Johan Eddy Luaran · Janudin Sardi
Anealka Aziz · Nor Aziah Alias *Editors*

Envisioning the Future of Online Learning

Selected Papers from the International Conference on e-Learning 2015

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Preface

These proceedings feature the selected papers presented at the International Conference on e-Learning 2015, held in Kota Kinabalu, Sabah, Malaysia. It features 41 papers which contributed to a wide range of current topics in e-Learning addressing a common theme, "Envisioning the Future of Online Learning".

Online learning is an undeniable part of teaching and learning and offers access and flexibility needed in today's driven world. Learning how to teach online probably would be one of the best steps an educator could take to assure viability in the twenty-first century; as such the most dysfunctional response by an educator today would be to dismiss or ignore both the technology and the social consequences online learning has on education.

Featuring the works of an international group of academicians and practitioners of online learning, experts in education and technology in education, this book offers many insightful ideas, experiences and strategies that will help educators better understand and address the challenges in this field.

Johan Eddy Luaran
Janudin Sardi
Anealka Aziz
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Contents

Chapter 1
iPad-Agogy: Expanding or Limiting Pedagogical Skills?

Jasmine Jain and Johan Eddy Luaran

Abstract The flooding of tablet computers in 2010 brought mobile learning (m-learning) to the lime light as it liberates users to the convenience of seamless learning. Extant researches have showed that m-learning offers the flexibility to access information and thus increase critical thinking among learners. The rise of Apple ecology with many revised models of iPad brought about empirical studies on its use on educational efficacy. However there is dearth of research in looking at it as a pedagogical tool. This research attempts to bring closer this gap by presenting an interesting outlook on how 11 final year pre service teachers of a Malaysian private university perceived the usefulness of iPad as a pedagogical tool. Taking case study as the framework for methodology, this research discovered both the perceived usefulness (four categories) and limitation of iPad (three categories) as a pedagogical tool. This study concludes with few recommendations on how iPads can be used to support the learning of pre service teachers and other students in higher learning institutions.

Keywords iPad · m-learning · Pre-service teachers

1.1 Introduction

Apple emerged as the leader in the field of tablet computer when the invention named iPad was introduced in 2010. iPad was then refined into more compact version and equipped with faster processor, more distinct displays, significantly

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differ in weight or size that resulted in iPad 2, iPad 3, iPad 4, iPad mini and iPad air. The use of the tablet computers has then spread through the educational sector, but with scarce empirical research to know about its effectiveness in the use of teaching and learning. This study intends to bridge the gap by studying the views of pre-service teachers who have experienced placement in school for three months as part of their teaching practicum.

1.2 The Context

Brand et al. (2010) explained the conceptual meaning of Mobile Learning as "learner and device mobility and flexibility, usually involving a mobile device and flexible user access to content and communication". The internet-enabled mobile computing devices explained by Brand et al. (2010) refers to mobile computers, personal digital assistance (PDA), tablet computers (including iPads), smartphones, personal media players and netbooks which are used in the context of teaching and learning. Three features of mobile learning are (a) portable, (b) technology driven and (c) connected classroom learning (Beetham and Sharpe 2007). These are the characteristics which differ mobile learning from the normal technology integrated classroom, where mobile learning liberates the teachers and students from stationary desktop computers and rooted internet connectivity. Many educators saw the immense benefits of mobile learning in delivering unique approaches to teaching and learning (Motiwalla 2007).

One of the benefits which are offered by mobile devices is the support it provides for learning based on social constructivism. It foregrounds the collaborative and communicative learning aspects which empowers the learners who are already the technological natives and users of Web 2.0 (Pegrum 2009). Teaching and learning approaches centred on the learners provides seamless learning opportunities which are extendable beyond formal setting of a classroom (Looi et al. 2010) and hence, cultivate a sense of a life-long and self-paced learning to the individual students.

In the Malaysia context, the use of iPad is slowly making its ways in transforming the teaching and learning landscape of higher educational institutions, consistent with the emphasis of blended learning-extending learning beyond the four-walled classrooms (Embi 2014). In the university of which the author is from, the policy of Bring Your Own Device (BYOD) was introduced since 2013 to encourage optimal educational uses of all these modern devices. In aiding such effort, the university is equipped with technological-equipped classrooms (Apple TV classroom and X-Space Classrooms) with high speed campus-wide internet facilities to complement the usage of the devices in the classroom.

1.3 Literature Review

While there is a consensus about the benefits of iPad usage in enhancing engagement in the classroom, how these devices aids in improving learning and achieving learning outcomes are not clearly stated in the literature (Pegrum et al. 2013). In the earlier study on the use of mobile learning devices, it was found that the devices are only used to support content transmission in the classroom which was found to complement the behaviourist's theory of learning (Patten et al. 2006). The study shows that there was a lack of pedagogical understanding of how iPad can be used to support teaching and learning, as opposed to be used only as a tool in replacing other conventional teaching aids.

However, there are small scale studies conducted worldwide that looked at the perspectives of teachers and students on the benefits and limitations of iPad usage in classrooms. In a qualitative study carried out by Franklin and Peng (2008) and Franklin et al. (2007), it was found that iPad in general was perceived as a device that is intrinsically engaging and provides significant evidences in students' learning. The study conducted by Pegrum et al. (2013) on pre service teachers in Australia was consistent with the global findings where they found that pre service teachers viewed iPad as beneficial in terms of developing understanding of content, developing understanding of pedagogy, staying connected and staying organized. However, the pre-service teachers also noted that iPad provides device limitation, time limitation and attitudinal limitation.

In the context of Malaysian Higher Educational Institutions, various efforts has been carried out to measure students' and lecturers' readiness on adopting blended learning in Malaysia. In a study conducted by Embi et al. (2014) on the readiness of teacher trainees in using blended learning, it was found that Malaysian teacher trainees have acceptable level of readiness and are ready as a whole to use this approach later in their teaching. Besides that, there is also a lot of other studies in Malaysia sharing about the increased participation and thinking skills with the use of university's Learning Management System, methods of flipping the classrooms, and the used of Web 2.0 tools in enhancing optimal learning environment (Luaran et al. 2014; Azhan and Saman 2014; Alsagoff et al. 2014). From the studies, it is apparent that the focus of researches in Malaysia is on the blended learning or the Virtual Learning environment. There is a lack in looking at how mobile devices are being perceived in terms of its pedagogical affordances by the pre service teachers.

1.4 The Research

This study investigates the pedagogical uses of mobile devices, specifically on the use of iPad among pre service teachers. Eleven pre-service teachers were included as the sample of this study and notably, they are the 11 that made up the first batch who were placed in a practicum school for three months from January to

March 2015. The setting of the practicum school in which they were placed in is a primary international school where most of the students in the school are from high-income families or expatriate families residing in Kuala Lumpur. The primary international school is currently running the International Primary Curriculum (IPC) originated from United Kingdom.

These pre service teachers have high level of familiarity with the iPad as this was the batch which received additional aids and the purchase of iPad was made compulsory for them when they registered into the programme. They were required to use their iPads during class throughout their 2-year program where the teaching and learning are highly centred on student-driven tasks. A pilot observation by the researcher prior to their placement in school saw that they used their iPads efficiently for note-taking, slides viewing, classroom presentation, collaborative work in a group (connected via Apple TV) and information search. As an extension of this observation, this research sought to understand how the pre service teachers perceive the use of iPads when it involve them teaching in the classroom. Using case study as research design, this research is governed by three research questions:

(a) How do the pre service teachers use iPad as a teaching tool?
(b) How do the pre service teachers perceive the benefits of iPad as a teaching tool?
(c) How do the pre service teachers perceive the limitation of iPad as a teaching tool?

The semi structured interview protocol used in this study comprised of 8 items adapted from Pegrum et al. (2013). All the 11 preservice teachers were interviewed for their views where each individual interview lasted for about 20–30 min. All the interview were recorded in audio and were transcribed. The transcripts were given back to the participants for member check and for further analysis. The categories emerged were also cross-checked with an expert in instructional technology as a triangulation effort to enhance the reliability of the findings.

1.5 Findings and Analysis

1.5.1 Demographic Details

The participants of this study are students who have enrolled in the Diploma in Primary Education program since August 2013 and have undergone their school practicum from January to March 2015. All of them aged between 19 and 20 years old in 2015 and have owned their iPads for at least 2 years. All of them admitted that they are frequent users of their iPad when asked about the rate of usage in their daily life. However, the responses differed when asked about their rate of iPad usage as part of a teaching tool. 3 out of 11 mentioned that they seldom use iPad as a teaching tool while Participant 9 said that she has never used iPad in her teaching.

1.5.2 The Use of iPad as a Teaching Tool

There were two major theme indicated by the participants about the use of iPad as their teaching tool. Firstly is for the preparation of the lesson and secondly is for the delivery of the lesson.

1.5.2.1 iPad Usage in Lesson Preparation

Majority of the participants regarded iPad as useful in preparing for any lesson during their practicum. Participant 1 mentioned: "*I use it more for preparation of my lesson…finding pictures, sending my mentor emails to confirm lesson plans, accessing Google Drive for teaching resources, researching lesson ideas- all done through my iPad.*"

Participant 3's response on the use of iPad was consistent with what Participant 1 has put forth. She agreed that iPad aids to "*prepare lesson resources and save it in Google Drive so that [she] can project its content on the interactive whiteboard in class*". Participant 4 similarly, indicated that it is convenient to view lesson plan through an iPad. He mentioned "*while waiting for food to be served, I can continue to do my lesson plan. I also always used iPad to search for online resources. It is easy to connect as it use lesser data.*"

Another participant, Participant 11, focuses on the note taking and resource-search on her iPad. She iterated that "*I use my iPad to jot down ideas about lesson plans. I also go on Pinterest to look for ideas from other users. Sometimes, I will look through the app store to explore educational apps as well.*"

1.5.2.2 iPad Usage in Lesson Delivery

There were only few responses with regards to the usage of iPad during classroom instruction. While a few of them regarded that iPads are helpful for delivery of a lesson, six out of 11 participants do not use iPad during their instruction. For those who did, they mentioned that iPad is useful as it provides evidences of learning.

Participant 1 mentioned that she used her iPad to "*take videos and pictures of the students' learning tasks*". Participant 2 on the other hand, use her iPad to show slideshows of pictures to her students while Participant 3 and participant 9 used it to open up lesson plan and view it in case she/he forgets the flow of a lesson. Participant 10 was supporting the use of iPad as a tool for lesson delivery. She mentioned

> The school smart board is connected to the computer, so the screen cannot be switched. I use iPad to open google docs to key in students' points which they earn in activities. After that, I can display the points the students earn on the screen. I also use it to search for information when I don't know something during the lesson and prevent the students from knowing that I don't know.

Based on the responses give above, it was found that the students do not have a seamless usage of iPad in the classroom during lesson delivery. They need to store information in cloud storage first through their iPad, and then only open the same file containing the information on the classroom desktop so that it can be projected to the whole class. Other than that, the participants also saw iPad as a good avenue for them to take to internet search about things they are not sure about, to gain confidence as a more knowledgeable others (MKO) in their students' eyes. In a way, the inability for iPad to be connected and projected onto the interactive whiteboard were rather a nuisance, but it allows the participants to double check their understanding when they are challenged by their students. It also enables them to double check with the lesson flow to ensure that they are covering all the suggested activities.

It is also interesting to note that although students are comfortable with using iPad for lesson preparation, many of them are still not sure about how to leverage on the device for lesson delivery.

1.5.3 The Perceived Benefit of iPad as a Pedagogical Tool

Based on the participants' responses on the advantages of iPad as a pedagogical tool, it was found that there are four common themes perceived by the participants, namely mobility, accessibility to information, providing teaching resources and providing evidences of learning.

1.5.3.1 Mobility

Due to the longer battery life and more compact design of iPad mini, the participants found that it is much more convenient than to bring an iPad as opposed to a laptop This is because they claimed that there is easy access to internet which is "*five times faster than a laptop*" (Participant 4) and saves a lot of time as they do not have to "*switch it on and off which usually takes up about 5 min as in the case of a laptop*" (Participant 8). Participant 7 was also congruent with the rest as she mentioned "*iPad is good for a school teacher because it is light. Teachers will leave their class when it is not their period or have some meetings at some other places. So, teachers could bring their iPad wherever they go as it is not that heavy compared to laptop*".

1.5.3.2 Accessibility to Information and Communication

The iPad is also viewed as a powerful tool that connects them with abundant information. Participant 11 mentioned "*the benefit of having iPad is a teacher can search information very quickly. This is because he or she does not need to wait for*

it to switch on as most of the time teacher will not switch off her iPad. For laptop, teacher might need some time to switch it on and thus, wastes students' time." Other than that, iPad is also viewed as helpful in communication among the staffs in school. They get synchronous update through email which is pushed into their iPad. Participant 4 clearly indicated this as "*the school used email a lot in communication*". Participant 6 on the other hand felt that iPad is useful for professional development of a teacher. She mentioned "*it's also very beneficial as we can use it to update ourselves through reading and searching for information online. The next thing that is convenient about it is the emailing apps really help to keep work organized*".

1.5.3.3 Provide Teaching Resources

As opposed to the category "accessibility to information", this category describes views that look at iPad as a way to retrieve shared lesson plans and examples of lesson activities. The views here centered on ideas like educational apps used especially for instructional tasks. For example, one of the participants mentioned that iPads can be used for students to play educational games. Participant 5 said: "*During class, teacher could use it for station games. For example, during numeracy class she can have online games station*". Participant 9 also agreed by saying that "*there is a lot of educational apps to choose from*".

1.5.3.4 Evidences of Learning

This category describes the use of iPads by the school pupils where they are allowed to use iPad for information search and experimentation. Only one participant noted response which is categorised under this category. Participant 1 mentioned "*the advantages of using iPads in class are obvious. They are a really easy tool for kids to do research on their projects with. They get to take pictures or videos to document their learning tasks, so that they can retrieve it later from YouTube.*"

1.5.4 The Perceived Limitations of iPad as a Pedagogical Tool

There were three distinctive themes found which reflected the limitations in the use of iPad as a pedagogical tool. The categories are device limitation, limited support-facility and attitudinal limitations.

1.5.4.1 Device Limitation

Device limitation describes the shortcomings of iPad felt by the participants as a pedagogical tool. All participants noted that the device should be invented to support Java plug-ins which is used in most educational websites. For example, Participant 5 said "*it does not support Java player. That's the major limitation!*" The rest of the responses noted that iPad does not have enough storage, limited keyboard size and the inability to connect to USB and read a CD. They felt that these are the drawbacks as many educational tools come in the form of CDs and external data storage like USB. Besides that, all participants also agree that iPads will work wonders if they are able to connect and display on the interactive whiteboard of the classroom. With the current form, they can only save their files in their cloud storage and retrieve it from the classroom desktop in order to project the files on the interactive whiteboard.

The comments made by the participants were consistent with what has been reviewed in the literature with regards to the concerns raised by educators on the app-based approaches to technologies (Anderson and Rainie 2012; McKenzie 2012). Despite the familiarity of the participants with iPad as their daily learning tool, they still find that the device has vast room of improvement, and admit that the hardware and software compatibilities made them resort to the usage of desktop in the classroom.

1.5.4.2 Limited Support Facilities

Under this category, the participant described that teaching and learning with the students would be more interactive and effective with the availability of Apple TV in school. This view is stemmed from their experience of using iPad for their learning on campus. Participant 9 mentioned:

> I think it CAN be a useful tool, but as of now it isn't really yet. for the iPad to be truly useful, the school would first have to install apple TV in each classroom so that the teacher can connect the iPad to the smart board via airplay. Right now, they can't. They are using VGA cables, and even if they do that, the smart board can only work as a projector screen.

Participant 9's view was congruent with Participant 7's opinion. He mentioned "*things that are on the iPad cannot be projected on the Smart Board unless it is an Apple TV*".

1.5.4.3 Attitudinal Limitation

This category describes the attitude of the senior teachers in the school who are not receptive towards the usage of iPad in the classroom. As this is not a popular view by the participants, there is only one of the participants who inferred this category. Participant 4 mentioned that "*my mentor who is senior doesn't like to use iPad as it*

is touch screen. Whenever I share my lesson plan with her, she becomes reluctant of the idea that I wanted to use iPad for my lesson. I was concerned with how she would evaluate me so I normally dismiss the idea of using my iPad".

While the category "attitudinal limitation" is similar with the category in the study conducted by Pegrum et al. (2013), the category found in this study are not the attitudinal limitations of the participants as reported in Pegrum et al. (2013), but rather on a limitation caused by other people who have conventional views about learning.

1.6 Discussion and Conclusion

One of the interesting findings that can be noted from this study is the vulnerability of the pre service teachers when they become teachers in classrooms. They are particularly worried about getting their lesson plan in a wrong sequence and hence the need to refer to the lesson plans in their iPad. Other than that, they were also worried about not being able to answer the students' questions during instructions and iPad can be used to look up for information quickly. These two also comprised the major reasons of how iPad is being used during the lesson delivery itself. It is also worth to note that the pre service teachers only optimized the used of iPad to prepare for classroom lesson and not during the lesson itself.

The limitation of iPad listed by the students which are categorized into device limitation, limited support facilities available and attitudinal limitation infer to us why the usage of iPad in the classroom is not encouraging. There is a need to study how teaching and learning can be maximized with the use of iPad enabled and Apple TV connectivity in the school. Despite the clear limitations laid out by the students, the overall experience of iPad usage as teachers was encouraging as it allows seamless connectivity to the information needed for instructional materials. The participants recognized iPads as a tool that expands their pedagogical skills in the way that it assists them in planning for a lesson. The iPads also helped to bring to focus few key ideas of 21st century learning in the explanation given by the pre service teachers such as collaboration, materials and team work and in turn, develop their understanding on their pedagogical skills.

Research such as this which looks into mobile learning and specifically on iPad in discovering the potential of tablet computers in education is an exciting and emerging domain area. As the future researches take on to look at the continual growth in teaching and learning, the relationship between technologies, pedagogy and content have to be made clear for the teachers in training. This study recommends an idea that the teaching and learning at the teacher preparatory program should not just teach future teachers how to use technology for their learning, but also to use technology in optimizing teaching and learning. Lecturers should explicitly provide input on how iPad can be used pedagogically and use to engage students in a reflective manner. As many more version of iPads and tablet computers are making their way into the educational landscape, educators should focus

on how the usage if such tools can foster critical and reflective skills among pre-service teachers so that they can go on and transfer such skills to the future generation, enabled by the use of technology.

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Chapter 2
Understanding Teacher Educators' Beliefs and Use of Information and Communication Technologies in Teacher Training Institute

Mei Lick Cheok, Su Luan Wong, Ahmad Fauzi Mohd Ayub and Rosnaini Mahmud

Abstract Technological competencies for teacher educators cannot be developed without consideration of an array of factors that impact the teaching and learning processes. This paper presents successful experiences and problems associated with the use of Information and Communication Technologies (ICT) as perceived by five teacher trainers. As realities indicate that there are significant barriers to the effective use of technology, the complex and less visible space of teacher trainers' must be addressed and understood. By understanding teacher trainers' beliefs and use, we can better design Continuous Professional Development (CPD) programmes plus other support system deemed necessary. Factors that both stimulate and obstruct will be discussed in this case study carried out in a Teacher Training Institute. Results among others highlight the need for technology environment that allows for learning and growth.

Keywords Teacher educator · ICT · Focus group

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2.1 Introduction

In 2011, the Malaysian Ministry of Education had launched the 1BestariNet programme which was aimed at providing all the government schools with high-speed internet connectivity, Chromebooks and a virtual learning environment; the FROG VLE. This is one of the initiatives stressed in the Malaysian Education Blueprint 2013–2025 which is to increase ICT usage in the classroom in order to improve the quality of teaching and learning. Though the FROG VLE has been purchased with the hope of realising many high expectations, the teachers have not seemed to embrace them as enthusiastically. A report made by the Auditor's General (2013) found that less than 5 % of Malaysian teachers make daily use of the VLE provided. With over RM6 million spent to date on ICT initiatives in schools, reasons for such poor usage have to be brought to the surface and problems rectified. Despite the large expenditures, increased access and active usage of technology among students and teachers, the extent to which technology is being used in the teaching and learning is questionable. Russell et al. (2003) have pointed out the need for teacher education and professional development programmes to allocate effective modelling and sufficient time for teachers to be able to use technology to transform teaching and learning. Teacher educators (TEs) should provide preservice teachers with opportunities to see them modelling the use of ICT in their training rooms. Teacher Education has to reflect what is going on in the field of practice (Krumsvik 2014).

This study acts as a platform for TEs specifically those who are training student teachers at the Teacher Training Institute to voice their opinions and concerns which would then lead to more specific solutions to the myriad of challenges that our Malaysian teachers are facing now. This paper sought to understand TEs' beliefs of the ICT and thus their usage. By understanding and improving TEs conditions and better use of the ICT, we could see the ripple effect of this on our future teachers in schools.

2.1.1 Teacher Educator Beliefs of Information Communication Technologies (ICT)

If TEs do not believe that the technologies can offer help to translate their pedagogical models and vision, then they may use the technology minimally. As many of them have had little or no experience of learning in a technology enabled classroom, it may be challenging for them to design learning integrated with technologies. They need to believe that the use of the ICT will lead them to good teaching and learning outcome. TEs technology use in this context refers to their use of technology for preparation, delivery, teacher-directed student use and work-related e-mailing and recording grades. This is adapted from Russell et al. (2003) distinction of factors which relates to teacher technology use.

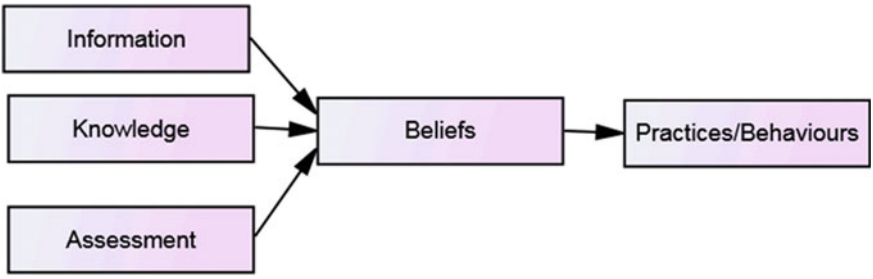

Fig. 2.1 Significance of beliefs on teacher educators behaviour towards ICT Use

Lewis et al. (2003) proposed TEs' beliefs are formed with the influence of institutional, social and individual factors. The conceptual framework of this study proposed after aspects like information, knowledge and individual assessment of a particular technology have been collected, processed and synthesised, it then has an impact on teachers subsequent behaviour and practices. It influences their course of action i.e. technology use. Given the tacit nature of beliefs, it is quite a challenge to know their beliefs. However, to know these beliefs can provide insights into how they reconcile and translate their beliefs in a technology rich environment. This knowledge will also be relevant when planning continuous professional development courses as some beliefs can then be readjusted and modified accordingly (Fig. 2.1).

If the trainers do not believe ICT can help translate their pedagogical model and vision, then they will use the technology minimally. As the TEs themselves have had very little experience of learning in a technology-enabled setting, therefore it will be difficult for them to form the beliefs that learning with technologies can be more effective (Steel and Levy 2009).

2.2 Research Purpose and Questions

The recent nationwide adoption of e-learning into all Malaysian government-aided schools require teachers to use the technology to facilitate student learning. However, recent report (Auditor General Report 2013) that shows lack of ICT usage among the teachers. Teacher Education has to meet the challenge of increasing ICT usage among their student teachers as the future teachers in the schools. The primary aim of this study is to understand teacher educators beliefs regarding their technology usage in the teaching and learning. It also provides room for them to define what makes technology integration meaningful for them and if their beliefs and practices are aligned and if not why? This study would provide beneficial insights into contextual factors that influence teacher educators' beliefs and technology usage. Aspects that encouraged or hindered teachers would be

better understood and specific strategies to further increase usage can then be planned and implemented. This study was designed to visit two questions:

1. How do beliefs and technology uses align?
2. To what extent external factors constrain teachers' integration efforts?

2.3 Methodology

As qualitative research allows one to examine human behaviour in the social, cultural and political contexts in which they occur, this method is chosen for this study. A qualitative's researcher's aim is more interested in the contents of an interviewee's speech than in the number of times a particular comment is made (Salkind 2014).

2.3.1 Sample

The participants were purposively identified as they were recommended by their heads of department based on their more frequent usage of the ICT as compared to the others in their department. Purposive sampling means they were selected based on certain criteria the researcher had in mind (Airasian et al. 2000). Five TEs from a teaching institute were gathered with the intention of gathering their opinions and perceptions towards the use of the learning management system in their classrooms. There are three females and two male trainers with age ranging from 59 years old the oldest and 41 being the youngest. Only one of them has a Ph.D. and one with a basic degree while the other three have a Masters degree. To date all the TEs have had more than five years of teaching at the Teacher Training Institute. Pseudonyms were assigned to each teacher educator (Aron, Bob, Chris, Denise, and Eve).

2.3.2 Data Collection

The source of data in this study came from a focus group interview. This is an approach where a large number of people were gathered in order to obtain information from them in a relatively short time (Salkind 2014). It can also generate insights into topics that were previously not understood. Focus group helps the researcher to understand how members of the group arrive at their conclusions. Having participants voice out their thought processes can help the researcher to dissect each individual's motivation and determine critical steps along the way towards deciding what is truly important to the members of the group. The other

pertinent reason for choosing the focus group approach is that it also encourages group interaction which helps to bring various viewpoints together in a way that individual interviews do not. Sometimes a question requires more than a person's input to answer it. It is a productive way to research a question but its success to a large extent depends on the ability of the researcher as the facilitator to keep the group focus on the topic discussed. Open-ended survey were also given to the trainers in addition to the focus group interaction. This is to ensure more personal thoughtful thoughts are collected individually.

2.3.3 Data Analysis

Data were triangulated across the data sources and analysed for emerging patterns and trends using constant comparative analysis (Miles and Huberman 1984). The researchers read and reread recorded interview transcripts, open-ended surveys and notes written by the researchers. Coding involved looking for patterns and emerging categories (Patton 1999). Hooper and Rieber's (1995) five phases of technology use were adopted in order to explain the trainers' usage of ICT. These five phases include familiarisation, utilisation, integration, reorientation and evolution.

2.4 Interpretation of Answers

This section presents some of the data gleaned from the five participants that are specific to their beliefs, their pedagogical and disciplinary visions of technology use. Most participants spoke at length to convey their beliefs that underpinned their practices in ICT. While their pedagogical beliefs varied in depth and complexities, they do however agree that ICT use in the classroom was necessary in order to offer quality learning experiences.

Aron

Aron, in the discipline of social sciences believes ICT does help to reduce the cost of teaching and learning. It increases one's productivity and quality of work. A greater impact on the teaching and learning outcome could be achieved as opposed to without the technology. A variety of instructional tools and approaches make teaching more exciting for him. He also believes that ICT made it easier to interact with his students where it was less intimidating through the virtual space as compared to the large lecture halls. Aron has no problem integrating ICT in his lessons, and in fact he found them easy to use with freedom for him to choose the time and place to work. Aron believes ICT,

> … is a powerful enabler which turns teaching and learning into magic.

One area where he had benefitted greatly was when he was involved training the inservice teachers under the SmartSchool programme. He opined that the continuous professional development programmes plus the need to have to immediately put that knowledge and skill into use have helped him to become more comfortable with ICT integration. To Aron, having access to the internet and peers who can help him troubleshoot are the two most important factors that will help him to continuously use ICT effectively. There is no short cut to be able to use ICT effectively, practice is the key. However, for the general teacher educator population, Aron feels that providing basic knowledge in various areas of ICT continuously will help them to accept, understand and apply ICT in their course of work. When asked about aspects that hindered his progress, he mentioned limited facilities; limited access to the internet, lack of LCD in the classrooms and lack of interest and knowledge on cloud computing among other TEs.

Ben

Ben from the educational technology department believes that ICT adds variety to his teaching and learning and in the process helped improve both the teachers' and students' skills. Through the visuals and sound effects, students will have better understanding of the content taught. In fact, Ben had abandoned formal lectures in favour of the more interactive learning management system (LMS) available in the institute. He finds the LMS made his work easier especially in terms of storing and retrieving materials and resources. These could then be easily edited and updated according to the needs of the syllabus or students. To him

> … ICT helps in my teaching and learning as it improves understanding, makes it easier for students to remember the lessons and made the whole process interesting and fun. It also stimulates various senses; catering to students unique learning styles.

He stressed the most important aspect of the ICT is its ability to retain students' attention towards the lesson being presented. He felt that students were more interested and focused.

Chris

Chris is from the language department. He finds ICT makes his work easier especially when it comes to locating information and increasing the amount of interaction with his students. As a language lab is available, Chris sets enrichment tasks for his students. However, he admits that he needed to have more training in learning to integrate the ICT tools. Hopefully with better skills, he will be able to use it more frequently in his lessons. Some of the setbacks mentioned include time and the maintenance of facilities. In future he hopes to set tasks which include ICT elements. At present he is not able to do this without sufficient confidence in his ability. He says

> …students enjoy sessions which included technology.

Knowing that his students must be exposed to ways of teaching with technology during their formal teacher preparation training, he hopes the Teacher Training Institute to be restructured in order to fully support the ICT integration during

instruction. As a trainer he is aware of his lack of knowledge and skills, and he is hoping for more CPD courses to help him be more competent in ICT integration.

Denise

Denise who is also from the language department feels that though ICT is important, it can never replace a teacher's presence. She uses ICT when she feels it does not burden anyone. If it does, then she will not use it. Teaching and learning are more fun and meaningful with the variety of resources and media available. Being confident in her abilities, she uses a variety of web 2.0 tools in her lessons. She finds them most helpful in drawing and maintaining attention. Though Denise expects more tools to be available for the trainers, she also stresses on the importance of training before they can be expected to use them. Only with sufficient understanding of how technology can be integrated into regular classroom instructional practices, can increased usage be expected. Her motivation to use ICT mostly comes from her reading of journal articles. As a member of the Mobile Learning Association, she has more opportunities to attend short CPD courses. To her,

> … management, colleaques and learners need to support ICT integration or it won't work.

She feels technology is still undersused as an instructional tool by her colleagues. She used smartphones mostly as they are more convenient for her students. In terms of language teaching, she hopes to use more phone apps in the future.

Eve

Eve from the religious department agrees that ICT is needed in the present time. She said as student teachers are inspired by the instant new knowledge and ideas available through the internet, they are more willing to take charge of their studies. She uses lots of YouTube and Google Search as they offer loads of flexibility and resources. ICT has changed her pedagogical practices where she is more of a facilitator now. It has made her teaching more effective. However, the use of ICT will need to depend on the curriculum requirements and assignment needs as to her at the end of the day, these matters most. Use will need to consider the topics taught and the questions needed to be answered. In terms of support, Eve appreciates the CPD courses available and the technical and the interdepartmental support between her department and the ICT's. So even when she is not not fully confident in her skills, as an experienced TE, she could still handle most short courses dealing with some usage of ICT. To Eve,

> … accessibility to sufficient resources is an encouraging determinant in choosing to use ICT in the classrooms. The training plus the resources such as modules given out during training, has enabled me to practise using the tools systematically and correctly.

When asked about factors which hinder her in her use of the ICT, Eve mentioned time to complete the syllabus and accessibility to resources and technical help. With time, Eve hopes she will be more competent and with that her ICT integration in the classroom would translate into meaningful and joyful learning with active participation from her students.

Table 2.1 Teacher educators' stage of technology use in education

Familiarisation (learning to use)	**Utilisation** (still trying)	**Integration** (using it for certain tasks)	**Reorientation** (focus now on student learning)	**Evolution** (continues to evolve and adapt)
~~Aron~~ →	~~Aron~~ →	~~Aron~~ →	~~Aron~~ →	Aron
~~Ben~~ →	~~Ben~~ →	~~Ben~~ →	Ben	
~~Denise~~ →	~~Denise~~ →	~~Denise~~ →	Denise	
~~Chris~~ →	~~Chris~~ →	Chris		
~~Eve~~ →	~~Eve~~ →	Eve		

2.4.1 Teacher Educators Use of Technology

The terms used to describe the five levels of technology use in the teaching and learning were taken from Hooper and Rieber (1995). A table was drawn to characterise the five educators stage of technology use (refer Table 2.1). They were defined on the basis of the relationship between their technology use and the reasons underlying those usage.

Evolution: Based on the interviews and the open-ended survey responses, the researchers categorised only one of the TE at the evolution stage. Aron majored in educational technology at the university and has been evolving and adopting himself to technology. He has since been placed at the ICT department to help training fellow TEs and student teachers with various technological tools. He has been involved in a number of national ICT projects, preparing training modules and training other trainers. These involvement had made him confident in using technology. He is considered the expert at his workplace. He utilises many different technologies and strongly advocates the use of ICT as he believes students are trained to be independent learners with technology. At this stage, educator are most likely to be using technology's diversifying abilities to address their students' needs. Student-centred strategies are in alignment with their beliefs about the ideal technology use (Mama and Hennessy 2013).

Reorientation: The two TEs in the reorientation stage seemed to scaffold the content by using technology. Ben being a senior TE has a better understanding of the content and technology needed for his student teachers. He seems to be continually updating his knowledge and skills by trying out new tools in his teaching and learning. It is a routine to use ICT in his classes. He believes ICT facilitates his students' understanding of the content taught better than he could ever do without the help of the ICT. Denise on the other hand, after having completed her studies and joining the Teacher Education recently, has a number of handy strategies up her sleeves. Her main interest is in using the smartphones to capture students attention and interest even after classroom hours. Through her modeling the use, students are exposed to a variety of technologies. They have expressed their desire to further explore the potentials of technology. Here educators are mostly restricted by their insufficient ICT competency.

Integration: Chris and Eve were similar in their use of technology in that they were the disseminators of knowledge whereby both used technology to present the knowledge they found to be important. The educators emphasised retrieval of information. Students are mostly looking for new ideas and knowledge from the internet in order to complete tasks set by them. The TEs build their class delivery mostly through PowerPoint. The LCD projector is a must have tool in their classrooms. They mentioned that they felt limited in their lessons by the assignments and syllabus requirements imposed by the centralised curriculum. However, the limitation of the technology usage was also imposed by their own limited competency. Despite their extensive use of technology at home, their usage of the technology in their lessons were limited to routine level of use; the LCD projector and powerpoint slides. The use was mostly to enhance their traditional existing practices, which corresponds with an stage of pedagogical stage using ICT (Petko 2012).

2.5 Practical Implications

Results indicated some diversity of beliefs, and practices in ICT use. Chris and Eve seemed quite satisfied with their use of their ICT tools, others seemed to want to move on to better use. Technology factors which constrained their use, thus their vision of teaching and learning. Mismatch between what they hope to do and what they can actually do remained clear. All four except for Aron, appreciate more training, more technical help and better facilities that support ICT use in the classrooms. To help the TEs move to higher levels of usage, professional development trainings that align with teachers' beliefs and existing instructional approaches will make technology infusion more possible (Ottenbreit-Leftwich et al. 2010). Wright and Wilson (2011) proposed an ongoing CPD that utilize interactive, online technologies and promote ongoing dialogue and dissemination of ideas.

Perhaps to completely expect all barriers removed before one can start using the technology is a far-fetched dream. According to Ertmer et al. (2012), even among award-winning teachers barriers like lack of resources, lack of support, and curriculum constraint still exist. Technology has to be seen as a partner, not an add-on in our teaching and learning. What Denise is doing, developing methods of using the emerging technologies of today; the smartphones is an encouraging move. TEs should no longer be kept alone and lonely in their training room; discussions as to how, when and why technologies are used or not used will encourage manifestation of ideas beyond current practices. The fact that student teachers in Malaysia will be asked to integrate ICT especially with the recent implementation of the e-learning in all schools, call for a greater need of preparing them to be digitally competent upon graduation. This is to prevent new teachers from having to spend a great deal of time and energy enhancing their digital competence when starting out as teachers in schools (Kirschner and Davis 2003).

One motivating aspect in this study is the fact that TEs realised the benefits and impact of technologies on their student teachers. But are TEs equipped to teach with

ICT is somewhat unclear. The relationship between TEs comfort with technology, beliefs about technology and professional uses of technology need close examination before any solutions to enhance TEs ability to use technology in the classroom can be proposed. At present, the fact remains that we are still in the situation where TEs lack sufficient digital competence, thus use. Computers are generally underused at all levels of education and they have not penetrated teachers' instructional practices and the school culture. We are assumed to have the necessary digital competence and sufficient facilities at the Teacher Training Institute. Kirschner et al. (2008) suggest getting the digital inhabitants; the student teachers to contribute their knowledge base on the use of ICT while teachers contribute their knowledge of teaching and learning praxis. A clear pedagogical framework for TEs digital competence and student teachers practices in teacher education as well as the requirements that they will have to meet in digitized schools as new teachers may help improve the teaching and learning in Teacher Education in general.

2.6 Conclusion

Although this was only a small sample, the cases illuminated some challenges that TEs try to reconcile as they work their beliefs into the ICT support classrooms. Teachers' beliefs about the importance of technology for teaching seem to predict their frequency of usage in the classroom. Perhaps if we are able to provide evidence to teachers that by adopting more technology in their lessons, they will reap better learning outcomes, we can influence more teachers to change their beliefs and practices. TEs practices are diverse and complex; yet they must be acknowledged and accommodated. Professional development and resource acquisition seem to be TEs main factors which will either hinder or support their continued use of technology. TEs as digital immigrants should be willing to accept the challenges of having to weave technology constructively into their teaching and learning. How the pedagogical use of ICT will be implemented by the TEs will largely depend on how digitally competent they are. Shifting our student teachers beliefs by exposing them to uses of technologies will help them to enhance their instructional uses of technology. It is time to bridge the gap between the actual school settings now and the teacher training.

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Chapter 3
Employing Websites in Language Learning for Tourism Purpose Among Arabic Learners at the MARA Poly-Tech College (KPTM)

Mohammad Taufiq Abdul Ghani, Wan Ab Aziz Wan Daud and Muhammad Sabri Sahrir

Abstract This paper examines the effectiveness of using websites in learning Arabic language for tourism purposes at the Department of General Studies, MARA Poly-Tech College (KPTM), Kelantan Darul Naim, Malaysia. This descriptive study sheds light on the issues in learning Arabic for specific purposes and analyzes the effectiveness of employing websites as the main tool in learning activities. This data was collected through a questionnaire survey and observation of the Basic Arabic Course for Tourism and Hospitality (HFA-1023) among 43 students who have registered and undergone the course for one semester in 2015. Descriptive quantitative analysis was used to analyze the data by using IBM SPSS statistical software. In general, the findings show that the use of a websites in learning the Arabic language for the purpose of tourism is effective among learners, and it provides good and proactive support for students in learning a language for specific purposes.

Keywords Arabic for tourism purpose · Higher learning institution · Language for specific purpose · Tourism · Web-based learning

3.1 Introduction

Education is not merely to enable a student to read, but to be able to think in a rational manner, engage in knowledge-seeking and ensuring survival in the modern world. To achieve these objectives, teaching and learning methods must be innovative and effective for the students of this digital era (Nawi 2014). Using websites

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as the main tool in learning is one of the effective methods and has become common in education today. The usage of websites in the teaching and learning process is not meant to replace teachers but to create a more enjoyable, effective and meaningful atmosphere of teaching and learning for the students (Hassan 2005).

The use of websites as a form of computer-assisted language learning (CALL) learning tool in teaching and learning activities has grown rapidly in almost all parts of the world. The use of World Wide Web technology, in particular, has significantly increased the power of computer-assisted language learning by allowing learners to open up and discover their own learning process (Son 2008). In the field of medicine for instance, among the advantages of web-based learning (WBL) in education are overcoming barriers of distance and time, economies of scale, and novel instructional methods, while disadvantages include social isolation, up-front costs, and technical problems (Cook 2007).

However, the lack of instructional tools, especially in Arabic language learning is still discussed among many researchers in attempts improve the situation based on several major issues. Arabic language learning is described as following the trend rather innovating new technologies, (Ghalib 2006). The existence of few computer-based instructional aids in teaching and learning Arabic has been found to be affected by various factors such as: preference in using traditional and non-computer instructional aids among teachers, poor computer literacy (Ismail 2008), poor computer skills (Ghalib 2000) and lack of computer training (Aladdin et al. 2004). In the field of teaching Arabic for specific purposes, it is suggested that the teaching process for the Arabic language be changed and transformed in order to equip students with Arabic communication skills to be used for tourism purpose as well as fulfilling the needs of Arab tourists (Samah 2007).

3.2 Language for Specific Purposes

Waters (2001) summarized the concept of the term language for special purposes as "*an approach to language teaching in which all decisions as to content and method are based on the learner's reason for learning*". Therefore, focus on the learners' needs became equally paramount as the methods employed to disseminate linguistic knowledge. Designing specific courses to better meet these individual needs was a natural extension of this thinking.

In recognizing the importance of the Arabic language to the global community, some researchers have taken steps to study this particular area of language which then shows the relevance of Arabic studies for private purposes (Chik 1988). The interest in the development of language for special purposes had begun to emerge in a new form in the last century, specifically in the sixties, when a group of specialists in applied linguistics analyzed different languages for different specialization fields.

They found that each vocabulary, rules and methods differ from one field to another. The complexity of language for special purposes in multiple fields depends on the specialization of the students. There are language academies for various purposes, namely: professional, religious, commercial, medical, scientific, legal, and media, including all educational and professional fields (Chik 2007).

Based on Jaafar (2013), there are (3) three types of ASP:

- Arabic Language for Professional Purposes
- Arabic language for Academic Purposes
- Arabic with specific topics

Additionally, Muhammad Najib Jaffar has mentioned that there is no clear-cut distinction between Arabic for Academic Purposes and Arabic for Occupational Purposes where people can work and study simultaneously; it is also likely that in many cases the language learned for immediate use in a study environment will be used later when the student takes up or returns to a job (Jaafar 2013).

3.3 Web-Based Learning in Language for Specific Purposes

There are many studies that have been conducted to measure the effectiveness of websites as tools in teaching and learning. For instance, (Hong et al. 2003) found that the majority of the students were satisfied with their web-based learning experience, achieving comparable learning outcomes as demonstrated through face-to-face instruction. Previous research have shown that the teaching of foreign language with good material, decent methodology and significant practice are the key ingredients for success and it has been proven that information and communications technology (ICT) does support these three crucial factors (Martinez 2010).

Moreover, Samah (2007) has mentioned the importance of using the internet as learning aid for teaching Arabic Language to assist students in their language acquisition, especially in the learning of Arabic language for specific purposes, specifically by using websites. Hence, the learning process will be more attractive, comprehensive and motivating for Arabic language learners. However, the use of technology in learning Arabic language for specific purposes, especially in Malaysia, is still in need for further research, development and improvement. The current trend of studies are still more inclined to stress on theoretical aspects rather than practical aspects. Thus, this paper aims at examining the employment of websites as a learning tool among Arabic language learners at the MARA Poly-Tech College (KPTM) for tourism purposes to measure their motivation in using web-based learning as a platform.

3.4 Methodology

The descriptive study method was used to measure the effectiveness of using websites in teaching and learning Arabic for tourism purposes. The effectiveness of web-based learning is measured based on learners' satisfaction and motivation in using websites by distributing a questionnaire and an observation among 43 students in an Arabic course of Elementary Arabic for Tourism and Hospitality (*Bahasa Arab Asas Untuk Pelancongan Dan Hospitaliti*)—HFA-1023. All of the students were aged between 19 and 21 years old. A set of questionnaires was distributed to them at the end of semester after they have taken the course for a semester. Descriptive quantitative analysis was used to analyze the data collected by using IBM SPSS statistical software.

3.5 Results and Findings

The aim of this survey is to measure the effectiveness of using websites in learning Arabic for tourism purposes at the MARA Poly-Tech College (KPTM). The results and findings of this paper are as shown below:

(a) Item 1: This question investigates the desire of the students to use websites in for daily learning purposes.
Table 3.1 shows that 100 % students preferred to use websites for learning purposes.

(b) Item 2: This question measures the efficacy of websites in serving the respondents.
Table 3.2 shows that using websites to learn Arabic for tourism purposes is very practical based on the high percentage of agreement (81.4 %) and strong agreement (11.6 %).

(c) Item 3: This question measures the effectiveness of websites in serving the respondent for long term studies.
Table 3.3 shows 79 % of the students agreeing that websites work for study purposes in the long term, while 20.9 % of the students were unsure whether websites would work in their studies for the long term or otherwise. Overall, it

Table 3.1 Preference to using websites for learning purpose

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	0 (0 %)	0 (0 %)	37 (86 %)	6 (14 %)

Table 3.2 The effectiveness of website for students

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	0 (0 %)	3 (7.0 %)	35 (81.4 %)	5 (11.6 %)

shows that websites can help them engage in study and activities for a longer period of time.

(d) Item 4: This question gauges the extent that websites help the students learn new terms in their area of study.
Table 3.4 indicates that 79.1 % of the students agreed that they have acquired new Arabic terms related to tourism from surfing Arabic websites. The finding suggests that Arabic websites are very helpful for students to acquire new Arabic terms easily.

(e) Item 5: This item examines the impact of using websites towards the students in their learning activities.
Table 3.5 shows that Arabic websites encourage the students to learn Arabic in a foreign environment. It was found that 62.8 % of the students agreed that they are encouraged to learn Arabic language in a foreign environment, while 4.7 % disagreed.

(f) Item 6: This question measures the effectiveness of websites in helping the students achieve their aim in studies.
As illustrated in the Table 3.6 above, 60.5 % of students felt that they have achieved their goals in learning Arabic through the use of websites. The result has found that generally, websites help students to reach their objective in learning Arabic for the purpose of tourism.

(g) Item 7: This item examines how frequent students surf the websites for the purpose of learning.
As shown in Table 3.7, 53.5 % of the learners used websites in their learning activities, while in contrast 9.3 % of students still used books and written notes. The conclusion is that most students often used websites to engage in

Table 3.3 The use of websites for studying long term

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	0 (0 %)	9 (20.9 %)	25 (58.2 %)	9 (20.9 %)

Table 3.4 Acquiring new Arabic terms for tourism purposes

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	1 (2.3 %)	8 (18.6 %)	30 (69.8 %)	4 (9.3 %)

Table 3.5 Encouraging learners to learn Arabic language in a foreign environment

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	2 (4.7 %)	14 (32.6 %)	22 (51.2 %)	5 (11.6 %)

Table 3.6 Achieving learning objectives

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	1 (2.3 %)	16 (37.2 %)	24 (55.8 %)	2 (4.7 %)

Table 3.7 Frequency of using web-based learning to learn Arabic

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	4 (9.3 %)	16 (37.2 %)	19 (44.2 %)	4 (9.3 %)

Table 3.8 Web-based learning is helpful

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	0 (0 %)	7 (16.3 %)	30 (69.8 %)	6 (14 %)

learning activities and shows that students enjoy learning Arabic through websites.

(h) Item 8: This question gauges the advantages of using websites to solve students' problems in learning the Arabic language.
The result shows that 83.8 % of the students found websites to be very helpful for them in solving their problems in learning the language. Most of students were observed to be using online dictionaries to find definitions of Arabic words (Table 3.8).

(i) Item 9: This question measures the students' level of enjoyment in learning Arabic through websites.
Table 3.9 indicates that 67.5 % of the students enjoyed learning Arabic language through websites because information is easy to access from their gadgets such as laptops and mobile phones.

(j) Item 10: This question measures the students' level of enjoyment in web-based Arabic language learning for the purpose of tourism.
Table 3.10 shows that the majority of the students (83.7 %) agreed that learning Arabic for the purpose of tourism is interesting and is beneficial to them. Moreover, learning Arabic language through websites can motivate them due to the easier learning process.

(k) Item 11: This question measures the students' level of motivation through web-based Arabic language learning for the purpose of tourism.
Table 3.11 exhibits a high percentage of students or 74.4 % who were motivated in learning Arabic for tourism purpose through websites.

Table 3.9 Web-based learning is enjoyable

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	1 (2.3 %)	13 (30.2 %)	23 (53.5 %)	6 (14 %)

Table 3.10 Web-based learning is attractive

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	1 (2.3 %)	6 (14.0 %)	31 (72.1 %)	5 (11.6 %)

Table 3.11 Web-based learning is motivating

Strongly disagree	Disagree	Somehow	Agree	Strongly agree
0 (0 %)	1 (2.3 %)	10 (23.3 %)	29 (67.4 %)	3 (7.0 %)

Overall, based on the previous discussions and results, the Arabic language learners at MARA Poly-Tech College (KPTM) show promising acceptance towards employing websites as a platform of learning Arabic for tourism purposes. Moreover, most of the students stated that learning Arabic language through websites makes the process easier and shortens the time spent as they are able to get the latest information easily from websites. Furthermore, they can learn Arabic language inside and outside classroom. By using websites to learn the Arabic language, students also acquire new vocabulary easily. It also allows students to practice their language skills by watching and listening to arabic short videos on websites.

On the other hand, learning through websites also has negative impacts on students. Most of the students stated that there are a lot of words in Arabic websites without punctuation marks that affect the pronunciation of the words among the students. Even though the students utilize websites in learning, they still need guidance from teachers to ensure clarity and understanding throughout the process.

3.6 Conclusion

The result of this study indicates that learning Arabic language for the purposes of tourism through websites has many positive impacts, keeping in pace with contemporary life. Therefore, we should intensify the study of the Arabic language for the purposes of tourism through websites in ways that benefits the fields of learning and teaching. This can be done based on the findings of the study which analyze the effectiveness of using websites in learning the Arabic language. Besides that, websites significantly contribute towards motivating the students to learn Arabic in terms of acquiring vocabulary, improving language skills and gaining information especially in foreign environments. The effectiveness of websites can be scrutinized in terms of its ability to expand upon language skills taught in the conventional classroom. For the development and implementation of effective learning using websites, students need to become more active and critical to develop their own skills in the learning process.

It is recommended that further research to be explored to design teaching material utilizing websites in learning the Arabic language for the purpose of tourism at MARA Poly-Tech College which will improve the students' understanding and knowledge.

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Chapter 4
The Nature of Student Group Online Interactions in Learning ICT Education

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Abstract This study investigated the nature of student group interactions through the incorporation of online collaborative learning (OCL) initiative, with its aim to enhance students' learning in a Malaysian tertiary multimedia and ICT education course. Data collected from questionnaires, interviews and online forum transcripts were the basis for an interpretive analysis of students' interactions in online collaborative learning and to assess the extent to which it was successful in enhancing students' learning. The results showed four types of student group interactions styles: strategic, task directed, peripheral and disengaged which in support of the students' cognitive, social and emotional development. The research also found that the incorporation of online collaborative learning can lead to the facilitation of the student and student's group learning process and potential constraints from the technology or the lack of social and verbal cues can lead to different working methods of communication and different styles of interactions and student's engagement.

Keywords CSCL · e-Learning · ICT education · Online learning

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4.1 Introduction

The use of online learning in Malaysian Higher Education Institutions (HEIs), either in public or private universities to support conventional teaching approaches or as a teaching medium for long-distance or off-campus studies, has increased tremendously in recent years (Aris et al. 2006; Embi 2011; Goi and Ng 2009). Online learning has been identified as one of the Critical Agenda Projects (CAP) and a Key Result Area (KRA) of the Ministry of Higher Education Malaysia (MOHE) as a result of the National Higher Education Strategic Plan (PSPTN); the latter translates the direction of national higher education for the future and focuses on the development of quality human and intellectual capital, and the country's aspirations to become a developed, prosperous, and competitive nation (Embi 2011). Although online learning has been used in Malaysian HEIs since 2000, the use of online learning in Malaysian tertiary classrooms is still growing, specifically in the area of tertiary teaching and learning. More efforts on practice and research are required to enhance and stimulate e-Learning activities in Malaysian tertiary education and to "tackle the digital natives" (Embi 2011, p. 98). Reported research advocates a move in online learning away from the typical teacher-centred model towards a student-centred one in which social collaboration among students is encouraged (Aris et al. 2006; Shaharuddin et al. 2012). Such an approach that promotes a student-centred learning model is collaborative learning, which has been considered an effective instructional method in both traditional and distance learning environments (Johnson and Johnson 2009; So and Brush 2008; Miyake 2007). Current Computer Supported Collaborative Learning (CSCL) research has also regarded collaborative learning as a popular type of learning that promotes learning as a social process (Miyake 2007; Harasim 2012). Online collaborative learning, which is supported by the Internet and network technologies, provides the space for creating online communities that allow learners to participate in social learning activities and build socially shared expertise (Häkkinen et al. 2004). Hence, this reduces the loneliness of learning and working in isolation in an online environment, which may affect learner's satisfaction and learning outcomes within online courses (Palloff and Pratt 2005; Harasim 2012). In online collaborative learning, it is important for the students to own their knowledge, rather than the teacher or the textbook, so that they can become committed in the process of knowledge construction, rather than merely receiving or reproducing it. Through participation and collaboration in online collaborative learning, students can learn more effectively, particularly because learning is central in a community of learners (Lave and Wenger 1991) and learning is not viewed as the mere acquisition of concepts or skills but as the appropriation of the culture specific to the knowledge community (Harasim 2012; Häkkinen et al. 2004).

4.2 Purpose of the Study

Simply providing students with online access to learning materials and replicating a classroom model of teacher-centered to learning online is inadequate (Mason and Rennie 2008; Harasim 2012). Research advocates that online learning should move towards a model of student-centered learning in which social collaboration among students is encouraged (Harasim 2012). The emphasis is on learning through an active social process rather than a passive process of knowledge acquisition, where knowledge is fostered through interactions and collaborations (Wenger et al. 2009). This study is therefore conducted to investigate the nature of online collaborative learning interactions and its outcomes in terms of supporting students' cognitive, social and emotional developments in learning ICT education subjects. This study involved both face-to-face and online participation components of the interdisciplinary collaboration between subject major programmes (Chemistry, Physics, and Mathematics, with Computer Education). The activities were authentically designed according to the students' disciplines and applications in order to stimulate socially shared knowledge and expertise in ICT education subjects.

4.3 Literature Review

Much of the research on collaborative learning has focused on traditional classrooms in which the spotlight is on face-to-face learning in small groups. Although there are efforts to extend the application of traditional collaborative learning into online learning environments, in reality, most online collaborative learning activities are usually demoted to discussion forum conversations, in which students are merely posting dialogues about their weekly readings, which limits the extent of actual collaboration (An et al. 2008). Educators also often instruct students to form small groups, hoping that students will collaborate; but this is not always the case. Simply assigning students to groups does not guarantee that an ideal collaborative learning situation would occur (Tu 2004). However, Harasim (2002) argues that collaborative learning facilitates "higher developmental levels in learners than accomplished by the same individuals working alone". She further points out that "conversation, argument, and multiple perspectives that arise in groups contribute to such cognitive processes as verbalization, cognitive restructuring, and conflict resolution" and there is also "reduction of uncertainty as learners find their way through complex activities and increased engagement with the learning process as a result of peer interaction" (p. 188). Therefore, this section reviews related literature on online collaborative learning approach.

4.3.1 Online Learning Technology

Due to advances in Internet and computer network technologies, distance learning has been able to move from an isolated, correspondence approach to one of collaborative and interactive learning through Computer-Mediated Communication (CMC). According to Harasim (2012), the online learning technologies could be categorized according to their roles in learning. The online learning technologies used in facilitating learning tasks are known as learning tool(s), while online learning technologies used in facilitating learning processes are known as learning environments (Harasim 2012, p. 98). The online learning technologies, or learning tools, are referred to as web tools that can facilitate or enable users to perform particular learning tasks in a learning activity. These tools can be web-generic specific (such as search engines, web browsers, email tools, productivity tools, graphic presentation tools, blogs, wikis, podcast-authoring tools, web-authoring tools, social networking tools and user-generated tools). Education-specific online learning tools could include websites or portals with resources aimed at teachers, students or particular disciplines. For instance, websites that provides teachers or students with lesson plans, assessments, inventories, support or tutoring, learning content, and related teaching and learning links. However, Harasim (2012) argues that online learning technologies used as learning tools do not provide suitable "spaces" for conducting and facilitating collaborative learning, even though these learning tools offer potential enhancements to collaborative discourse and group conversation. But they are not shared environments that are "able—in and of themselves—to support collaborative learning and knowledge building discourse" (p. 98).

The central aspect of online collaborative learning and knowledge building is the need for a shared space for discourse and interaction which is provided by the online learning technologies referred to as a learning environment. The term "online learning environment" refers to a web-based system or software that is designed to "host or house the learning activities" (Harasim 2012, p. 98). Harasim (2012) describes an online learning environment as equal to a physical classroom, whereby users can construct knowledge and negotiate meaning through conversation and collaboration, and not just merely transmitting information or receiving communication. The experience gained is also considered as 'lived spaces' which facilitate both the perception of opportunities for acting as well as some means for acting (Allen and Otto 1996, p. 199). The content of an online learning environment for collaborative learning is generated by learners through the use of generic group-discussion applications such as forum, bulletin board or computer conferring system. Forum discussion in an online learning environment can be organized by instructors to represent different topics and different group activities, with different group sizes that can be conducted at different times, whereby students can navigate at their own convenient time to read or contribute to the assigned work. Harasim (2012) argues that online learning technologies used as a learning environment have the potential to support highly effective learning and knowledge creation processes

through various tools embedded within the environment which could provide learners with relevant information and content.

4.3.2 Online Collaborative Learning (OCL)

Online collaborative learning represents a significant shift away from the typical teacher-centered approach. The underlying concept for collaborative learning is firmly grounded in socio-constructivism, socio-cultural (Vygotsky 1978; Rogoff 1990; Wertsch 1998), and distributed cognition and situated learning (Brown et al. 1989; Lave and Wenger 1991), where social interactions are emphasized. The context of social interactions has shifted from merely a background for individual activity to a focus of research, where it has become a unit of analysis (Dillenbourg 1999). Although Johnson and Johnson (1996) state that much of the work using collaborative methods are derived from traditional classroom settings, collaborative methods are favorable for online learning communities as well (Ashcraft and Treadwell 2008). Research on distance education reveals that collaborative learning through its electronic technology has advantages of interactions and communications over face-to-face collaboration. Through online settings, collaborative interactions among students are becoming easier to manage and monitor. Students are able to read others' responses and at the same time participate by adding their own opinions and ideas to discuss and solve problems (Ingram and Hathorn 2004). In campus-based collaborative settings, students have access to face-to-face interaction with their lecturer in lecture halls and in individual consultations. However, the numbers of students that a lecturer can accommodate at one time is small and limited and therefore inhibits further development of collaboration relationships between students and teachers. Online learning, by contrast, offers greater convenience for collaboration to take place. However, Curtis and Lawson (2001) point out that the ease of interactions initiated by students through online technologies occurs at the expense of efficiency and also can be time-consuming.

4.3.3 Online Collaborative Learning Within a Community of Learners

In online collaborative learning, the instructor plays a key and essential role, a role that is neither "guide on the side" nor "sage on the stage" (Harasim 2012, p. 94). Rather, the role of the lecturer is to engage students in the collaborative learning activities associated with building and acculturating them into the discourse of the knowledge community. The instructor is a facilitator and representative of the knowledge community, and as such introduces the students to the appropriate

activities as well as their application within their discipline. Although there are various definitions of a community of learners, a learning community is usually guided by two important elements: (a) tasks to be fulfilled by the community, and (b) goals to be achieved through the collaboration and interactions within the community (Lave and Wenger 1991; Rogoff 2003). It is considered that through the tasks and goals, the community members can construct their knowledge. In other words, a community of learners can also be seen as an advanced interpretation of collaborative design where students take joint responsibility for planning, implementing and evaluating the design, content and direction of the course. For educators, the values of collaborative learning within a community of learners are seen as offering an alternative to more individualistic approaches, and these values are reflected in group work. A key benefit of participating in the learning community is that a learner has the opportunity to take increasing responsibility for learning and autonomy in learning. The teacher's role is supportive and they act more as a facilitator and coordinator to structure and guide the overall direction for students' learning. Students, on the other hand, increasingly learn to participate and manage their own learning and involvement and provide some leadership at times, demonstrating increasing confidence and expertise as they progress from the periphery towards the centre of the community (Lave and Wenger 1991). By participating in online collaborative learning environments, students enter a large group that could be viewed as a community of learners. This is crucial as learning is not viewed as the mere acquisition of concepts or skills but as the appropriation of the culture specific to the target community (Häkkinen et al. 2004).

4.4 Methodology

This research employed an interpretive methodology through qualitative case study approach that included the collection of quantitative and qualitative data using in-depth interviews, focus group discussions, online forum transcripts and online questionnaire (Merriam 2009; Yin 2009). Quantitative data was generated from online questionnaires and forum transcripts, and analyzed using content analysis based on participative, interactive, social, and cognitive dimensions. Qualitative data was generated via interviews and online transcripts, and analyzed using constant comparative method at two levels: within-case analysis and cross-case analysis. These data were collected and analyzed in order to triangulate the findings and to help researcher assess the extent to which the study is successful in enhancing students' learning. The research phases involved are further elaborated as follows.

4.4.1 Phase 1: Defining and Designing the Study

Establishing the need analysis for online collaborative learning (OCL) including: identifying appropriate subject or course with issue or problem in learning and the potential concerns and challenges of OCL. It also included critical reviews of literature on the nature of OCL interactions, cognitive, critical and uncritical approaches. The information obtain in this phase was used as baseline data for constructing the questionnaires, interviews (students and lecturers) and online transcripts (for evaluation e.g. online journal). All instruments were piloted prior to actual study.

4.4.2 Phase 2: Conduct Case Study

The second phase of this study was by conducting the case study through preparing and collecting the data: both quantitative and qualitative data. Quantitative data involved the distribution of online questionnaires at the beginning and at the end of the research, while qualitative data was obtained through students' and lecturers' interviews, online transcripts and online journals. The formal letter consists of an information sheet describing the research in detail and seeking permission to approach targeted participants at the Faculty of Education. The students' and lecturers' informed consents were also collected at the beginning of the course. Data generation involves in-depth interviews and analyzed using constant comparison approach and content analysis based on participative, interactive, social, and cognitive dimensions.

4.4.3 Phase 3: Performing Data Analysis

The third phase of the study was by analyzing the case study evidences or data. The data generated during online collaborative learning (OCL) intervention was analyzed quantitatively and qualitatively. Quantitative analysis was performed on quantitative data collected from online questionnaires, together with online data based on the online transcripts. The online transcripts was analyzed using content analysis techniques based on participative, interactive, social, and cognitive dimensions (Henri 1992; Hara et al. 2000; Lipponen et al. 2003; Gerbic and Stacey 2005; Pozzi et al. 2007). In order to safeguard credibility and to validate the coding procedures of the modified categories from Henri's (1992) model, intra-rater and inter-rater coding were employed. Intra-rater was conducted by the researcher as 'coder agreeing with his self (coding) over time' (Wever et al. 2006). This was done by running the coding multiple times before reaching coding stability. The inter-rater reliability (the ability of multiple and distinct groups of researchers to

apply the coding scheme reliably) was conducted between two independent coders agreeing with each other (Wever et al. 2006). Guidelines for coding were formulated stating clearly what comprises a unit, and descriptions of all categories. Two graduate Malaysian researchers were asked to help with the coding with the guidelines and instructions were introduced to them. A one-hour training session was held during which these guidelines explain. After that, one transcript was randomly selected (altogether totaling approximately 10 % of online transcripts) and coded separately by the two coders and they then compared their results. This study's yielded 0.81 Cohen's Kappa value for the consistency of inter-raters' agreement which can be considered highly reliable (Wever et al. 2006). Qualitative analysis was conducted on the data collected from interviews with students. The verified interview transcripts by participants were analyzed using the grounded theory technique (constant comparative method) at two levels: within-case analysis and cross-case analysis, in order to generate meaningful qualitative themes (Maykut and Morehouse 1994; Miles and Huberman 2002; Merriam 2009). In this method, each individual group of transcript was studied and emerging themes from the data will be coded and compiled for each group. The emerging themes were then compared across groups and subsequently categorize into similar units of meaning. The categories were continually refined, changed, merged or removed and grouped accordingly. Cross-case analysis within and between groups were conducted to explore relationships and patterns that emerged from the interactions within each individual group case.

4.4.4 Phase 4: Reporting the Findings

The final phase of this study research is the stage of reporting the findings of the study. Creswell (2008) suggests that the report of a study that include both quantitative and qualitative methods depending on whether the strategy for conducting the study was sequential or concurrent. A sequential study is one where qualitative and quantitative phases are conducted separately in the research and a concurrent study is one in which the quantitative and qualitative methods are applied concurrently, as will be the case of this study. Therefore, the report of the findings in this study is structured to answer the research questions using both analysis and interpretation of quantitative and qualitative data. This will be the structure adopted for reporting the findings for this study.

4.4.5 Research Setting and Participants

The online collaborative learning (OCL) intervention in this study was conducted through an ICT education course in a Malaysian university that required OCL discussions for 13 weeks: the first four weeks were intra-group work discussions

(Task 1), followed by five weeks of inter-group work discussions (Task 2), and the remaining four weeks were for the final intra-group work discussions (Task 3). The OCL intervention was aimed at facilitating interdisciplinary collaboration and interaction between students from Chemistry, Physics and Mathematics majors through the university's Learning Management System (Moodle), which provided the shared space for the OCL discourse and tools for collaboration. A total of nine groups of four to six students (N = 46) were involved in this study. The students participating in the research were Malaysian undergraduate pre-service teachers from three different programmes of Science and Mathematics, with specialization in Computer Education, namely, Science and Computer with Education (Chemistry), Science and Computer with Education (Physics), and Science and Computer with Education (Mathematics). The students in each programme were in the second year of their study and were enrolled in a Computer Education course known as Authoring Language, which was conducted under the Department of Educational Multimedia, Faculty of Education at the Universiti Teknologi Malaysia. The teaching and learning in the Authoring Language course consisted of conventional face-to-face teaching lectures together with online participation through the university's virtual LMS. The course ran for 15 weeks, comprised of 13 weeks of lectures, and one week each of mid-semester break and study week.

4.5 Findings

A total of 624 (n = 46) online transcripts were analyzed within each group in order to reveal the nature of student group interactions during online collaborative learning (OCL) which then triangulated with data obtained from semi-structured group interviews in order to understand and help describe the way of each participating group worked. The findings of the analysis are categorized into online groups' discussion characteristics and online groups' ways of working: participation methods, communication styles and communication roles.

4.5.1 Online Group Characteristics

Online groups' discussion characteristics was conducted within each group, based on the overall classroom findings in participative, interactive, social and cognitive dimensions; this also included the levels and types of participation, levels of reciprocity, levels of sociability and the cognitive approach. Generally, all groups indicated increased participation in online group discussions over time, although three groups' (Group 4, 7 and 8) participation was low. Only one group (Group 4) contributed an extremely low number of posts, as the majority of their discussions were made offline. From the findings of the participative dimension, six groups illustrated task-directed engagement indicated by similar patterns, with three groups

(Group 2, 6 and 9), seen as core progressive groups with strategic engagement. Group 7 and 8 illustrated peripheral engagement through their high levels of viewing posts; while Group 4 illustrated their group's disengagement in online group discussions. Regarding the interactive, social and cognitive dimensions, eight groups indicated an increasingly high level of reciprocity and sociability over time, with three groups (Group 2, 6 and 9) showing deep learning and another three groups (Group 1, 3 and 5) showing a mixture of surface and deep learning. Three groups (Group 4, 7 and 8) showed surface cognitive approaches to learning in the online group discussions. Through the findings of the online groups' discussions, all nine groups developed ways of working within online discussions through their participation in situated learning activities driven by goals which were socially mediated and distributed through interacting with others (albeit low in some groups). These developments were valuable in terms of helping them accomplish higher report quality for group achievements and obtain better final grades.

4.5.2 Online Groups' Ways of Working: Group Participation Methods

The findings of online group discussions in this study have demonstrated several personalized (or unique) forms of discussion that may have been shaped by the social, emotional and cultural processes of each participating group. Although all groups were experienced e-Learning forum users, with some understanding of effective online discussions, their participation methods, as depicted in the online group discussions were derived from the combination of face-to-face, online media (e.g. Facebook) and assessment. The ways the groups participated varied depending on the technology, and their social and cognitive efforts. Generally, all groups used a combination of face-to-face and online communication as well as using other media for their online discussions; the latter were being implemented to compensate for the constraints of technology and to fulfill the absence of certain social and verbal cues in online discussions. The use of face-to-face interactions in online discussions was complementary in three groups (Group 4, 7 and 8), which had technological constraints and had more face-to-face than online interactions. On the contrary, three groups (Group 2, 6 and 9) had far more online discussions. The high numbers of these groups' online interactions were driven by their awareness of the 10 % (assessment) awarded for online interactions. Although the online interactions were assessment-oriented, students in Group 2, 6 and 9 showed a solid knowledge and understanding of the subject matter and an appreciation of discussing the issues. Much of their efforts were made to manage time for the discussions, and more detailed and lengthy posts were found in these groups compared to others.

4.5.3 Online Groups' Ways of Working: Group Communication Styles

The online discussions delivered by nine groups revealed that four groups (Group 2, 3, 5 and 9) developed a synchronous style of chatting in e-Learning forum discussions. The synchronous styles of discussions in e-Learning forums occurred when the students had virtual or physical meetings, usually at a specific time, which required the presence of all group members to discuss and work together in the online discussions. The synchronous style of chatting, as depicted by online posts during a specific time, usually lasted a day. Many of the main aspects of discussion, such as brainstorming, negotiation and consensus were covered. Follow-ups occurred only when there were changes to plans or new information was obtained. The atypical synchronous styles of chatting in e-Learning forums were developed by students partly to gain immediate responses from their peers and to allow them to continue working on the learning tasks, and also partly because of the absence of a synchronous chat tool in the e-Learning forum.

4.5.4 Online Groups' Ways of Working: Group Communication Roles

The online discussions presented by nine groups also revealed students' participative roles as contributors, viewers and experts. Generally, all students in their respective groups were expected to actively contribute ideas or opinions in the online discussions. However, two groups (Group 7 and 8) were passive. Much of the students' activities in these groups were related to viewing the discussion posts, with them providing few posts, of which most were off-topic. These groups had confidence and lack of knowledge issues which limited their ways of relating to one another in online discussions. On the other hand, six groups showed active contributions with Group 2, 3, 6 and 9 showing the most, with a majority of students who were highly knowledgeable and functioned as key persons to ensure that the discussions proceeded. Much of the details and conceptual explanations were given by the students.

4.5.5 The Outcomes of OCL Activities

In this research, the outcomes of online collaborative learning (OCL) activities are marked as a cognitive transformation through groups' developing understanding and gaining expertise, as social transformation through groups developing joint commitment and responsibilities, and emotional transformation through groups developing confidence, attitude and satisfaction. Evidence of interest comes from online transcripts and interviews.

4.5.5.1 Cognitive Transformation: Developing Understanding and Gaining Expertise

All groups' responses from the online group discussions in the course indicated that students had developed understanding and gained knowledge and expertise about Authoring Language, computer and ICT. All nine groups reported becoming more knowledgeable about authoring software, computer and ICT, as reported by Brian from Group 9:

> As a learner before I have entered this course, I have never heard of Authorware, let alone the processes of building interactive presentations. My weakness is that I am not highly creative when it comes to building interactive presentations. After entering this course, I have learnt not only about building an interactive presentation but also including other media, display, and so on. These are all available in this course and I am glad that I have participated in it. (Brian, Group 9)

Six groups highlighted the value of participating in the course in helping them improve their computer-related knowledge, as they responded in their online group journal entries. Ain from Group 5 reported:

> I felt that my involvement in this course had improved my computer knowledge, in a way that I know more about computers, particularly about authoring and web authoring. Before entering this course I didn't have any knowledge about Authorware, and now I would like to learn more about it. (Ain, Group 5)

Meanwhile, data from interviews corroborated findings from the analysis of online discussion transcripts and revealed a majority of students' mentions about cognitive skills and abilities (more than 42 %) were focused on clarification skills, indicating students developing and gaining an understanding of the Authoring Language as well as computers and ICT in general. This also indicated how students participating in the course gained expertise and knowledge in Authoring Language, computers and ICT—from that of a novice at the beginning of the course towards becoming more expert-like at the end of the semester.

4.5.5.2 Social Transformation: Developing Mutual Responsibilities and Relationships

Students' interactions as a result of participating in online group collaborative learning in the course fostered social outcomes with students changing from competitive and individualistic viewing of learning towards appreciating others' contributions at the end of the course. Ruhi from Group 6 reported how she appreciated her increasing responsibilities for participation in the course:

> One of our responsibilities is to remind them and care about others participating in discussions because when we discuss we need feedback, so, by reminding other students to participate in the online discussion, we can get responses for those who are online. (Ruhi, Group 6)

Hami from Group 9 added that through sharing contrasting ideas and disagreement in the discussion he was able to see valuable ideas for learning and develop a mutual relationship with other students in the course. Hami reported:

> When I disagree with someone's point, it doesn't mean I'm fooling around, but I want to identify what are the points. I want to see the points and the explanation and also the supportive ideas. If there are points that we can support and argue with our ideas, we are free to point out our view. We are university students, so critics and compliments are a normal thing that we should accept. This is my effort to build partial agreement [mutual relationship] in the discussion so that we can expand the discussion with new ideas. (Hami, Group 9)

Meanwhile, data from online transcripts and interviews corroborates findings indicating students' developing roles and responsibilities towards working together. This also described how students developed mutual responsibilities and relationships in online discussions while learning about Authoring Language, computer and ICT which were evident through their reports of their increasing mutual responsibilities, relationships and commitment within their group and across other groups.

4.5.5.3 Emotional Transformation: Developing Confidence and User Satisfaction

From the interviews and online discussions set up at the end of the course, all groups commented on how much they had gained confidence through discussion and learning about Authoring Language in particular and computers in general. Ruhi from Group 6 reported:

> We have to think critically on how to do the task together because when the lecturer asks us to discuss it in the classroom, we will feel very shy to do it, but the case is different when we do it in e-Learning where we feel more confident to do [discuss] it. (Ruhi, Group 6)

Seven groups reported that their participation in the course had changed their attitudes towards learning about Authoring Language, computer and ICT. Busyra from Group 7 reported:

> Before entering this course, I was a person who knew nothing about Authorware but after entering this course, I now know what is Authorware and my participation in discussions through e-Learning somehow has changed my attitude to be involved more in e-Learning and learn more about computer subjects especially this course where we have to participate in an interactive e-Learning forum. (Busyra, Group 7)

In addition, six groups responded in the online group discussions that they would recommend the course to other students. All students generally agreed that they enjoyed learning online in the course and were satisfied with their group work outcomes. This described how students reported that they developed their confidence and satisfaction by participating in the course.

4.6 Discussion

The study revealed the online interactions of nine student groups as they became involved and engaged in the online collaborative learning (OCL) intervention. The findings revealed that the groups' ways of working in OCL were derived from a combination of tools and methods (e.g., face-to-face and online, tools, and assessment), which related to the nature of student intra-group work interactions within the participative, interactive, social and cognitive dimensions. The analysis of the data revealed that the student groups' participation methods, communication styles and roles contributed to student groups' collaboration characteristics: strategic, task-directed, peripheral and disengaged; this in turn corresponds with the participative, interactive, social and cognitive dimensions of OCL. For instance, the strategic and task-directed student groups were seen as highly engaged and participated in the OCL discussions. These groups also played an important role in the learning processes that benefited themselves and others.

On the other hand, the peripheral and disengaged student groups appeared to participate less in the online collaborative learning (OCL) discussions. These groups were seen as the groups that lacked knowledge and had problems with the content, as well as adapting to the technology. Nevertheless, all student groups showed increased collaboration over the period of the OCL intervention, which was fostered and guided by the goals and affordances of the OCL activities. The findings in this study also showed that a total of six of the nine groups exhibited strategic and task-directed engagement and these groups had high participation and contribution levels, high reciprocity and sociability; they also had better group achievements, with the majority of the students obtaining high final grades. Additionally, the findings revealed that the groups adopted different working methods of communication to achieve their goals, and different styles of interactions to other groups in order to progress in the OCL intervention, as was evident in their online discussions. This supports Rogoff's (1994) idea that interactions may be conflicting or "they may be complementary or with some leading and others supporting, or actively observing and may involve disagreements about who is responsible for what aspects of the endeavor" (p. 213). The findings also support online collaborative learning (OCL) from the socio-cultural perspective on learning communities, which highlights that student group interactions involve different levels of participation, different sorts of responsibility, different sets of role relations, and different interactive involvement (Lave and Wenger 1991; Wenger 1998).

4.6.1 A Particular Case of Socio-cultural Learning

The notion of the nature of student group interactions, as based on the participative, interactive, social and cognitive dimensions highlighted in this study, was also a particular case of socio-cultural learning, in which student groups' interactions

could be seen to be mediated through the online collaborative learning (OCL) tools (e.g. Moodle, website, online, computer). Although the mediating tools can include anything from physical, technical, psychological or symbolic tools (Vygotsky 1978; Wrestch 1998), the study found that student groups' interactions were mediated by the combination of face-to-face tools (e.g., written texts, books, lecture notes), online tools (e.g., Moodle, website, Facebook) and assessment tools (e.g., marks, grades, tests, quizzes). The ways the groups collaborated varied depending on their ease of access to the online tool (Moodle), and their social and cognitive efforts, and their participation may have changed as they were being shaped by the members of the knowledge community or shaped by the development of the community (Lave and Wenger 1991). For instance, all groups used a combination of face-to-face and online communication, as well as using online tools (for example, Facebook and educational websites) for their online discussions; the latter tool (e.g., Facebook and website) was implemented to compensate for the constraints of the Moodle platform and the absence of social and verbal cues in online discussions (e.g. facial expression). The use of face-to-face collaboration to assist in their online discussions was evident in three particular groups (see Group 4, 7 and 8), which had technological constraints and had more face-to-face than online interactions. In contrast, three other groups (see Group 2, 6 and 9) had far more online discussions in completing the assignments which enabled them to acquire higher marks (assessment) for their online interactions. These students even expressed the idea that much of their efforts went into managing time for the discussions, as well as compensating for the constraints of the technology.

4.6.2 The Affordances of Tools: Distributed Cognition

The affordances and constraints of the online collaborative learning (OCL) tools led to a variety of types of online collaboration in order to tap into the distributed cognition (Salomon 1993; Pea 1993; Perkins 1993). Within these interactions, the students could communicate, interact and collaborate with one another and access the knowledge, understanding and expertise distributed across the student groups to achieve results that might have been otherwise difficult for an individual to attain (Harasim 2004; Perkins 1993; Salomon 1993). However, the findings revealed that only a small difference in collaboration in the interactive dimension was observed between tasks (Task 1, 2 and 3) for the groups compared to differences between tasks in the social dimension in the development of the distribution of expertise in the student collaborative groups (for example, concern and encouragement in Task 1, 2 and 3). According to Salomon (1993), the distributed cognition within a learning community is important between and among students, peers, teachers and tools in order to achieve particular goals, and is not merely something that occurs inside a learner (p. 112). In this study, the cognition was distributed between students and student groups within the knowledge community, mediated by the lecturer as the representative of the community.

4.6.3 The Affordances of Tools: Situated Activity

The student group interactions within a situated activity in the online collaborative learning (OCL) intervention were important, as they embedded a system of activity, communications, culture and context (Lave and Wenger 1991; Brown et al. 1989) in an ICT education course in a Malaysian University. Situated activity in the OCL intervention means that the students were provided with a context to engage in and to work collaboratively with their peers, and so become involved and enculturated into the knowledge community (Barab and Duffy 2000; Harasim 2012). The affordances of the situated activity, through the use of authentic and relevant tasks, led to the development of student groups' communication styles. This was partly to gain immediate responses from their peers in order to allow them to contribute and accomplish the task goals, and also partly because of the absence of a specific tool in the e-Learning forum (for example, asynchronous tool or chat). Thus, the affordances offered by a situated activity can encourage learners to contribute to the distribution of cognition in that activity (Slaouti 2007).

4.6.4 The Affordances of Tools: Goals-directed

In the online collaborative learning (OCL) situated activity, different goals were embedded in order to support the students to accomplish shared goals. In other words, the student interactions were anchored as 'goal-directed' for participating in the OCL activity (Yamagata-Lynch, 2010, p. 17). For instance, Task 1 and 3 were designed to accomplish the intra-group goals while Task 2 was designed to achieve the inter-group goals. According to Kaptelinin (2005), goal-directed action is the reason why individuals and groups of individuals choose to participate in an activity, and it is also what holds the elements of an activity together, as evident in this study where particular types of interactions became more prevalent than others. Such differences in collaborative interactions were shaped by the shared goals of the activities, as well as by mediating the adoptive communicative roles of the students as evident in their online posts. Thus, this suggests that the nature of the student group interactions in the OCL activities was shaped by the goals that were most readily afforded by the student and group within the boundary of the institution and the knowledge community.

4.6.5 The Affordances of Tools: Participatory Action

This study examined the outcomes of learning for students who participated in the online collaborative learning (OCL) intervention. As students reported, they entered the course with one goal—to pass the course. Over the period of the course, they

increasingly participated and became involved in the OCL activities, and became enculturated into the discourse of the OCL within the knowledge community of the class. The students gradually experienced new perspectives on a particular knowledge problem through their interactions with peers; they developed new and deeper understandings and eventually learnt to address their understandings in the manner of the knowledge community. This is consistent with the view that the development of learning in OCL is a process of transformation through people's participation, rather than an acquisition of knowledge (Rogoff 1994). Furthermore, the students' participation is constantly changing as the knowledge community is shaped by, and in turn shapes, the development of its participants (Lave and Wenger 1991). In this study, the outcomes of learning in OCL were reported based on the cognitive, social and emotional transformations. The cognitive outcomes were observed through students achieving shared goals in the online collaborative learning (OCL) intervention over the period of the course, as they participated and developed understanding and gained expertise to become more expert-like by the end of the course in Authoring Language (Harasim 2004; Lave and Wenger 1991; Palloff and Pratt 2005). As a result of their participation in the OCL activities, particular students' improvement in Authoring Language understandings and skills was noted. At the end of the course, students reported that they had improved their knowledge of ICT and computer education, and had obtained a good final course grade. The social outcomes were reported in the form of students' relationships in developing more focused discussions in terms of increasing mutual responsiveness and responsibilities for their own and others' learning in the OCL environment. Finally, the emotional outcomes indicated that students gained confidence; positive attitudes and satisfaction by the end of the semester in relation to OCL. However, the findings also revealed some potential constraints and tensions may arise from the OCL activities which consistent with past research such as technology-related contradictions (such as a desire for synchronous feedback in forum discussions, cutting and pasting and plagiarism of ideas, and other technological distractions) and group discussion contradictions (such as repetitive and mixed-up posts, clashes on topics of discussion, and discussions being too formal).

4.6.6 Group Four (Low and Disengaged)'s Reflections on the Learning Process

Generally the majority of the students from Group Four agreed prior to the intervention that the use of e-Learning helped them learn on their own, learn online, learn within an online group and also provided them access to course learning materials to the extent that the students from Group Four could also access the additional information for their assignments. However, there were some negatives, particularly regarding aspects of e-Learning forum discussions within an online group. This was not surprising as these views are consistent with the students' responses from the

interview which reported that the group's online discussions did not run smoothly because the majority of the group members had constraints, particularly in accessing the e-Learning; some of the students had limited access to the Internet, lack of technical knowledge in dealing with insecure access that required an access certificate to the e-Learning website, which the students saw as a computer virus, and the disruptive Internet connection which resulted in frequent lost connections to the e-Learning website. Specifically, when the students were asked to indicate if their e-Learning experiences contributed positively or hindered their learning, all students reported that e-Learning experiences contributed positively to their learning. However, when the students were asked directly in the interview whether the e-Learning was an effective learning environment, they responded that it was ineffective because they couldn't use the e-Learning through the university's wireless Internet connection, as they felt it was difficult to get connected to it. On the other hand, the students appreciated the opportunities provided by e-Learning, as they could experience the e-Learning contents for the subject beforehand, download the lecture notes and prepare for the assignments and coursework through the use of information provided by their peers and lecturers. A student also highlighted how e-Learning discussions could be very handy in terms of referring back to what had been discussed and having e-Learning discussions after the class hour. In terms of online discussions in e-Learning, the students from Group Four acknowledged that an effective online discussion for the group was obtained when they were working together through sharing information and contributing ideas, in which the students felt that they gained new information as well as expanded their ICT knowledge.

4.7 Conclusion

The nature of student group interactions and its outcomes were the focus of investigation in this study. This study has shown that OCL can be effective in delivering positive outcomes for learners. The study also showed that OCL can be effective in facilitating online collaboration through customizing the design of online collaboration and learners' interactions within OCL shared goal. OCL shared goal (e.g. intra and inter-group learning tasks) must be designed to foster online collaborations (e.g. intra and inter-group interactions) and to frame learners' online collaboration for learning based on the cognitive, social and emotional aspects. The study revealed positive outcomes for learning were related to learner's cognitive transformation in developing understandings and gaining expertise, learner's social transformation in developing responsibility for their own and others' learning, and learner's emotional transformation in developing positive attitudes, confidence and satisfaction in the course. Students can also develop knowledge and skills and enhance their intra and interpersonal communication skills through delivering ideas, judgments and opinions within the online collaborative discourse. These skills are likely to contribute to their learning which is an important aspect in today's challenging world.

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Chapter 5
Designing a Collaborative Malaysian-Vietnamese Online Writing Project: A Design-Based Research

Kean Wah Lee, Jaclyn Xiang Ruei Yau, Noraini Said, Sook Jhee Yoon, Choon Keong Tan, Long V. Nguyen and Siew Ming Thang

Abstract In Vietnam, academic writing is often developed through a formal instructional setting. Teaching ESL writing to undergraduates in Vietnamese universities is not always easy as instructors are often overloaded with multiple classes of mixed-ability learners. Thus in most cases, students are often left on their own to fend for themselves. Thrown into an era of information overload, students are often overwhelmed with what to look for to support their learning. In this study, a web-based Writing Portal (TWP), made possible by the advent of a Malaysian-Vietnamese collaborative partnership is developed to address these problems. TWP enables collaborative, yet self-regulated learning amongst two groups of Vietnamese Undergraduates (N = 78) undergoing a semester of English Writing class, designed and managed by a team of researchers from Universiti Malaysia Sabah and University of Da Nang, Vietnam. A Design-based research (DBR) approach was adopted to provide solutions to a practical problem that faces the Vietnamese educational context through a process of iterative analysis, design, development, and implementation. The paper highlights the experiences gained

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throughout the three main phases of DBR exploration, i.e., (1) analysis/exploration, (2) design/construction, and (3) evaluation/reflection with the ongoing practices as the intervention is adopted, enacted, and sustained in a Vietnamese educational setting.

Keywords Design-based research approach · Online writing · Writing portal

5.1 Introduction

The ability to write well academically at tertiary level is generally expected of university students as poor academic writing skills have often been blamed as a key factor in the failure of ESL and international students in meeting institutional literacy expectations (Bacha 2002; Zhu 2004). In the Vietnamese context, although English is gaining momentum as an emerging second language, the general competency in English of Vietnamese university students is far below the required level, particularly in the case of academic writing in English. Writing in academic contexts requires students to advance their own ideas within a framework of domain or discipline knowledge and engage the reader in academic discourse. This unfortunately is often the bane of the problem. Research studies reveal that for students entering tertiary levels post-secondary, academic success is dependent on successful academic writing. It is undeniable that academic writing epitomises the language of scholarship and demonstrates eligibility for higher education. The quality of an individual's written work determines his or her scholarship and acceptance in academia. Poor academic writing skills have often been blamed as a key factor in the failure of ESL students in meeting institutional literacy expectations, and students faced challenges to write in appropriate academic manner through the acquisition of new conventions and literacy skills. (Bacha 2002; Zhu 2004; Chokwe 2014; Horstmanshof and Brownie 2013).

In Vietnam, academic writing is often developed through a formal instructional setting. Teaching ESL writing to undergraduates in Vietnamese universities is not always easy as instructors are often overloaded with multiple classes of mixed-ability learners. Thus in most cases, students are often left on their own to fend for themselves. Thrown into an era of information overload, students are often overwhelmed with what to look for to support their learning. Over the years with the rapid development of technology, technology-based learning has taken a foot-hold in the teaching and learning environment. However, despite the vast interest amongst researchers towards teaching-learning innovations, (Cuban 1986, 2001; Kent and McNergney 1999, as cited in Wang and Hannafin 2005) there is still little direct influence on the practice of technology-based learning amongst teachers and students. In this study, a web-based Writing Portal (TWP), made possible by the advent of a Malaysian-Vietnamese collaborative partnership was developed to provide a supplementary platform to support students' learning. TWP enables collaborative, yet self-regulated learning amongst two groups of Vietnamese Undergraduates (N = 78) undergoing a semester of English Online

Writing class, designed and managed by a team of researchers from Universiti Malaysia Sabah and University of Da Nang, Vietnam. A Design-based research (DBR) approach was adopted to provide a solution to a practical problem that faces the Vietnamese educational context through a process of iterative analysis, design, development, and implementation. The paper highlights the experiences gained throughout the three main phases of DBR exploration, i.e., (1) analysis/exploration, (2) design/construction, and (3) evaluation/reflection with the ongoing practices as the intervention is adopted, enacted, and sustained (implementation) in a Vietnamese educational setting.

Recent CALL research has shown that technology is extensively used as enabling tool in writing by students in their daily lives (Yoon 2008; Lin 2011; Kaun 2009). Ghandoura (2006) observes that the number of publications on topics related to computer-assisted language learning has increased exponentially, along with a correspondingly increase in helpful ESL and EFL websites in educational settings to support students' writing development. Ghandoura (2006) also noted that students often rely on useful websites for linguistic exercises, for accessing authentic language materials and as a medium of student publishing. Most of the studies reviewed show that a lot has been done on the benefits and potentials of using technology in teaching writing courses in general, especially in providing student-student and student-teacher support (Baltinger 2005; Doering and Beach 2002; Horstmanshof and Brownie 2013). However, research that looks specifically into web portals from the perspectives of ESL students themselves is still relatively new.

Likewise, recent studies also reveal that researchers tend to use existing technological tools in their studies (Chambers 2005; Chamberlain 2010) rather than developing their own tools, especially web portals to support students' learning. Although there are many studies done to evaluate websites, studies on web portals were found to be less well-defined, underutilized, and under-researched (Lucey and Heo 2010). The amount of research available on Web portals is limited, and there is even less information to be found on scholarly or informational portals. Looking further into this topic reveals that there is only a very small body of research that specifically relates to Web portals in education, especially the research that support Web 2.0 technology. Given the potential benefits of incorporating Web 2.0 into Web portals, it seems that the integration of these technologies holds great promise. Despite this encouraging outlook, the true educational value of Web portals that support Web 2.0 cannot be determined until further research is done on this topic.

5.2 The Writing Portal (TWP)

The Writing Portal (TWP) is a prototype e-learning portal developed with the purpose to provide Vietnamese university students with a new way of accomplishing writing tasks via a single web portal. Architectured on the ideas of a Personal Learning Environment (PLE) which recognizes that learning is personal and self-directed, social, open, emergent, and is driven by knowledge-pull (Chatti et al. 2010), TWP is

designed as a 'one-stop centre' for the university students with appropriate tools for academic writing within a flexible and supportive environment. TWP offers various benefits including access to various reliable ESL resources, a platform for sharing and collaboration, and exposure to web 2.0 technologies which are now highly regarded as a must in education. The portal features eight main sections: (1) links to evaluated free ESL resources grouped into to several categories, (2) individual portfolio and public blogs for users as writing database, (3) chat room, (4) forum or threaded discussion, (5) polling, (6) news and announcements to share latest updates, (7) latest activity as a way of looking at users' activities and alerts to the users, and (8) user management system. The 3P model (Chatti et al. 2010) shapes the design of TWP to complement all stages in writing process: planning/pre-writing, drafting, revising, editing and publishing.

5.3 Using Design-Based Research in TWP Development

Design-based research (DBR) has generated increasing interest among educational researchers in the last decade (Anderson and Shattuck 2012). DBR is also defined as "a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings and leading to contextually-sensitive design principles and theories" (Wang and Hannafin 2005, 6–7). Iterative analysis is used as its cycles are essentially micro-cycles of the research (Plomp and Nieveen 2010) as it leads to more comprehensive qualitative and quantitative research efforts as compared to formative evaluation cycles. The ultimate goal of design-based research is to build a stronger connection between educational research and real world problems. Collins (1992) stated that design-based researchers address simultaneously the multitude of variables evident in real-world settings. Such an approach is timely as quite a number of educational research as observed by Design-based Research Collective (2003: 5) "to be divorced from the problems and issues of everyday practice." Van den Akker (1999: 2), whose research in the domain of curriculum development and implementation, attests that many 'traditional' research approaches such as experiments, surveys, correlational analyses, with their emphasis on description hardly provide prescriptions that are useful for design and development problems in education. Wang and Hannafin (2005) said by using a combination of methods, data from multiple sources will increase the objectivity, validity, and applicability of the on-going research. The Design-based Research Collective (2003) argued that DBR can help create and extend knowledge about developing, enacting, and sustaining innovation learning environment. Quantitative and qualitative methods were used to observe the different aspects of the design in order to address the problems and needs, and to document why and how adjustments are made (Collins et al. 2004).

DBR methodology puts researchers alongside practitioners as a team that usually works together over a period of time, to address real-life issues in a specific

educational context. This approach uses an intervention in the form of object, activity, or process that is designed as a possible solution to address the identified issue. Reeves (2006) describes intervention as a term to encompass the different kinds of solutions that are designed. These solutions include educational products, processes, programs, and policies. This study identified the TWP as the intervention that was developed as a potential solution to the perceived need for better enhancement of academic writing process in the context of a Vietnamese Higher Education Institution (HEI). DBR is deemed relevant in this study in that the Malaysian collaborators in their maiden initiative working together with their Vietnamese counterparts might be unfamiliar with the Vietnamese practitioners' preferences, beliefs, pedagogy and cultural practices.

To explain how the research reported in this study was positioned within a collaborative ongoing DBR project, Reeves' (2006) model for design research was adopted to provide an outline for the TWP project phases. The DBR model consists of three main phases: analysis and exploration, design and construction, and evaluation and reflection, that might help to throw further light on increased theoretical understanding and effective intervention. The research process is cyclical in character, and involves an iterative process of analysis, design, evaluation and revision activities are iterated until a satisfying balance between ideals ('the intended') and realization has been achieved. Basically, DBR comprises of a number of stages or phases:

1. *preliminary research*: involves needs and context analysis, review of literature, development of a conceptual or theoretical framework for the study;
2. *prototyping phase*: iterative design phase consisting a micro- cycle of research with formative evaluation aimed at improving and refining the intervention;
3. *assessment phase*: semi-summative evaluation to assess whether intervention meets the intended objectives, usually result in recommendations for improvement of the intervention.

Reeves (2006) depicts the design research approach as follows (see Fig. 5.1).

These phases will be used as a framework to design, implement, and evaluate the Collaborative Malaysian-Vietnamese Online Writing Project based on the objective

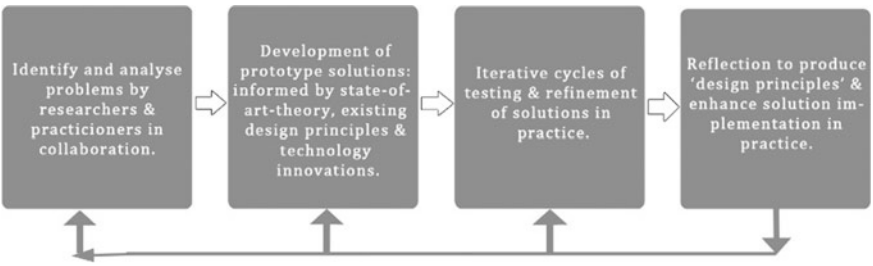

Fig. 5.1 Process of design-based research approach

of evaluating the process of designing and implementing an online writing portal for the development of process writing in a Vietnamese HEI context.

5.4 Research Methodology Participants

The participants in this research project were the two first-year classes of Vietnamese Undergraduates (N = 78) undergoing a semester of English Writing at the University of Foreign Language Studies (UFLS), Da Nang, Vietnam, selected purposively for this study. The classes were assigned to this collaborative study as they met the specific requisite needed, i.e., beginners to academic writing with modest to average English language proficiency. The average age of the participants was around twenty (20) with English proficiency levels equivalent to bands 3–4 in IELTS. All the participants have very limited experience in e-learning. The two writing instructors who were involved in instructing these classes also participated in the study. The instructors were responsible in teaching and learning of these two classes over a 15-week semester. Both the instructors have been involved in teaching English writing for more than 8 years at the University of Da Nang.

5.5 Data Collection and Analysis

This study employed three methods for data collection and analysis. These three methods are (1) Research-based Design Model Phases, (2) Quantitative tools involving questionnaires to survey participants' academic writing readiness and ICT infrastructure of the university, and (3) Qualitative tools involving structured and semi-structured interviews with student participants and instructors. Reflective feedbacks from students were also collected and analysed. In what follows, a detailed description of each method is provided:

(1) **Design-based Research (DBR) Model Phase**

In DBR, intervention is identified through a literature review and suggestions from experts and practitioners in terms of the content, structure, and instructional approaches. This information is then applied in the first iteration of the intervention. The purpose of the preliminary literature review is to identify draft design principles that could help solve the problem the intervention is designed to solve. In Analysis and Exploration stage, a preliminary literature review will be collected for meta-analysis purposes. Pre-interview sessions with instructions and students on the view of e-learning will be conducted.

The next stage is the implementation stage, which consists of developing, designing, and evaluating a working writing portal and the used results from module, course assignments, and reflection journals to make minor ongoing changes to design.

In evaluation and reflection stage, questionnaire will be distributed to TWP users to find out the effectiveness of the TWP and why. This is to identify key characteristics that impacted later practice. Observations and interviews focused on TWP impact on later practice will be conducted at the end of the research. In this study, data collected up to the mid-point of the Sem 2 2014/2015 were reviewed and analysed.

5.6 Quantitative Research Method

(a) Student questionnaire—This will be devised to investigate the students' perceptions of the TWP for academic writing at the end of the semester. The students' questionnaire will comprise two parts. The first part consists of items to elicit students' background information. The second part consists of items that cover the areas under investigation in the research questions. The data will be analysed using descriptive and inferential statistics derived from SPSS version 20. The teacher reflection questionnaire comprises open-ended items that the teacher needs to complete at the end of the semester in response to questions regarding their perception of their experiences in implementing the TWP for academic writing.

5.7 Qualitative Research Method

(a) Reflection and self-assessment—The students in both classes were asked to reflect and self-assess themselves over the course of the semester to record down their learning processes. Training was given to students to guide them on how to do this at the beginning of the semester. Their reflections were analysed to gain a deeper insight into their learning processes.
(b) Semi-structured interview—This was conducted on selected groups of students using the focus group approach. The participants in this interview were asked open-ended questions that aim to elicit information on the effectiveness of TWP for academic writing and the challenges of using the system.
(c) Interviews with instructors—Interviews were also conducted at the end of the semester. The purpose of using the interviews was to support and corroborate the findings derived from the quantitative data as well as to flesh out issues that the quantitative approach fails to bring to uncover. Both semi-structured and interviews were fully transcribed and coded according to emerging themes. Two independent researchers were invited to check the coding in an iterative process to confirm the validity of the themes.

5.8 Findings and Discussion

5.8.1 Evaluating the Design and Implementation of the TWP in a Vietnamese HEI Context

1. **Analysis/Exploration phase**

In the analysis/exploration phase, where preliminary research is conducted, the Malaysian team set out to conduct needs and context analysis for the study. At this stage both quantitative and qualitative data were collected and analysed. Two sets of online questionnaire were administered: (1) to gain a better understanding of the students' access to and attitude towards the use of ICT and use of Web 2.0 tools in learning English; (2) to find out the Vietnamese students' personal writing skills and strategies. However, due to limited number of computers available at the time of data collection, only 38 students responded and submitted the online questionnaires. Besides that, interviews were also conducted with both instructors and students on their views of e-learning in learning how to write in tertiary education. The main purpose for collating such information was to identify and analyse the likely affordances and potential problems in designing an online portal for writing development that is culturally appropriate to be implemented in a Vietnamese context.

In terms of students' access to the use of ICT (use of laptops/PC and access to internet), survey data revealed that all student participants have access to laptops/PC within their campus or at home in the last three months. Likewise, the student participants also mentioned they have access to internet in same period of time whether in campus, homes or internet cafes. However, when probed whether they have ownerships of laptops/tablet PC/netbook/mini notebook with internet access at home, only 45 % of the respondents claimed to have owned at least one of them, indicating that computers and laptops are still a luxury to some of the students (see Appendix A). This finding might have implications to the eventual implementation of TWP in Vietnam as access to and ownership of ICT tools were deemed critical for the success of the implementation of TWP. However, further interviews with the ICT coordinators and senior management officers at the Vietnamese university eased the anxiety as the Vietnamese collaborators were more than happy to allow the student participants to have access to the computer lab regularly.

Attitude towards the use of ICT and Web 2.0 tools was assessed through the student participants' experience in using ICT and Web 2.0 tools in their daily lives. Based on a 4-point Likert of a positive experience of using them everyday(4) to a non-experience of never using the tools at all (1), survey data revealed that all the student respondents have positive attitudes, as evinced by mean scores of between 3 to a high of 3.6 on a 4-point Likert scale (See Appendix B). These findings revealed that the students realised the importance of using a computer for learning (*It is really important to me to work with a computer for learning = 3.44*) and needing

the computer for later study (*Learning with computer is important for me because I need it for what I want to study later on = 3.39*). Hence in terms of attitude towards the use of ICT and Web 2.0 tools, there were positive indicators that the research team could implement the online writing intervention in Vietnam.

A survey using a 35-item questionnaire on personal writing skills and strategies was administered to the student respondents. The questionnaire employed a 3-point Likert scale, ranging from a scale of never (1)—usually (3) on their self-assessment of writing skills and strategies used in academic writing. In total, 35 questionnaires were returned and data analysed. Findings revealed the mean scores for all the 35 items range from the lowest mean score of 1.69 to the highest of 2.63. The lowest mean score was related to the item on writing strategies (write the conclusion first knowing it will change by the time I finish the paper), while the highest mean score was related to three items (*Start writing on the aspect/subject area that I understand the most; write the introduction first; and revise my first draft for grammar and vocabulary*). This indicates that the students were aware of the needed writing skills and strategies for academic writing. With the positive findings, the research team felt confident that TWP would be well-received.

2. **Design/Construction Phase**

In the design/construction phase, also known as the prototyping phase, the Malaysian researchers piloted two prototypes of the writing portal, each involving a micro-cycle of research with formative evaluation aimed at improving and refining the Writing Portal to suit the Vietnamese context.

The first prototype involved testing the Malaysian version of the Joomla-powered *The Writing Portal* (TWP) (www.thewritingportal.net) in a Vietnamese university for three whole days. Data collected via interviews with practitioners revealed a number of problems and mismatches in areas of access, compatibility, and familiarity. Based on findings obtained from interviews with the stakeholders in Vietnam such as the Vietnamese instructors, ICT coordinators, and students, it was found that gaining access to TWP was problematic. To gain access, the Malaysian collaborators had to pre-register the users to the TWP before access could be gained. This brought a lot of inconvenience to both the Malaysian and Vietnamese collaborators as the Malaysian researchers only got to better understand the Vietnamese context after they have visited the University. Design-based research is conducted in real-world settings and one of the dilemmas faced was the Malaysian researchers were TWP designers while Vietnamese collaborators were the implementers of TWP (McKenny et al. 2006 cited in Plomp and Nieveen 2010). Collaborators from Vietnam, who had better understanding towards the culture and learning habits amongst Vietnamese students, was assigned the role to conduct English classes to the students. Malaysian researchers appeared to be 'cultural strangers' in the setting of this research (Thijs 1999) and the design of TWP was done based on an earlier study conducted in the Malaysia HEI context (Noraini and Lee 2014).

Secondly, slow access also exacerbated the problem of TWP. This was because TWP was hosted on Malaysia-based server. It was later discovered with configuration failure In addition to that, the lack of familiarity with the TWP portal also caused a lot of uneasiness amongst the users, particularly on the part of the Vietnamese instructors who (Thijs 1999) were less open to researchers coming from the outside. It was identified that this collaboration was the first they had with researchers from other countries.

Although e-learning is not widely used in the Vietnamese university, one of the instructors actually used their own Moodle LMS for e-learning practice. To her, the Joomla-based TWP was not at all user-friendly, as she had no administrator right. Thus, based on the problems and constraints faced, a second TWP prototype was designed in the hope to better suit the Vietnamese HEI context.

Results-driven design decision making differs design-based research from a traditional evaluation (Plomp and Nieveen 2010) as it involves various cycle of data-gathering and analysis. This leads to the shift of first TWP prototype from Joomla-based to the second TWP prototype, which was hosted on Schoology platform after issues were identified and discussed.(see Fig. 5.2). Schoology was chosen as a platform to host the Malaysian-designed TWP because it is easier to access, cloud-based, and much familiar to the Moodle system used in the Vietnamese university.

After consulting the Vietnamese instructors, and securing their syllabus, a major overhaul was done to the materials and activities in the second prototype. This was done in accordance to Plomp and Nieveen (2010), who advised that assessment in design research should be done formatively in order to guide the design of a prototype and to conduct iterative re-design if necessary.

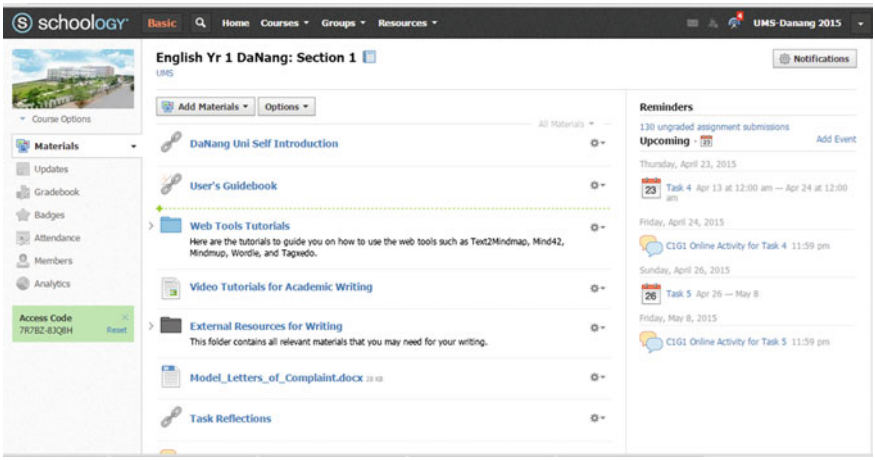

Fig. 5.2 Screen shot of the Schoology-based TWP

Using the Schoology platform as a basic account user, the researchers only have limited control over the template and design of the interface. Nevertheless, elements which are considered of utmost importance to the Vietnamese instructors and students have been built into the Schoology-based TWP. The design of the Schoology-based TWP consists of four major sections, namely Resources, Tasks, Discussions, and Submission of tasks. Resources consist of useful links to video-sharing sites such as Youtube, writing websites, and notes of different writing strategies. Tasks consist of topics and step-by-step guidance in completing the tasks. Discussions consist on threaded discussion of the drafts, outlines, and mind maps uploaded by the students. Submission of tasks consists of a 'dropbox'-like feature which allows students to upload their final drafts upon completion. In order to ensure access and monitoring of the students' progress and participation, administrator rights was also provided to the Vietnamese instructors.

Based on interviews conducted with the Vietnamese stakeholders, particularly the instructors, students, and senior administrators, the Schoology-based TWP was much preferred. There were many positives mentioned, among others the ease of useand mobile-friendly. Students much preferred the Schoology-based TWP because of its similarity to Facebook with its social media features.

The instructors preferred it because it is similar to their moodle system.

> I had a very great impression on Schoology, it is a good website, it is very similar to moodle. We have been using Moodle in our university as a supplement for many years. The difference is for Moodle, we have to enroll the students ourselves.

For the Malaysian collaborators, the Schoology-based TWP was easier to manage and implement. This is because the Malaysian researchers have been operating on Schoology for more than 2 years in UMS as alternative to their Moodle system. Despite the ease of use and user-friendly features, the Schoology-based TWP did however faced a number of problems. Chief among them was getting the students to participate actively in the writing tasks aimed at developing their academic writing performance. Later, it was revealed the cause for the lukewarm participation was due to mismatches of beliefs between the Malaysian designers and the Vietnamese practitioners. Such mismatches of beliefs could have contributed to the passive contribution from the students.

> the moodle system we use hasdefault learning tools, but for Schoology, I find that the mindmap tool is imported from other links. It is nicer if it is already embedded inside Schoology. Another issue isnot all writing genre is suitable for mindmap. Mindmap is a good way, but some of my students complained because it's difficult for them because it takes time.

In a follow-up visit, the collaborators and researchers came to consensus on providing a refined module for monitoring and coordination. With a consensus reached, the second prototype in the form of Schoology-based TWP was adopted and implemented as an intervention to improve the Vietnamese students' English writing development.

3. Evaluation/Reflection Phase

In the evaluation/reflection phase the researchers evaluated the ongoing interactions and practices as the online writing portal (Schoology-based TWP) was adopted, enacted, and implemented in the Vietnamese context. Data was gathered via course, user, and discussion analytics culled from Schoology. Structured interviews were also conducted with student participants, instructors, and senior management officers involved in the collaboration.

To evaluate the on-going interactions and participations of the students on the online writing portal, analytics (see Fig. 5.3) based on students' participation and discussion were analysed.

Table 5.1 shows the analysis conducted based on students' participation in Task 1 and Task 2, based on a mid-semester review. In Task 1, 108 discussions were generated with only 22 submissions. Task 2, however, had only 20 discussion posts recorded but there were 34 submissions made. The abnormally between discussion and submission of Task 1 and Task 2 prompted the researchers to seek further understanding. Based on E-mails exchanges and forum discussion on Schoology, it was found that the main cause for this disparity was the lack of specificity of the task instructions. Students were found to have misinterpreted the instructions. Instead of doing online discussion, students carried out discussions in a face-to-face manner.

To overcome students' misinterpretations, step-by-step instructions and guidance were given to scaffold and clarify the confusion amongst students (see Fig. 5.4).

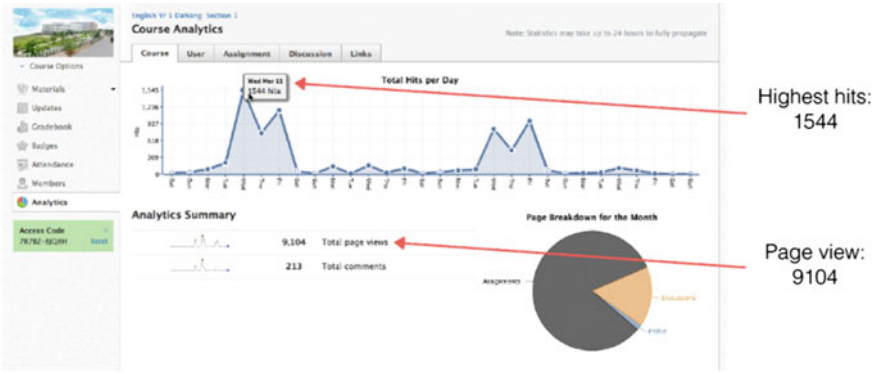

Fig. 5.3 Screenshot of analytics on students' participation and discussion

Table 5.1 Number of discussion and submission posts for Task 1 and Task 2

Participation	Discussion (post)	Submission (post)
Task 1	108	22
Task 2	20	34
Total	128	56

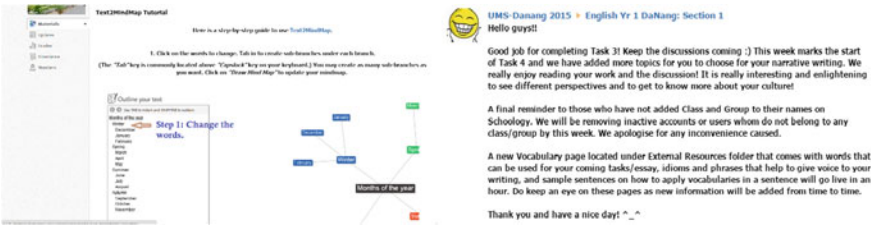

Fig. 5.4 Screenshot of step-by-step pictorial guide and explicit instructions

Besides that, positive reinforcement and words of encouragement were also given to motivate students to partake actively in the tasks given. Based on the findings shown in Table 5.1, the increase in the number of submissions demonstrated the effectiveness of the explicit instructions provided on Schoology.

5.9 Conclusion

The TWP project carried out in Vietnam originated in the desire of a group of instructional designers, instructors, and administrators from four institutions in Malaysia and Vietnam, to collaboratively tackle the growing problem to best provide quality academic writing development for first-year undergraduates in Vietnam. Using a DBR methodological approach, this study evaluated whether the content, structure, and instructional approaches of the TWP was effective in helping students to develop their academic writing skills. This study provided detailed feedback for the TWP project, and the design principles emerged from this study may be of interest to researchers and professionals who are involved in developing academic writing in a CALL environment. The findings from this study expand knowledge and contribute to the research literature on designing, developing and implementing online writing courses for both experienced and inexperienced instructional designers and instructors. Other recent studies that focused on using technology in teaching writing for instructors have resulted in similar findings to this study (see, for example, Baltinger 2005; Doering and Beach 2002; Kaun 2009; Lin 2011; Yoon 2008). The findings from this study have resulted in design principles that have been derived from different situations and learning environments. These design principles can be adopted and transferred as effective design principles and practices to other context. This research demonstrated the role design-based research methodology can play in (a) guiding the design of CALL environment, (b) developing an understanding on how CALL environment assists learning, and (c) researching learning that occurs in a CALL environment.

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Chapter 6
Assessing User Needs Analysis for Inter-school Social Information Sharing Portal

Haslinda Noradzan, Nor Zalina Ismail, Nawal Abdul Razak, Fazlin Marini Hussain and Rahmah Lob Yussof

Abstract Information sharing for schools involved the activities of sharing relevant contents, exchanging knowledge and interests, and document retrieval purposes. Our preliminary study shows, updating information for schools in Malaysia using web-based portal managed by Ministry of Education that acts as a platform in disseminating updates from ministry to all schools is still fairly under-researched. To date, no social information sharing platform serves between schools in Malaysia enabling them to update and share relevant contents and documents. The main objective of this paper is to discuss the user needs analysis that has been done to pursue the development of the model for the information sharing purposes. This paper includes fact-finding activities conducted by theoretical study that involves the review of reading previous researches and related documents. Empirical study involves the distributing of questionnaires and interview sessions with the teachers who are responsible in managing students' activities from 140 secondary schools in Pahang. The aim of the fact-finding phase is to assess their willingness to share social information and identify types of social information to be shared among schools. This paper will produce the findings on variable that can be used to help in constructing an information sharing environment among schools.

Keywords Information sharing · Inter-school · Portal · Social information

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6.1 Introduction

With rapid development of computer network and information technologies nowadays, modernization of education has gained advantages such as in the expansion of knowledge and frequently updated information from various resources. Internet or "cloud" becomes the data centre and offers fast, safe, and convenient data storage and network computing services. Utilizing the internet capabilities as storage and web technology as sharing platform and processing power, it will reduce the education institution's burden thus simplify the services on the user's computer that can access to the data centre according to the needs.

Information sharing is a method of information acquisition and usually using person, documentary sources, channels, social and technical searching in its practices. In academic research community, information sharing involves activities of sharing relevant contents, consultation, formal and informal communication, and document retrieval system. Talja (2002) states that classification of types of information sharing are strategic sharing, paradigmatic sharing, directive sharing and social sharing. In this research, we focus on social sharing which is not strictly goal-oriented but involves the sharing of encountering information with others such as potentially relevant documents and related to community building activities. This research focuses on constructing a propotype of an online application that provides social information sharing among schools.

Updating information for schools using direct connection to a server have to deal with heavy implementation or configuration of infrastructure, storage, databases, and application which acts as a platform to disseminate updates (Hormozi et al. 2012). Over and above, there are many cloud computing environments already available to use. Despite the fast growth and adoption, there has been little study in providing a new way for information sharing and dissemination (Wei and Xu 2012). Information sharing of type social sharing which is not strictly goal-oriented but involved the sharing of encountering information with others such as potentially relevant documents and related to community building activities (Talja 2002). Wang and Xing (2011) find that huge gap exists in education information between urban and rural area among various schools and faces lack of effective supervision in education information system due to social background and IT-based education.

Saidu et al. (2015) carried out a research on sharing information among schools by using a model of Software as a Service (SaaS). The research used cloud computing as a sharing platform and focused only on the education resources sharing systems, online examination and assessments systems. The cloud model they chosen was involving the relationship between five elements which are the data centers, cloud services, service providers, users and Internet. A research by Yunus and Suliman (2014) that being done in a rural school in Malaysia revealed that teachers and students showed positive feedback on using Internet as a tool to carry out literature lessons but needs further actions to encourage them in using Internet for other purposes.

A research conducted by Hou et al. (2009) observed on how teachers solve problems by providing an online knowledge sharing environment and record the process of community discussion to solve the problems. The research was conducted in Taiwan and involved 495 teachers as participants in the online discussion. The research found that 67.5 % of the responses in the discussion had contributed to the online discussion by proposing solutions and related information regarding the problems. It shows that practices on sharing ideas among teachers and using online platform as a medium is being accepted by schools environment. In the other hand, So et al. (2009) in their research came out with a concrete design of an online environment for teacher community in Singapore that enable teachers to share video using online platform and make use of Web 2.0 technology as a tool. The research group found that the teachers involved in the study shared their views on professional development experiences, online communities as well as the technology that can be implemented in teaching and learning processes in contributing ideas towards designing the online video based platform.

6.2 Method

The model that is applied in carrying out this research is System Development Life Cycle (SDLC). It is commonly used in system engineering, information system, and software engineering to describe the process of planning, creating, testing, and deploying an information system.

6.2.1 The System Development Life Cycle Methodology

System Development Life Cycle (SDLC) is used in this research to develop the prototype of the portal. The first phase of SDLC process is project planning whereby the project initiation, system concept, project management plan and requirement analysis are being done and produced the concept proposal, system's scope, feasibility study and user needs analysis. Figure 6.1 depicts the details of the steps involved in SDLC and stated the phase that will be covered in this paper. This paper discusses the first three early phases; project initiation, system concept development, and project planning. The major task and output of the phases involved are summarized in Fig. 6.1.

6.2.2 Project Initiation

The project was initiated since 2013 when the application for Research Acculturation Grant Scheme (RAGS) to financially fund the development of the

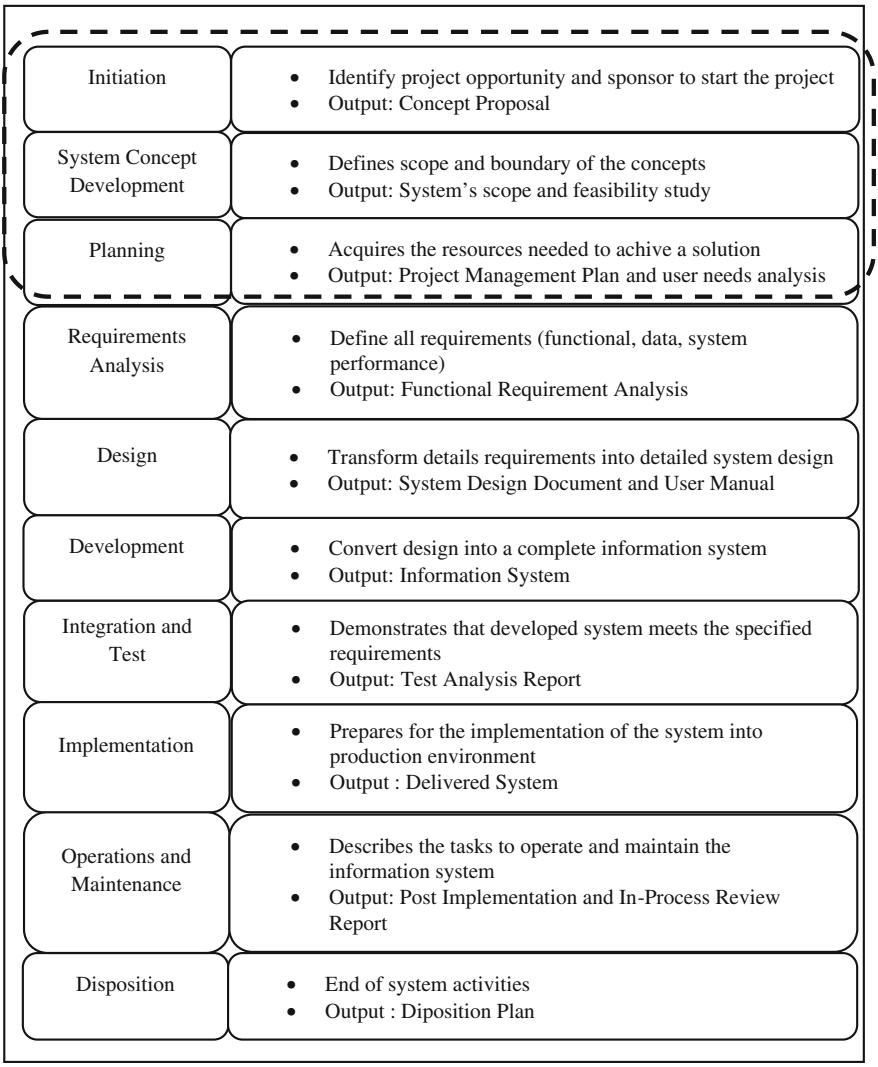

Fig. 6.1 System development life cycle phases (Department of Justice system development life cycle guidance documents 2003)

project was successfully approved. Preliminary study was done to seek for the opportunity to pursue the development of the project's framework by observing the current information sharing activities and procedure for schools in Malaysia. From the observation, it shows that currently the activities of information sharing and distributing updates are being done using a web-based portal managed by Ministry of Education. There is no platform for sharing social information between schools that enables schools to be connected with each other in form of social activities

rather than focusing only on official matters that currently being shared using the official portal. The concept proposal was produced during this phase and potential research area was identified to be formed after the research being done.

6.2.3 System Concept Development

System concept development phase involved the activities of defining the scope of the system concepts and feasibility study. It is important to define the system's boundary to capture the goals of the project and also define the criteria to measure the output whether it satisfies the users' needs and project objectives. To highlight the resources, researchers' experience, and budget to deliver the project, a series of discussions and brainstorming sessions among the research team's member were arranged during this phase in ensuring the system boundary and deliverables can be produced at the end of the project duration. Interview sessions with schools' administrative staffs also conducted in this phase to find out the person in charged on schools activities and the files and documents that ready to be shared among schools. The process covered the feasibility study which was important to be firm up before entering the design phase in SDLC.

6.2.4 Planning

Project Management Plan was produced during this phase where it provided the basis for acquiring the resources needed to achieve a solution. In this phase, the team had also factored all the cost that need to be measured such as the human resources, consultants, software, and miscellaneous cost that incurred during the project duration. Planning for scheduling the project was represented by finalizing the project planning progress using Gantt Chart and Milestone Chart to set the completion date for each stage in the project. To analyse user needs and develops user requirements, users' needs was assessed by evaluating the distributed questionnaires to selected respondents from all 140 secondary schools in Pahang, Malaysia. A set of questionnaires was developed by research team members and went through the pilot test phase that involved respondents from 40 schools to verify the validity of the questionnaires. The respondents are headmasters, teachers, and school administrative officers who involved in social activities in schools. There are several procedures were prepared and gone through before getting the permission of distributing questionnaires and getting responses from the respondents. Official application letters were submitted to be evaluated and approved by Pahang's State Education Department and Ministry of Education, Malaysia. In this paper, the samples are randomly selected from the respondents those returned the questionnaires among 140 schools in Pahang that involved in the distributed questionnaires.

6.3 Result and Discussion

This section provides the results of fact finding for three early phases of SDLC model in this research. This research started on September 2013 and expected to be complete on March 2016 and involved nine activities to be carried out along the research period. The activities involved are reviewing related past researches, designing questionnaire and interview questions, conducting pilot test on interview and questionnaire, improving interview and questionnaire questions, arranging data collection activities, performing data analysis, designing and developing prototype, and producing final report and documentations.

In defining the system scope and boundary, the research involved 140 secondary schools in Negeri Pahang, Malaysia. There are three elements to be evaluated to set the system scope and boundary. The elements are the person in charge on sharing schools' social information, the type of social information to be shared among schools and type of documents or file to be shared.

During the pilot test phase, interview sessions with schools' administrative staffs in 40 secondary schools were conducted to seek for the person in charge in schools social activities. From the interview sessions, it was found that most of activities were managed by Co-curriculum Teacher, Counselling Officer, Sports Teacher, Resident Staffs, and the Headmaster. From the finding, it shows that there will be multiple users from one particular school that will have access to the proposed social information sharing portal depending on their roles and responsibilities.

To determine the type of information agreed to be shared among schools, a section in the distributed questionnaire provides the information types and assessed on the respondents' willingness to share the information. The information was evaluated using 4-point Likert scale; according to the degree of agreements, 4 for strongly agree and 1 for strongly disagree. Table 6.1 shows a list of information to be shared with its means score analysed by Microsoft Excel 2010. It can be concluded that all type of information listed are agreed to be shared among schools.

The third element to be considered in this phase is the type of document to be shared using the portal to represent the social information or activities being carried out in schools. From the interview sessions done, details about the events such as date, time, venue, participants and people involved are the type of main information

Table 6.1 Type of social information to be shared

No	Type of social information	Mean
1	Students' achievement in sports	3.15
2	Examination result	3.20
3	Co-curriculum activities organized by schools	3.25
4	School annual events	3.18
5	Students' motivation program	3.25
6	Academic/curriculum activities	3.28
7	Teachers/staffs development program	3.20

to be presented on the online portal. Related documents and files such as images and videos captured during the events, document on students' achievement in any curriculum or co-curriculum activities can be uploaded and represented as photo albums or gallery and attachments.

6.3.1 Users' Needs for a Social Information Sharing Portal

To determine the users' needs for a social information sharing portal two sections in distributed questionnaires were evaluated. The first section assessing on respondents' background on information technology facilities provided in schools and Internet access by users. Table 6.2 represents the descriptive statistic about information technology facilities in schools and the frequency of Internet access by the users.

Table 6.1 shows 52.5 % of the respondents are from rural area schools and 47.5 % are from urban area schools with majority of schools with 77.5 % provides computers for their staffs but 17.5 % of them felt that the number of computers is not sufficient for all staffs. All schools involved in this study provide Internet access for their staffs and 42.5 % of them get connected to Internet within 2–4 h per day.

The second section evaluating users' thoughts about sharing schools' activities and social information with other schools and the section was evaluated using 4-point Likert scale; according to the degree of agreements, 4 for strongly agree and 1 for strongly disagree.

Table 6.2 Descriptive statistics of information technology facilities

No	Items	Variables	Percentage
1	School category	Rural	52.5
		Urban	47.5
2	Provides computer	Yes	77.5
		No	22.5
3	Satisfies with the computer provided	Yes	45
		No	55
4	Sufficient number of computers for staffs	Yes	17.5
		No	82.5
5	School provides internet connection	Yes	100
		No	0
6	Frequency of internet access by the user	Less than 2 h	25
		2–4 h	42.5
		4–8 h	30
		More than 8 h	2.5

Table 6.3 Users' thoughts about social information sharing among schools

No	Items	Mean
1	Thought to share information	2.90
2	Sharing information can enhance staffs' reputation	2.88
3	School already share information with other schools	2.90
4	Sharing information will not lead to misused of information	2.48
5	The school is leading on information sharing	2.68
6	IT officer play role in encouraging information sharing activity	3.03
7	Sharing information provides efficient and cost effective service	3.05

From the mean score, the items assessed in this section reveals that the respondent have thought about sharing the social information among schools and the highest mean score (3.05) shows, they agree that information sharing activities provides efficient and cost effective service (Table 6.3). From this findings, we discover that most users are already thought about sharing information among schools.

6.4 Conclusion

Proposing an online inter-school portal is an alternative way of disseminating social information that enables schools to be connected with each other. Deliverables from studies that being done in three early phases in SDLC model show that the schools involved in this research are ready for an online portal to act as platform for them to share their school' social activities and achievements. The system scope and boundary that being finalized in the second phase also determined on project area together with the project's timeline in ensuring the research can be completed on time. The three phases done in this research also will help in proceeding to the next phase which is the requirement analysis that will produce functional requirement analysis thus will support in designing and development stages of the portal's prototype. From the findings activities through the theory and literature review, interview sessions and questionnaires distributed, this research has a potential to contribute to the education field in encouraging information sharing activities using the online platform for schools level.

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Chapter 7
Feel-It: An Intelligent Secondary School Physics Q&A System

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Abstract Feel-It is an intelligent 'questioning and answering system' for secondary school Physics. The system is created to help solving open-ended Physics problems, as well as providing adaptive guidance and giving relevant learning resources from the Internet according to users' queries. The proposed architecture for Feel-It constitutes of four basic modules: data extraction, question classification, solution identification and answer formulation. The data extraction module builds the Physics knowledge base. The question classification module identifies and analyses the question. The solution identification module solves Physics questions and selects the top n most relevant resource references. The last module, answer formulation, arranges and compiles the result as system output. Our preliminary result has shown that the system is able to produce correct answers up to 60 % of accuracy.

Keywords Artificial intelligent · Online tutoring · Physics · Q&A

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7.1 Introduction

Physics is a commonly taught subject in upper secondary schools. The common reason students dislike the subject is because they do not understand the subject well enough to confidently solve Physics questions. Research in Physics education specifies three main areas of difficulties that affect students' problem solving ability: the presence of misconceptions, misinterpretation of the question posed and weak mathematical ability (Soong et al. 2009). Therefore, when a student does not understand the problem, the solution may become difficult or impossible. In order to properly understand a Physics problem, we must identify the relevant information in the problem first. The information includes question's focus, question keywords, values with their units and problem domain. According to Gok (2014), the problem solving strategies are to identify fundamental principle(s), solving and checking the obtained solution. This is done through identifying the fundamental principle, the concepts, known variables, and unknown variables.

The process of understanding Physics problems could be facilitated through guiding students to understand the bigger picture of the problem. We propose a computer-aided learning tool called *Feel-It*. It can automatically categorize Physics problems based on the domain and identify the relevant data which are used to determine the most suitable equation to solve the problem. In most Question Answer (QA) systems, especially the ones existed online, the user can post the question and wait for other users to reply. For example "Yahoo! Answers", "Ask.com" and "Google Questions and Answers". Besides, the user can find other related questions with answers which were posted by others. However, the user has to wait for others to post the answer, or else they will not get the solution. "BrainBoost" is designed to let the users input search terms in natural language form, then submit it to different search engines and extract the answers from the search result pages (Sullivan 2005). It is suitable to find answers for straightforward questions, but not for the problems that require computation.

Our main emphasis in *Feel-It* is the learning algorithms which are capable of categorizing Physics problems based on the domain and identifying the question focus, question keywords, values with their units within the problem statement in order to provide solution guidance. The objectives of the study are to construct highly correlated annotated Physics resources, and to build an intelligent knowledge base to support the QA system and to prove the effectiveness of the proposed QA system on a number of selected students.

The next section describes the process of Physics problem understanding. Then, Sect. 7.3 details out *Feel-It* system design for solving Physics problem. Section 7.4 presents the system evaluation, result and discussion. Finally, Sect. 7.5 concludes the paper with future works.

7.2 Background

Over the past decades, a number of researches have been carried out to address the difficulties students faced in solving Physics problems. Various online and offline QA systems have been seen to attempt to address the issues. In this section, we present the related works of Physics problem understanding as well as to discuss existing systems and their limitations.

7.2.1 Physics Problem Understanding Challenges

Novices usually do not possess a deep understanding of Physics problems. Most of them will try to memorize equations and recall previously solved examples in hopes of fabricating a solution. This is because they believe that knowing facts, equations and algorithms could lead to understand the subject (Elby 1999). However, competent students know that this kind of thinking cannot lead to the real understanding of the problem. To truly understand Physics problem, the students should be able to identify the required information from the question such as problem domain, question focus, question keywords and values with their units. Then, the students must be able to assign the right notation to the identified information. Finally, the students needs to be able to know how to use needs to be able to know how to use the correct principle or equation to solve the problem.

Students who are able to solve the problems with the correct answers do not always mean that they have proper understanding of the problems. Most of them will look for the equations that match the quantities provided by the problem and manipulate it to derive the correct answer. Although this strategy usually yields the correct answers, it does not imply that students have a deep conceptual understanding of the problem (Docktor et al. 2012).

7.2.2 Physics Problem Solution Systems

Two types of the Physics problems were commonly asked in a classroom: open text query and Physics problem. Open text query is the question-like or natural language text with which requires explanation, e.g. "*What is energy*?". A Physics problem is a solvable question which consists of the parameters and units where it is a type of question that required calculation. For example, "*What is the acceleration of the car when it starts from* 10 m/s *to* 50 m/s *within* 2 s*?*".

In general, there are four types of the Physics QA systems existed, which are "Yahoo! Answers", "BrainBoost", "Tutorvista.com" and "Score A", to solve various types of Physics problems. The summary of each of the systems is listed in Table 7.1.

Table 7.1 Existing Physics Q&A systems

System	Problem types	System function	Advantages	Limitations
Yahoo! Answers	1. Open text query 2. Physics problem	Users submit problems in hope that other users will provide the solutions	Answer by humans Various answers are available Users can search for related questions and answers	Users may or may not get the answers Delay responses
BrainBoost	1. Open text query	Users input problem and the system uses meta search engine to retrieve answers and rank the answers	Users can get answers immediately	Users cannot get the correct answers for Physics problems
Tutorvista.com	1. Open text query 2. Physics problem	Users input problem and tutors provided the answer	Users can obtain accurate answers with explanations	Paid service and requires to book for tutoring session
Score A	1. Multiple choices	Solutions accompany with explanations	Users can obtain the explanation immediately	Limited exercises

7.2.2.1 Yahoo! Answers

Yahoo! Answers is an online question answer system which serves as a knowledge platform for knowledge sharing, including questions related to Physics. It represents a type of community portal that allow users to post their questions and answers (Gyöngyi et al. 2008). Users can also seek advices, opinions and accept more than one answer. To use the system, users are required to registere in the system. Users can then start posting questions where the community can provide answers. In addition, the community can vote for the best answer and comment on the answers (Gyöngyi et al. 2008).

7.2.2.2 BrainBoost

BrainBoost is one of the meta search engines which uses machine learning and natural language processing to provide answers to the questions encoded in natural language (Srinivas et al. 2011). Conventional search engines, search for the most

relevant results where users have to read them to verify if the results are valid. Brainboost has improved its search method by combining multiple results from different search engines, improving both recall and precision. BrainBoost generates different queries to be submitted to different search engines, examines the search results, extracts the possible answers from the results and finally uses Answer Rank algorithm to rank the possible answers. It is only available in English currently.

7.2.2.3 Tutorvista.com

Tutorvista.com is an online tutoring system for Math, Physics, Chemistry and Statistic. The student can study the subject on a one-on-one basis with a professional tutor in a secured web based environment. It uses the virtual whiteboard workspace to draw and write in order to share problems, solution and explanation. It also uses simulations and animations to improve learning (How it works, 2014). However, the student is required to book for tutoring sessions. In addition, for Physics, the system provides references such as concepts, equations, calculators and worksheets. For example, for the topic of acceleration, it explains the meaning of acceleration with suggested equation and provides topic related calculator. The student can then input the values in the provided textbox to obtain the result.

7.2.2.4 Score A

Score A is an online e-learning system for primary school to secondary school students. Students choose programmes based on their levels, subjects, and topics. They may practise on the set of questions, carry out exercises, and try out trial or past year examinations according to the predefined categories: eTopic, eAssessment, eTrial Exam and ePast Year Exam. For Physics subject, the system currently only provides multiple choice questions accompanied with explanations. It also includes features such as eDictionary, e-Notes, e-Report Card and a count down timer for eTrial Exam and ePast Year Exam. This system enables parents to monitor their children's strength and weakness (Lobo 2009). However, Score A requires subscription in order to access to all of their contents.

7.3 Feel-It Architecture

After identifying the shortcomings of the reviewed systems such as non-instantaneous answers, unable to accept open ended Physics problems, and inflexible tutoring sessions. We would like to propose *Feel-It*, to overcome the above mentioned shortcomings and to guide students through the problem solving stages (1) understanding the Physics problem, (2) planning solution, and

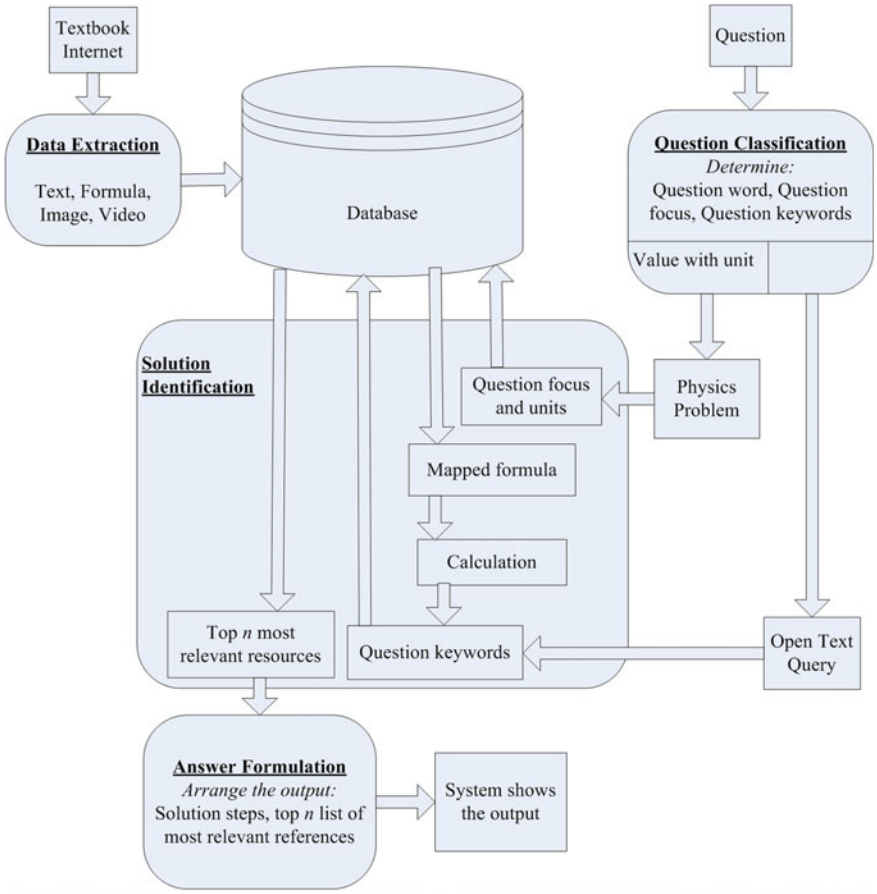

Fig. 7.1 The architecture of *Feel-It*

(3) executing the plan. Figure 7.1 below shows the architecture of the proposed system. The system constitutes of four major modules: data extraction, question classification, solution identification and answer formulation.

7.3.1 Data Extraction

We have manually collected various forms of Physics resources such as texts, equations and images to build our Physics knowledge. For categorization tasks, we compiled a list of Physics datasets including kinematics, elastic collision, inelastic collision, work, energy, power, elasticity and force & motion domain as listed in Fig. 7.2. Most of the datasets are obtained through extracting the content from the

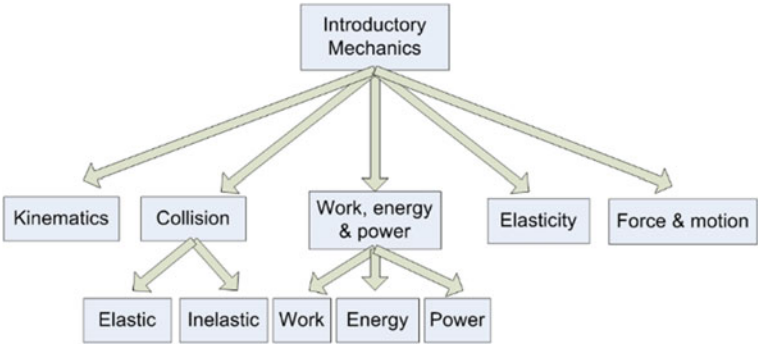

Fig. 7.2 Physics datasets across each category

Physics textbooks.[1] Other resources used were Youtube and Google images. Each dataset and resource were captured and stored according to their categories (domains). The distribution of datasets across each category is shown in Fig. 7.2. Besides, these datasets were also being used to create a semantic space by using Latent Semantic Indexing (LSI) (Wiemer-Hastings et al. 2004), so that, the similarity of the datasets and the question can be computed as the cosine similarity in the semantic space to retrieve the most relevant references.

LSI is a statistical information retrieval method that is able to retrieve information based on the concept contains (Branford 2009). It works extremely well on synonym. For example, when one searches for *car*, it can identify *motion*, *automobile*, *vehicle* etc. In other words, the system is able to capture the resource context using LSI algorithm to retrieve a list of most contextual relevant resources to the question.

We use LSI to determine the word occurrence for every dataset using text-document matrix and based on the word frequency to determine which words are more important by using Term Frequency Inverse Document Frequency (TF-IDF) weighting scheme (Ramos 2003). Its value will be higher when term t occurs many times within the documents. Then, the Singular Value Decomposition (SVD) will be performed on the matrix to transform it into a 'semantic' space of low dimensionality. Its purpose is to find the semantic relations between terms and documents in order to solve the issues of synonymy and polysemy (Jaber et al. 2012). Lastly, the system will use the cosine measure to return similarities in the range of $<-1, 1>$.

Our proposed system constitutes of four modules as mention above. Once data are collected, it proceeds to understand the Physics problem in the question classification phase.

[1](1) Newtonian Physics written by Benjamin Crowell, (2) The Free High School Texts: A Textbook for High School Students Physics written by Mark Hommer, Sam Haliday and Spencer Wheaton and (3) College Physics written by Dr. Paul Peter Urone, Dr. Roger Hinrichs, Dr. Kim Dirks, and Dr. Manjula Sharma.

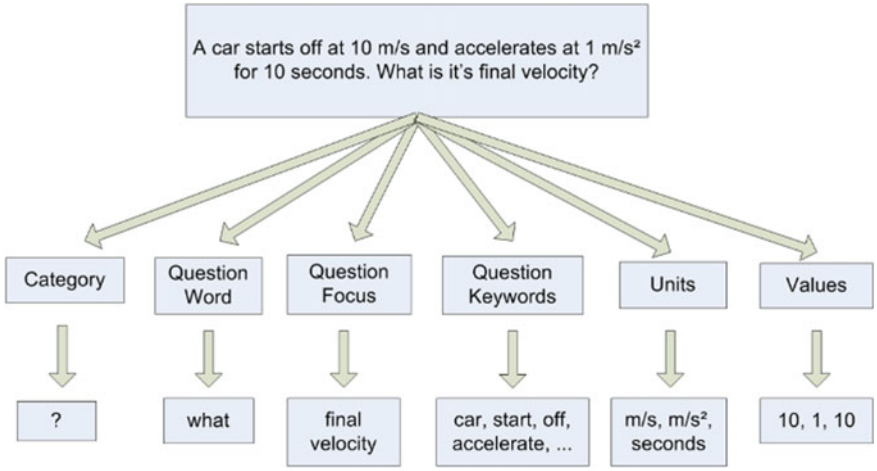

Fig. 7.3 Representation of a Physics problem in question classification

7.3.2 *Question Classification*

In most QA systems, the solutions to questions are normally pre-categorized or predefined by humans, but *Feel-It* attempts to automatically identify the solutions to guide the users to understand the problems by showing related references through videos and images in order to maximize learning experience. The steps of representing new problems leading to a solution in *Feel-It* are as follows:

1. Present a problem statement.
2. Represent the problem statement by extracting significant keywords, finding question's focus, identifying question keywords, units and values.
3. Categorize the problem statement.
4. Identify the most suitable equation.
5. Present the solution.

An example of the final output of a represented Physics problem is shown in Fig. 7.3. The steps taken by the system to extract relevant information from a given problem and transform the information to a visual representation is a unique aspect of *Feel-It*. Unlike any of the existing tools, the student could see the problem solving process, leading to the final answer with relevant references.

7.3.3 *Solution Identification*

The solution identification module computes solution as well as searches for the top $n = \{1 \ldots 100\}$ most relevant references according to the user input using the

knowledge base build in Sect. 7.3.1. The solution very much depends on the question focus and units, which will then be mapped to the equation in the database. Quantity unit appears in the problem will be automatically converted to the International System of Units (SI) units and substituted the values with the corresponding SI units to allow calculation. At the same time, the module will retrieve the top *n* most relevant resources using the LSI algorithm.

For example, when the user input a question "*A car starts off at* 10 m/s *and accelerates at* 1 m/s^2 *for* 10 s. *What is it's final velocity?*". The representation of the problem is carried out at question classification phase (see Sect. 7.3.2). Based on these three values with units, we know that they are initial velocity *u* with "m/s", acceleration *a* with "m/s^2" and time *t* with "*seconds*". The system then will find the suitable equations to solve the final velocity. There have three types of equations that can solve the question, which are as shown in Eqs. (7.1), (7.2) and (7.3).

$$\mathrm{v} = (\mathrm{u} + \mathrm{at}) \tag{7.1}$$

$$\mathrm{v} = (2\mathrm{s}/\mathrm{t}) - \mathrm{u} \tag{7.2}$$

$$\mathrm{v} = \sqrt{(\mathrm{u}^2 + 2\mathrm{as})} \tag{7.3}$$

Among these, the most suitable one is Eq. (7.1) because the system is able to obtain *u* value, *a* value and *t* value from the question. Then, all the units will be converted to SI units. After that, all the values with SI units are substituted into the found equation then produce the final answer. "$\mathrm{v} = (\mathrm{u} + \mathrm{at}) = (10\,\mathrm{m/s} + (1\,\mathrm{m/s^2})(10\,\mathrm{seconds})) = 20\,\mathrm{m/s}$".

After completing the computation, the system will extract the top *n* most relevant resource references from the database, complementing with the solution. The process is to provide aids to students leading to the solution.

For the open text query, the system will skip the computation part and search for the most relevant references. The system will project the open text query into the semantic space and retrieve the most similar resources, including reference text, images, videos and equations.

7.3.4 Answer Formulation

The main role of answer formulation module is to organize the solutions or results to be interpreted by users. There were two types of the output for Physics problems. The first output is the category and the solution showing the steps in getting the

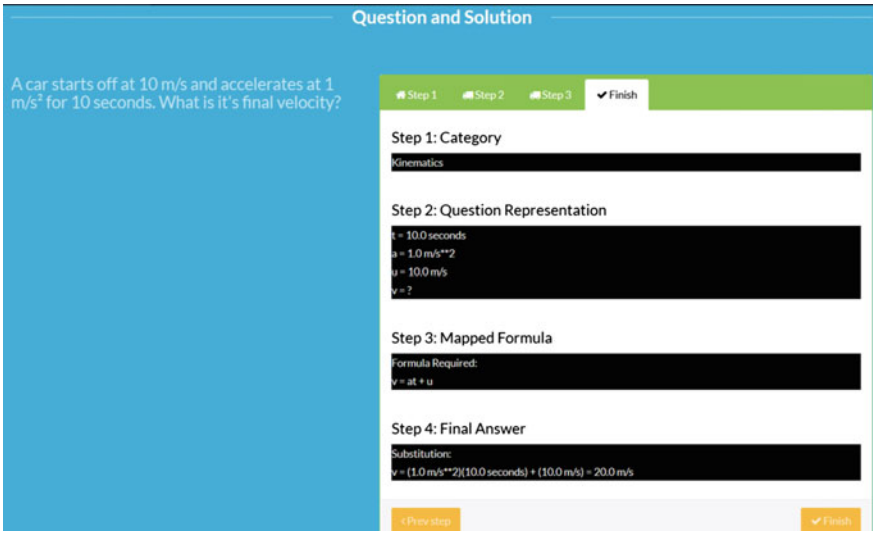

Fig. 7.4 Calculation of solution in a given Physics problem

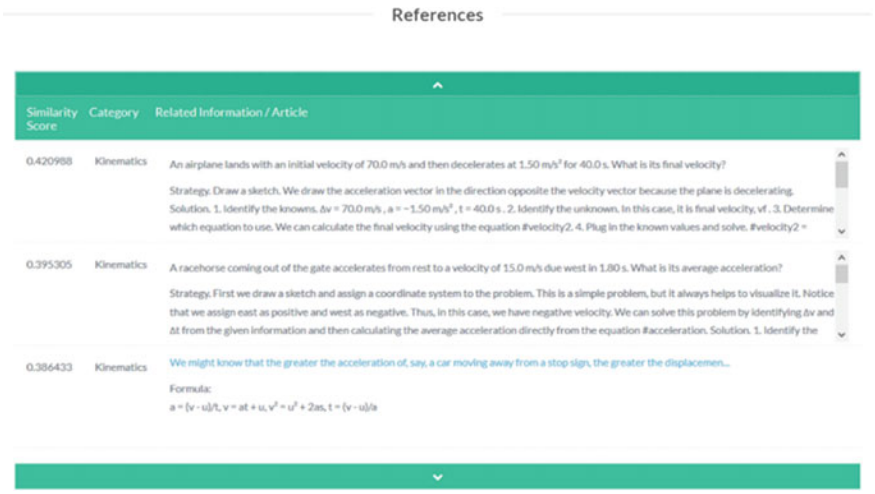

Fig. 7.5 Returning the top *n* most relevant resource references

final solution, see Fig. 7.4. The second output is showing the top *n* most relevant resource, as shown in Fig. 7.5.

If the input were open text queries, it only shows the top *n* most relevant resources which include videos and images as shown in Fig. 7.6.

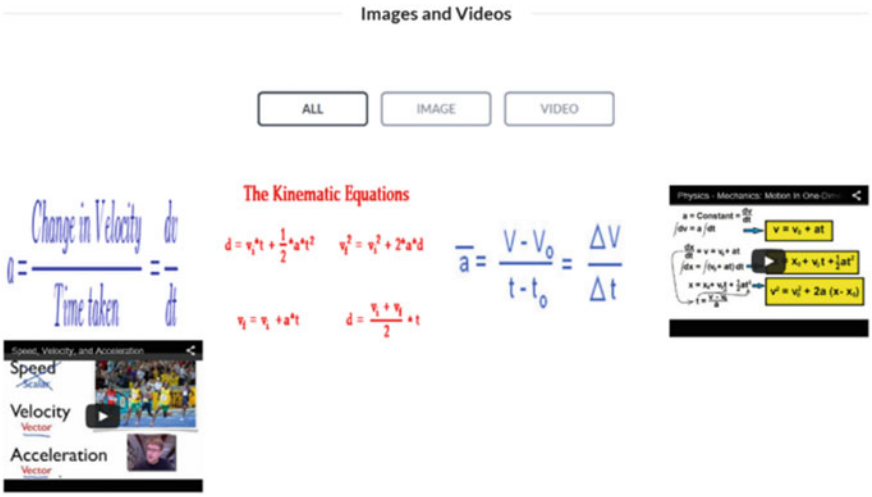

Fig. 7.6 Returning the most relevant videos and images

7.4 Result and Discussion

We have identified a number of undergraduate students to evaluate the system, each was asked to submit a number of open ended Physics questions. Table 7.2 shows the overall result of the system after all the students have input 70 questions.

Based on the table above, it was obvious that the system is able to solve the majority of the questions. There are 8 questions which were out of the scope. Some of the incorrect answers were due to complicated questions where the system is unable to detect the values to calculate the solutions correctly, e.g. hidden words and hidden equations. For example, given "*A car traveled* 88 m/s, 90 km *in the next* 2 min*, and then* 76 m/s *before reaching its destination. What was the car's average speed?*", it constitutes of too many values with units which are rather confusing.

These values cannot be directly substituted into the equation. It required derived equations. The question requires adding all the distances which are "$\sum s = s_1 + s_2 + s \ldots = 88\,m + (90 * 1000)\,m + 76\,m = 90164\,m$" and the total time spent, which is "$\sum t = t_1 + t_2 + t \ldots = 1\,s + (2 * 60)\,s + 1\,s = 122\,s$". Finally, all the values were substituted into the equation and get the average speed, "$v = s/t = 90164\,m/122\,s = 739.05\,m/s$". Due to these hidden equations, the proposed system failed to obtain the solution.

Table 7.2 Overall result of the system

	Result of the system			
	Correct	Incorrect	Out of topic	Unable to solve
Total number of answers	45	3	8	14

Another example is "*A rock is thrown straight upward with an initial velocity of* 9.6 m/s *in a location where the acceleration due to gravity has a magnitude of* 9.81 m/s^2. *To what height does it rise?*". This question involved the upward gravity, which requires the negative value of the gravity. However, our system currently has not encoded with such information.

7.5 Conclusions and Future Work

In order to understand a Physics problem, a student needs to be able to categorize the problem based on the domain and identify relevant features such as question word, question focus, question keywords, units and values. To assist the student in this task, an intelligent secondary school Physics QA system called *Feel-It* has been proposed. The system can help students to avoid misconceptions and misinterpretations of the questions. *Feel-It* shows solution in steps, leading to the final solution.

Feel-It consists of four modules which are data extraction, question classification, solution identification and answer formulation. After the data have been extracted, the system starts to identify the question whether it is a Physics problem or an open text query, then it will find the solution through identifying the values and units. To find related references, *Feel-It* uses LSI. The overall result shows that the proposed system is able to solve most of the random questions, but may be hurdled at complicated questions and those that fall out of our topics coverage.

For future work, we plan to improve the system by including freebase database or DBPedia database by using the Quepy framework (Cardellino and i Alemany 2013). With the combination of these databases, the system will be able to facilitate more resources to enhance the answers generated.

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Chapter 8
Conceptualizing Data Driven Decision Support Component in Academic Information Management System

Ariza Nordin and Suriyani Ariffin

Abstract Academic management decision making in academia reflects effective leadership in determining the quality of graduates. It is challenging and time-consuming effort as the decision makers must be comprehensively and accurately informed. The use of technology to develop decision support system has been proven to reduce the time-consuming problem as databases are used to promote systematic capturing and storing of data. This paper reports the conceptualization of data driven decision support component in Academic Information Management System. It is intended as a design framework for a web-based data driven decision support component for academic insights and analytics. A participatory action research strategy by which one researcher is representing the technical team and another representing process owner team focus on conceptualize the data driven decision support component. Appointed as the project team, the researchers worked together over several months for implementation of Academic Information Management System. Meetings, workshops and discussions are avenues of data gathering, analysis and reflection. The analysis and reflection contributes to a qualitatively identified data driven model of the decision support component. The data driven model emphasizes on consistency of curriculum data where curriculum management module acts as the single source of truth in providing input to other modules and the student information management system. Reflectively the accuracy of academic data insights to decision makers is directly dependent on how effective curriculum data has been captured, stored, organized and disseminated within a curriculum lifecycle.

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Keywords Decision support system · Academic management · Higher education · Analytics

8.1 Introduction

The challenge of higher education academic managers is to make the right decision in academic management. Published researches suggested frequently encountered decision making problems in academic management are "resource allocation, performance measurement, budgeting, and scheduling" (Ho et al. 2006). Academic management refers to functions of academic planning, organizing, influencing and controlling of things and people pertaining to teaching and learning, and research (Deem and Brehony 2005). Academic management decisions are often time-consuming with high dependency on non-volatile academic data and external data. In practice, academic decision makers in Universiti Teknologi MARA (UiTM) have predicaments due to academic data inconsistencies as they came from multiple sources and systems. These predicaments promote decision delayed and trust problem to UiTM academic managers.

UiTM decision makers in academic management attend to the educational needs of hundred thousand of its students and eight thousand academicians. UiTM presently comprises 38 campuses offering 385 academic programs to 175,000 students at various academic levels. The university is currently experiencing an academic transformation phase demanding lean management and autonomy campuses in the pursuit of academic excellence. Adding to the transformation agenda are pressures from the Ministry of Education to promote operational efficiencies through reducing operational costs, better and more responsive service to students. Academic transformation inspires innovation of business processes through the use of technology in academic management. Academic Information Management System (AIMS) in UiTM is a strategic information system identified through series of bi-annual academic executive management meetings (META) and Strategic Information System Planning UiTM (ISP UiTM 2013-2017). AIMS targets curriculum management, examination management, workload management, academic resource planning, scheduling and academic calendaring as most crucial and challenging business processes innovation to be realized. On the same note, UiTM is responding to globalization by making technology an integral part of its teaching and learning. Blended learning and massive open online course (MOOC) have been promoted to be an academia culture in UiTM. With these innovative solutions in place, databases of AIMS and the Student Information Management System (SIMS) are valuable asset to UiTM and crucial for academic management decision making. The return of investment for information technology depends on how well these data has been captured, stored, transformed into information and knowledge. A reliable decision support system beyond these databases is yet another innovative success story within the academic landscape. This upcoming success story however, depends on a trusted data driven layer within the decision support system

architecture in AIMS. This case study aims to conceptualize the data driven decision support component in AIMS.

8.2 Literature Review

The 21st century higher education is experiencing a new phase affecting students, faculty, governance, curriculum, functions, and society commitments (Stanley and Trinkle 2011). Continuous pressure applied on universities to become agile in their way of doing things and effective in decision makings. Academic transformation agenda has impacted on higher education institutions in that there is an increased emphasis on productivity, quality and accountability with regard to the core business of a university (Clark et al. 2009). Higher education institutions strived to be efficient by automating business processes and effective by leveraging on IT decision support solution to gain insights of data for academic management. Strategic decisions in academic management determine globalization of graduates and quality of a university. Within an academic management framework, data and information is crucial. Academic management demands academic managers to be equipped with accurate data and resilient enough to come under pressure in making decisions. Existing enterprise solution in academia strived to provide consistent and reliable data to decision makers at every academic management function and level.

The concept of decision support system emerged as early as mid-seventies (Sol 1981). Decision Support System (DSS) has been defined in various definitions (Turban et al. 2005; Bresfelean and Ghisoiu 2009) which in principle points to the concept of technology enabled decision making process for problem solving at operational, tactical and strategic level of organization management. DSS represents a specific class of information systems and data driven decision support system is a categorized as DSS with high dependency on operational data of an organization and external data (Power 2004). However data driven DSS good design must include a data warehouse, which is subject-oriented, integrated, time-variant, non-normalized, non-volatile collection of data (Kimball 1996). DSS can be categorized into several types (Alouhal and Albidewi 2014), however the study is focused on the knowledge based and the data driven types.

Figure 8.1 illustrates selected previous works of DSS in higher education landscape. Data driven decision support system has been contributed by Zilli and Trunk-Širca (2009) producing a comprehensive design of DSS for academic workload management using a case study of "a faculty with around 3000 students, 100 faculty staff members and over 100,000 working hours of yearly workload". Vinnik and Scholl (2005) proposed DSS to workload management DSS to assess educational capacity using data driven DSS. Several knowledge-based DSS models published are Turban, Fisher, and Altman in 1988 produced an early work of Academic Administration DSS followed by Lopes et al. (1997) published DSS for Academic Departments Performance. Academic Advising DSS is the most investigated and starting from the work of (Murray et al. 2000). Academic Advising is

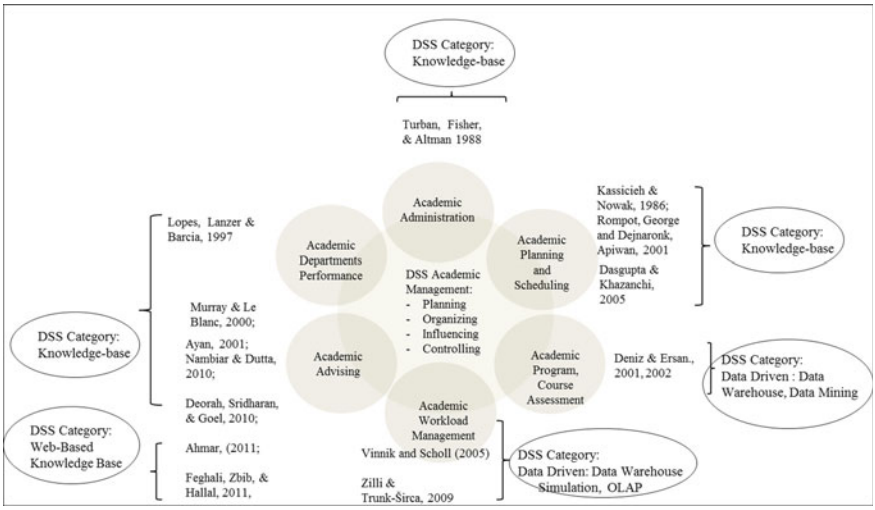

Fig. 8.1 Previous works of DSS 1986–2011

further researched by Ayan and Ozturan (2001), Nambiar and Dutta 2010, Deorah et al. (2010), Ahmar (2011) and Feghali et al. (2011). Kassicieh and Nowak (1986), Rompot et al. (2001) contributed some work and discovery in academic planning and scheduling DSS while Deniz and Ersan (2001, 2002) proposed a DSS for student, course and programme assessment. Dasgupta and Khazanchi (2005) described intelligent agent enabled DSS for academic course scheduling. Knowledge-based DSS is data driven with addition of rule-based and categorized as expert system or intelligent system.

8.3 Methodology

Adopting Participatory action research (PAR) in this case study provides a justified systematic method of learning through one's practice by working through a series of reflective stages that facilitate the conceptualization of a model. PAR is collaborative research, education and action used to gather information to use for change on social or environmental issues. It involves people who are concerned about or affected by an issue taking a leading role in producing and using knowledge about it. PAR is an approach that enables specific stakeholders (process owner team—HEA team) to own decisions about those aspects of service development and delivery that directly affect them. The methods used in association of the PAR approach in this case study are group discussion, meeting, and diagramming. Figure 8.2 below described a working PAR model adopted where each step taken is illustrates against its principle.

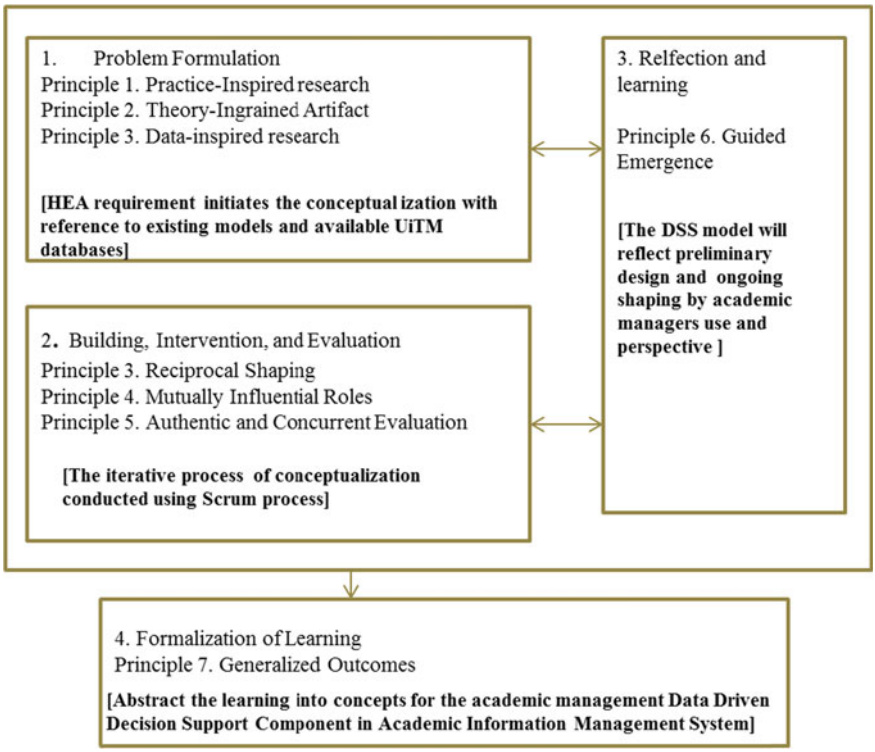

Fig. 8.2 PAR approach adopted. *Source* Hllinen (2012)

8.4 Conceptualizing Data Driven Decision Support Component

Based on analysis of the problem stated by the process owner—HEA team, the scope of decisions identified is limited to categories of decisions for academic managers in Academic Affairs office.

8.4.1 Underlying Data Sources

The data used to make decisions in academic management originated from the internal operational databases of AIMS, SIMS, Facility Management System, Human Resources System, Financial System, Research and Consultancy Information Management System and Publication Information Management System. External data requirements include graduates employability and annual events and public holidays. From the perspective of data quality, both the process

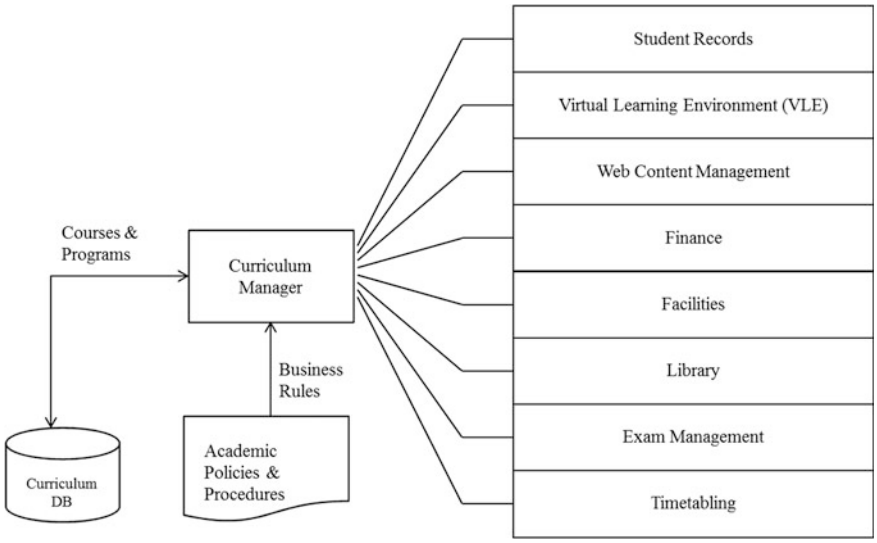

Fig. 8.3 Coherent design model of AIMS

owners and technical team reflected that curriculum data in silo or fractured across multiple systems are difficult to be managed causing the inconsistencies problem stated by this case study. Hence AIMS has been designed to provide the single source of truth to solve the problem of curriculum data inconsistencies, fractured across multiple sources (Fig. 8.3).

8.4.2 AIMS Data Warehouse

AIMS Data Warehouse for the scope of academic management studied consists of four (4) data marts which share dimension tables building a constellation of star schemas. Tabulated in Table 8.1 are potential dimension and fact tables discovered during the conceptualization course of work. However the list is not exhaustive as it has potential to be extended in actual development of the data warehouse.

8.4.3 DSS Component

The DSS component in AIMS targets to provide insights of academic transactional data to academic managers for informed decision making. Figure 8.4 illustrates the four (4) DSS components discovered from the process owners team. The components are for academic planning and scheduling, academic advising, workload management and performance evaluation and assessment.

Table 8.1 AIMS DSS data mart

Data Mart	Shared dimension table	Dimension table	Fact table
Planning	Academic period (Time) Course Program Field of study Faculty Campus Academic staff Student	Calendar Schedule Activity Activity category	Activity outcome Calendar conflict Timetabling conflict Academic activity count
Curriculum		Study plan Study plan type Course standard Program standard Assessment	Course assessment Program assessment Curriculum review index Enrolment indicator Popularity index
Resource		Workload type Staff role Facility type Teaching load Requirement Teaching cost Facility cost Student group	Staff workload Cost per student Student group count
Research, publication and consultancy		Performance Evaluation Assessment Publication Research core Consultancy Grant	Research score Consultancy income Consultancy cost Publication volume Publication density Grant amount

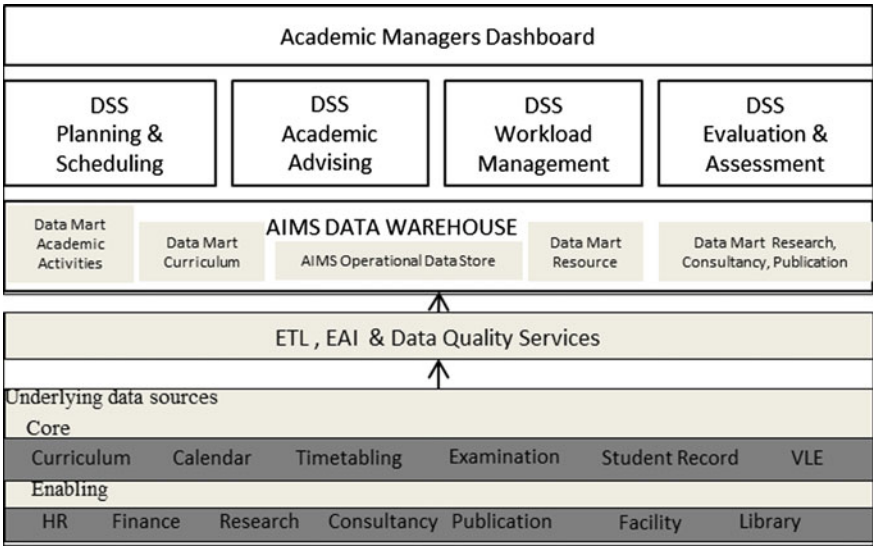

Fig. 8.4 DSS component in AIMS

Table 8.2 AIMS DSS Referencing Models

DSS component	DSS model	Data mart required
DSS planning and scheduling	Available Dasgupta and Khazanchi (2005)	Curriculum Academic activities Resource
DSS academic advising	Available Feghali, Zbib, and Hallal (2011)	Curriculum
DSS workload management	Available Zilli and Trunk-Širca (2009)	Curriculum Resource Research, publication and consultancy
DSS evaluation and assessment	Available Deniz and Ersan (2001, 2002)	Curriculum Academic activities

The conceptual layer of a dashboard provides the decision support system, with a user interface that allows academic managers to visualize information by means of a visualization tool in addition to the capability of selecting data to be used for further analytics as power users. Dashboards are most effective when they are customized to reflect the specific needs of each user group. The DSS component accessible by power users are divided into components to be authorized by academic managers scope of work and data access security level. The access level is determined by collecting non-functional requirements of the DSS development. The data warehouse layer houses the data mart elaborated in Sect. 8.4.2 with an additional AIMS Operational Data Store. Operaitonal Data Store is a data mart consisting of real time data for enquiry purposes. Finally the ETL (Extract, Transform and Load) process, EAI (Enterprise Application Integration) and data quality services are services used to populate data into the data warehouse data store.

As previous works of DSS have produced models in relation to each of the AIMS DSS component, Table 8.2 tabulates the reference model for each DSS component illustrated in Fig. 8.4.

8.5 Conclusion

Academic management decisions are crucial to a university with consequences to credibility and global reputation of the higher education institution. In addition these decisions can cause phenomenal impact when students are at stake. Decisions within the academic management scope are time-consuming where data quality is a key to the right choice of decision options. Technology has answers to the time consuming and data quality challenging issues by providing a specific information system decision support system which comes with several categories. As university is a data intensive organization, data driven decision support system are able to

reveal significant amount of answers that academic managers need to solve problems within their scope of authority. Conceptualizing the decision support component in an Academic Information Management System framework aims to provide the design idea which is required during the framework implementation. This case study adopts PAR to identify the current problem, build, intervene, evaluate, reflect and formalize the DSS component for the scope of UiTM academic managers.

Recommendation for future work to this effort is to design the analytic and predictive model for university strategic purpose. Incorporating big data analytics to the academic management decision making framework unveils patterns of online and virtual learning environment. This future work continuity provides top executive management of the university with analytics capability making use massive online data relevant to forecast and envision future organization direction in tandem with technology leadership recognition.

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Chapter 9
Inter-school Information Sharing Activities Through Cloud Services: User Willingness and Less Favoured Areas

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Abstract Cloud services means services provided by cloud computing provider based on user requirements. Popular cloud services activities nowadays are online data storage, data backup solutions, document collaboration services and database processing. This research has two main objectives. First objective of this research are to determine the willingness of inter-school information sharing on cloud. Second research objective is to determine less favoured category of information shared on cloud. This research paper was produce by using two research methods. First technique utilized the quantitative research method that used questionnaire to gather data and information on user willingness. Second technique was using the literature method that collect the information sharing activities among schools through an analysis of related research paper to determine the less favored information sharing category to be shared on cloud. Next, the information collected on these two techniques was analysed based on the research objectives. Results of this research are respondents highly agree and willing to share school information inter-organization and intra-organization. Other results of this research are social information is one of the less favoured category of information to be shared among schools on cloud. They prefer to share on education areas mainly and also some schools prefer to share on administrative area.

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Keywords Cloud services · Academic information sharing · Inter-school · Social information sharing

9.1 Introduction

The motivation to write this research paper is to confirm and support the gap analysis for the research project titled "Inter-Schools Social Information Sharing by Cloud Service as Cloud-based Delivery Model" funded by Ministry of Education Malaysia. This research is utilized the Research Acculturation Grant Scheme (RAGS). This section will discuss the important terms used in this research paper and outline the objective of this research paper. The flow will start with the short review on cloud computing in general and also in education field. Next, the objectives of the research paper are explained in this section.

Cloud computing is a "clusters of distributed computers (largely vast data centers and server farms) which provide on-demand resources and services over a networked" (Sultan 2010). It is an exciting Information Technology development that can be apply in educational environment because it can reduce organizational cost and give powerful functional capabilities (Ercan 2010). This technology will enable the sharing of computer resources such as networks, servers, storage, applications, and services such as emailing services (Paventhan et al. 2014) and it also great because all the updating, backup and maintenance is done by the cloud service provider. The intention of this paper is the benefit gain by data storage and data merging services provide by cloud computing technology that enable users to share information and merge the ideas on cloud. Next, we move to the benefit and meaning of information sharing.

Information sharing is a beneficial activity that will help to boost the productivity, knowledge and quality. This research was focus on information sharing activities among schools that utilize the cloud computing technology. Sharing means to allow people to see, use or have something that you own and it also means to tell people about something (Macmillan Publishers Limited 2015b). Many people agree that information sharing can give the advantages to many parties but there are some reluctant to share an information due to the issues of data security and privacy. The objectives of this research are stated as below:

(a) To determine on user willingness which is schools in Malaysia to share information through cloud services
(b) To identify less favored areas of information want to be shared by schools in Malaysia through cloud services.

In the literature review this paper will discuss a few previous researches on user willingness to share information and the areas they always like to share.

9.2 Literature Review

Research done by Lim et al. (2015) reported that principals of Swedish believe cloud computing can give the significant benefits to the school on pleasure access of data and software and also enable people to share learning contents and data but they have some reluctant to adopt the cloud computing technology due to the data security and privacy issues. Other issues concerns on emerging cloud computing are related to "control, vendor lock, performance, latency, security, privacy and reliability" (Sultan 2010). The privacy and security issues lead to the next objective of this research that will determine the willingness to share school data and information on cloud among schools in Malaysia. This objective is to confirm and ensure that this project will get the support from the target end users.

Then, this research paper move to the next level by determine the less favoured category of information shared by schools on cloud. The researchers limit the scope into two main categories which are academic and social information. This research will identify less favored category between these two categories. The output of this objective is important to ensure research gap of the project that will be conducted. Academic information means the information or detail on the activity relate to education either in schools or higher institutions (Mac Millan Publishers Limited 2015a) and for addition, meaning of education is an activity of educate people in primary and secondary schools and higher institution, and also all policies and arrangement related with teaching and learning process (Mac Millan Publishers Limited 2015). Examples of education activity are built up the lesson plan, lab experiments tutorial, innovation education games and etc. On the other hand, social information means the information or detail on activity related with society (Macmillan Publishers Limited 2015c) that will create fun, boost motivation and build self-confidence. School social activities is categorized by School Events, Spirit Events, Student Council Bonding Events, Advertising and Public Service (Bunyan et al. n.d.). Table 9.1 shows the example of school social activity by category.

Detail on the task or procedure of research conducted for this research paper will be discussed in the next section.

Table 9.1 List of school social activity by category (Bunyan et al. n.d.)

No.	Social activity category	Example of activity
1	School events	Basketball tournament, music fest, survivor
2	Spirit events	Spirit week, team spirit
3	Student council bonding events	Game week, orientation day, English day
4	Advertising/Awareness	Balloon messages, clock posters
5	Service	Blood donation, car wash, trauma bear

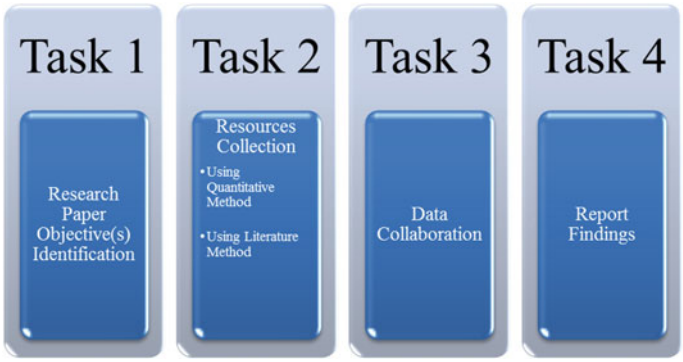

Fig. 9.1 Research Method Diagram

9.3 Methodology

Two main sources of data and information in this research are through Questionnaires and related previous research work (literature study) on cloud computing technology practices focuses on education and schools. Main activities involve in this research are Research Paper Objective Identification, Resources Collection, Data Collaboration and Report Findings. Figure 9.1 shows the Research Method Diagram that illustrate the activities apply in this research paper.

The description on research method diagram that consist of four task or activities involve in this research paper as stated below.

9.3.1 Task 1: Research Paper Objective(s) Identification

This step involves the list of interest research topic and expected result outcome that lead to the research paper objective(s) identification. The well-defined objective(s) will help to driven the searching and selecting process on potential related research paper. The deliverables of this task is also important to design the good questionnaire items.

9.3.2 Task 2: Resources Collection

This task involves the collection of data and information from two sources which are questionnaires and related research paper. Two types of method used in this task are:

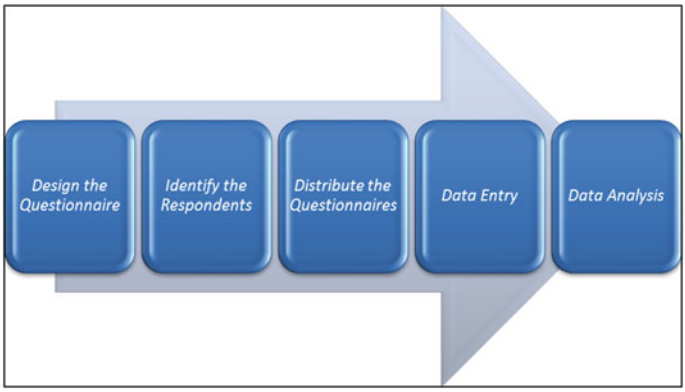

Fig. 9.2 Quantitative method diagram

Table 9.2 Research questionnaire rating and strength of agreement

Rating	Strength of Agreement
1	Strongly disagree
2	Disagree
3	Agree
4	Strongly agree

9.3.2.1 Quantitative Method

Figure 9.2 shows the quantitative method diagram consist of steps involve in this research paper. The purpose of this method is to collect the data through questionnaires and transform the data into information.

The questionnaire is design for the whole research project titled "Inter-Schools Social Information Sharing by Cloud Service as Cloud-based Delivery Model" funded by Ministry of Education (MoE) Malaysia. The respondents of this questionnaire are the Malaysia high school administrative staff and teachers. Distribution process is done through mail. The data in this research paper is based on the pilot test data from 18 respondents. The analysis of data is done using SPSS based on first research paper objectives. Scale used in the questionnaire is based on Likert Scale that has four rating value as shown in Table 9.2.

9.3.2.2 Literature Method

The methodology apply for this section is an enhancement on Lin (2009) that elaborate on research methodology for literature study on previous research paper. Figure 9.3 show the activities involve in the literature method.

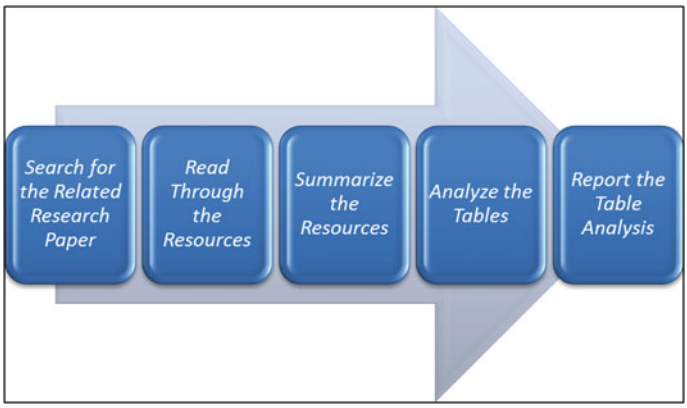

Fig. 9.3 Literature research methodology activities

Research methodology activities listed in Fig. 9.3 is the common step used by the researchers that written the research paper based on literature review. Details of the task involved in each activity are stated below:

9.3.2.3 Search for the Related Research Paper (Resources)

The task involve in this step is find the related research paper known as resources based on the research paper objective stated earlier. The searching and finding research paper process is using the university's online databases. The related resources were downloading into the Mendeley application. Keywords used in the searching process are education, cloud, school, academic and social.

9.3.2.4 Read Through the Resources

Downloaded material or resources was read thoroughly. Then process of identifying and sorting the essential resources that match with the research objective is taken place.

9.3.2.5 Summarize the Resources

Content in the resources was simplified and summarized by using table based on theme or table titles.

9.3.2.6 Analyse the Tables

Analyse the table by list down the differences or similarity or pro and cons.

9.3.2.7 Report the Table Analysis

Table analysis is written as results in the research paper.

Output or deliverables of task in Figs. 9.1, 9.2 and 9.3 is presented in the Sect. 9.4 as results for this paper.

9.4 Results and Discussion

The structure of this section was presented based on two research paper objectives. As stated in the introduction, first objective is to determine the willingness of information sharing among schools in Malaysia through cloud services. The result of the first objective was gain by using quantitative method that used questionnaire as a medium to gather data and information. The importance of this result is to make sure the project to be conducted is supported by the target end users. Next, this section will move to the second objective which is to determine the less favored areas of information shared by the school on cloud all over the world. This result is necessary to ensure the gap of the project is well defined. Justification of the second objective was if the area is already matured so it might be enough technical and procedure available all over the world.

9.4.1 Willingness of Information Sharing on Cloud

SPSS application is used to get the results of willingness rating value for 18 respondents. This information is extract from Section V (a) in the questionnaire. Detail of the target user willingness rating to share information on cloud shown in Table 9.3. The value for Cronbach α for this data set is 0.924 which is accepted as reliable data.

Mean value in Table 9.3 shows that all the respondents rating for each type of information to be shared on cloud is more than 3.0. As outline shows in Table 9.2 of Research Method Section, rating 3.0 means agree with the statements stated in the questionnaire. This output may be influence by the belief on benefit will be gain on information sharing among schools on cloud. Table 9.4 shows the analysis rating value on benefits of information sharing on cloud.

Mean values in Table 9.4 shows that all the respondents agree with the listed benefit to be gain from cloud computing technology except “Information sharing can avoid duplication of efforts in searching efficient procedure/accomplish tasks”. The output of this section shows that schools in Malaysia are agree or willing to share information through cloud service. This is a good sign of evolution on big data in Malaysia and openness of information sharing among schools for education and co-curriculum success in Malaysia.

Table 9.3 Analysis value on willingness to share information on cloud among schools

	N	Minimum	Maximum	Mean	Std. deviation
Students' achievement in sports	18	2	4	3.06	0.639
Examination result	18	2	4	3.17	0.618
Co-curriculum activities organized by schools	18	3	4	3.22	0.428
School annual events	18	2	4	3.11	0.471
Students' motivation program	18	3	4	3.22	0.428
Academics/curriculum activities	18	2	4	3.22	0.548
Teachers/staff development programs	18	3	4	3.17	0.383
Valid N (listwise)	18				

Table 9.4 Analysis value on benefits of information sharing on cloud

	N	Minimum	Maximum	Mean	Std. deviation
Information sharing can avoid duplication of efforts in searching efficient procedure/accomplish tasks	18	2	4	2.94	0.539
Information sharing can create a better picture of what is going on inside the schools such as upcoming events	18	2	4	3.17	0.618
Information sharing can help motivating other schools in organizing community events	18	3	4	3.17	0.383
Schools can exchange skills resources	18	2	4	3.22	0.548
Information sharing can improve each other's understanding of common issues in schools	18	3	4	3.22	0.428
Information sharing can speed up action	18	3	4	3.33	0.485
Valid N (listwise)	18				

9.4.2 Less Favored Areas of Information Sharing Among Schools on Cloud

This section used the literature method output to obtain the results. Table 9.5 shows the analysis of cloud computing adoption in education all over the world. This table was summarized five research paper related on cloud computing practices in education.

Table 9.5 shows that five case studies used the cloud computing in education areas and two case studies also adopt the cloud computing technology in administrative area. It shows that areas that always shared by schools all over the world is focusing on education areas mainly and also in administrative area. They did not interest on sharing about social information's of their schools.

Table 9.5 Literature analysis on cloud service usage in education

Writer	Place	Areas adopted cloud services	Cloud services usage
Paventhan et al. (2014)	India cover 14 Kendriya Vidayala schools in 3 geographic regions	Academic Administrative	• Teaching and learning - Published and disseminate learning content - Access productivity software - Online assessment - Share teaching materials • Administrative - Data backup - Collaborative platform
Alex Pham (2013)	Boston	Academic	• Teaching and learning - Music Massively open online courses (MOOCs) - Software called Chromatik- lets musicians record, annotate, upload and share songs and performances. Comments and notations are synced through the cloud so that students can see what their teachers and peers comments
Digital Learning (2012a)	RN Podar school Noida, India	Administrative Academic	• Teaching and learning - Use free online resources like Google apps in Education • Administrative - Social media (Facebook) for communication with management, staff, students, parents and school board
Digital Learning (2012b)	Schools in Delhi (Public school, American School of Bombay, KR Mangalam)	Academic	• Teaching and learning - Use microsoft livened
Digital Learning (2013)	Chennai Government High School in MGR nagar and Government Girls High School in Sriperumbudur	Academic	• Teaching and Learning - Enable to learn and interact with students from other schools using the internet-based learning facility

9.5 Conclusion

The result on willingness to share school information on cloud among schools in Malaysia is high. They absolutely agree to share the data and information on cloud. This is the good sign for education field in Malaysia. It reveals the positive thinking of school teachers and staff on acceptance of new technology in school education. They highly agree the benefit of cloud computing in education field.

This research paper found that popular category in education that utilized the cloud computing technologies are academic and followed by administrative category. This is because the framework for these two categories is already matured to serve schools and higher institution needs. This study does not find the facts that cloud computing are used for social information sharing or collaboration among schools. This research ensures that social information is one of the less favorable categories to be shared and merge on cloud. For future research work, it is recommended to identify what is the benefit to schools, parent and public to share social information through cloud. The impact of this recommended research is people will appreciate the sharing activities of social information among schools through cloud computing.

Acknowledgement This research paper is based on research project titled "Inter-Schools Social Information Sharing by Cloud Service as Cloud-based Delivery Model" funded by Ministry of Education (MoE) Malaysia under Research Acculturation Grant Scheme (RAGS).

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Chapter 10
An Interactive Approach of an E-TajweedYaasin System

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Abstract Tajweed is rules to be followed by any person who wish to read the Holy Al-Quran. These rules are to ensure proper pronunciation, reading, recitation and interpretation of the Al-Quran. Traditional practices, known as 'syafawiah' and 'talaqi' would require the presence of an 'ustaz' or experienced religious teacher during the learning process. This method does not support self-learning of tajweed. Many studies have identified students are having problems with tajweed. In this study, data was collected from 130 students who were required to recite the surah of Yaasin. It was found that 98 students were not able to recite the surah using the proper tajweed. Students were not able to recite and read properly of the three different tajweed rules. For this reason, an interactive system was developed to support learners to recite the Yaasin surah with the proper tajweed. The system has enabled users to learn, identify and revise the correct tajweed for each of the verses in the surah. The system was to point out common mistakes done by the students. The correct tajweed rules were given and supported by videos of an experienced 'ustaz' reciting the verses. The combination of notes with audio, animation that

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points on the common mistakes, video and interactive components can simulate the learning process of tajweed of the surah of Yaasin. It was found that the reading of students have improved after the implementation of the system.

Keywords Tajweed · Interactive · E-Learning

10.1 Introduction

Tajweed is rules to be followed by any person who wish to read the Holy Al-Quran. These rules are to ensure proper pronunciation, reading, reciting and interpretation of the Al-Quran. Traditional practices, known as 'syafawiah' and 'talaqi' (Ahsiah et al. 2013) would require the presence of an 'ustaz' or experienced religious teachers during the learning process. Traditional Quranic learning would require a teacher or 'ustaz' is to give guidance directly to the students. This traditional method does not support self-learning of tajweed for a person who wishes to learn the tajweed rules for surah of Yaasin based on their own capacity regardless of place and time.

Many studies (Ali Hasan et al. 2010; Awang et al. 2010) have identified that students are having problems of reading and reciting the Al-Quran with the proper tajweed. Currently, Muslim students at diploma level at Universiti Teknologi MARA (UiTM) are required to read the surah of Yaasin properly. They are being evaluated for assessment in two courses. In this study, data was collected from 130 students who were required to recite the surah of Yaasin. It was found that 98 students were not able to recite the surah using the proper tajweed. Students were not able to recite properly due to three different tajweed rules. For this reason, an interactive system was developed to support learners on how to read and recite the surah of Yaasin using the proper tajweed. Aljenaa et al. (2011) have stated that e-learning can enhance the traditional teaching method to be a creative and interactive learning-teaching environment for the students.

The following section will discuss the current development of technology-enhanced learning of al-Quran and the implementation and design of an e-learning system that will facilitate student's learning anywhere and anytime. Preliminary findings that lead to the development of an interactive e-tajweedYaasin is discussed in Sect. 10.3. The methodology in developing and testing the e-TajweedYaasin system is discussed in Sect. 10.4. The result and discussion are presented in Sect. 10.5. Finally, the conclusion is presented in Sect. 10.6.

10.2 Literature Review

Study done by Awang et al. (2010) have identified that final semester diploma students at UiTM Terengganu were at moderate level of the knowledge of reading the Al-Quran. Ali Hasan et al. (2010) have concluded that students at UiTM

Sarawak were also at moderate level for their knowledge of reading and understanding of tajweed rules. Teaching and learning of the al-Quran is definitely an important part of being a Muslim. The tajweed is a set of rules that must be followed by any Muslim who wishes to read or recite the al-Quran (Al-Quran 73:4). Traditional methods known as 'syafawiah' and 'talaqi' (Ahsiah et al. 2013) would require the present of an 'ustaz' or experienced religious teacher in the learning process of al-Quran.

E-Learning refers to a wide range of applications and processes to deliver instructions using technology such as CD or Internet access. E-Learning also facilitates self-study in which students are able to access the material anywhere and anytime (Luaran et al. 2014). As stated by Elhadj (2010), the existing technology until the twentieth century for the learning of al-Quran is the usage recording systems and electronic devices that keep both text and audio of the Quran with tajweed rules. The other approach of technology-enabled e-learning of al-Quran is that a novice learner can follow some kind of pointer to the corresponding text on the screen while listening to the verses recited by an authentic reciter (Elhadj 2010).

Teaching and learning methods are continuously changing with the rapid development of computerized technology. As stated by Chen et al. (2010), a technology-enhanced learning is an inter-disciplinary field where different perspective is created based on design, computational, cognitive, social, culture and epistemological area. Design of a technology-enhanced learning can be achieved by providing materials in an open structure which includes animated sequence where student may be able to attach the other instructional materials using any kind of controlling mechanism (Haugen 1992). Interactive components can be implemented within the interface design process. The interface layout is a mechanism to establish connection between learners and instructor (Mavromoustakos and Papanikolaou 2010). The presentation of learning materials such as graphics, charts or diagrams plus its relationship with the other materials can encourage students to use mental skills in a more effective way as discussed by Surjono (2015). Multimedia contents are text, graphics, audio, animation and video (Li and Lau 2011). Multimedia and interactive components can support self-learning of learners at their own pace as stated by Lau et al. (2014) and Srinivasan (2013).

10.3 Preliminary Findings

Data was collected from 130 diploma students (session 1 2014/15) where they are required to recite verses starting from the first until twentieth verse of the Yaasin surah. The students were being evaluated by using the following scales: 1—able to recite only one, two or three verses only, 2—not able to recite all the verses, 3—able to recite all the verses without proper tajweed and 4—able to recite all the verses with proper tajweed. The evaluation was done in two parts. Students are required to recite the verses starting from verse one to ten (v1–v10) for the first part and the rest of the verses (v11–v20) for the second part. It was found that only 32

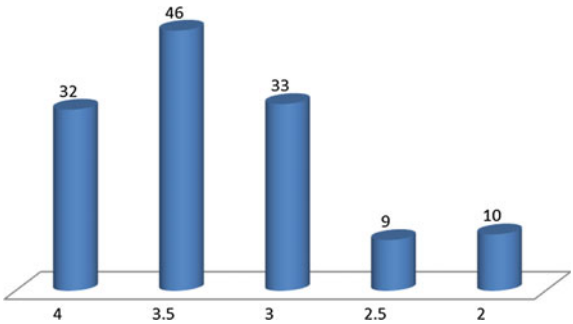

Fig. 10.1 The evaluation level and its numbers of students

students were able to recite all the twenty verses with proper tajweed which is equivalent to 24.6 % of 130 students. It was found that 98 students were not able to recite the surah with the proper tajweed. The distribution of students and its corresponding evaluation level is shown in Fig. 10.1.

Other set of data was also collected from 51 diploma students (session 1 2014/15) to determine what types of tajweed rules that they were not able to comprehend and as a result, they were not able to read the surah of Yaasin using proper tajweed. Each student was evaluated for nine different types of tajweed rules. Students are required to read the surah Yaasin starting from the twentieth until fortieth verse. For each verse, every mistake from the nine different types of tajweed

Table 10.1 The numbers of mistake and its corresponding tajweed rules

No.	Tajweed rules	Brief explanation	Number of mistakes
1.	'IzharHalki'	The reading involved direct and clear pronunciation of Arabic letters	31
2.	'IkhfakHakiki'	The reading that involved humming for a set of Arabic letters	133
3.	'IdghamMa'alGhunnah'	The reading that involved humming and changing of pronunciation for a set of Arabic letters	96
4.	'IdghamBilaGhunnah'	The reading that does not involved humming for a set of Arabic letters	48
5.	'Qalqalah'	The reading that required strong rebounded sound for a set of Arabic letters	34
6.	'WajibulGhunnah'	The compulsory humming for two specific Arabic letters	110
7.	'Mad Lazim'	The reading that involved long vowel	179
8.	'Mad WajibMuttasil' and 'Mad Ja'izMunfasil'	The rules of 'Mad' letters when it is to be read with one specific letter	40
9.	'MakhrajHuruf'	Correct pronunciation of each Arabic letters	174

rules was marked by the instructor. It was found that students were having problems of the tajweed rules of 'Mad Lazim', 'MakhrajHuruf' and 'IkhfakHakiki'. The summarized finding for the nine types of tajweed rules and the number of mistakes done by students is shown in Table 10.1.

10.4 Methodology

E-TajweedYaasin was developed based on the ADDIE (Analyse, Design, Develop, Implement and Evaluate) model which is an instructional model. In analysis stage, the technique of visualization and interactive were identified as the factors that help student to study and understand the concept of tajweed. The design process is about creating a layout of contents that can be easily accessible by users. Learning can be achieved by modifying a traditional method of learning into an interactive environment. Therefore, it is important to design a coherent graphical user interface (GUI) that shows the contents in an organized manner. This GUI is to facilitate learning of tajweed for the surah of Yaasin which in a way to imitate the traditional method. References of tajweed resources such as Dahlan al-Hafiz and Hj Othman (2014) and Mohamamed Khalid et al. (2009) were referred to in the development of the E-TajweedYaasin system.

10.4.1 Main GUI Elements

The main GUI elements which represent the system's contents are shown in Fig. 10.2. There is an automatic animated sequence for all the slides which follows the same arrangement of contents as shown in Fig. 10.2. On each slide, there are the graphic of the verse, outline of all the slides (slide tab), notes for common mistakes and rules to be followed by the students with its corresponding audio (notes tab), navigation and control buttons and video to show an authentic reciter reading the

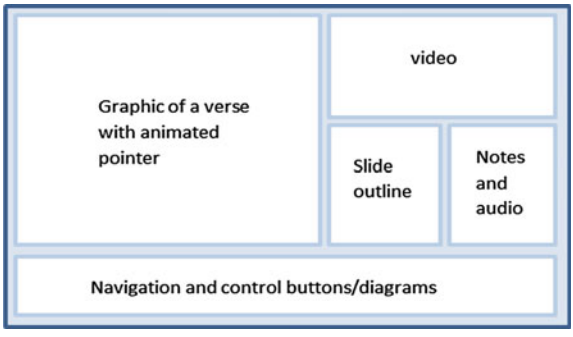

Fig. 10.2 Main GUI elements

verse. Students are able to interact to the system by either clicking on play/pause, next, previous and refresh buttons or selecting any slides from the outline tab. Students can also control the flow of the contents on the slide if they do not want it to run automatically.

The software that was being used in the development process is the MS-Powerpoint with i-Spring features. This software had enabled the contents to be displayed as graphics of the actual verse, an outline to represent all the slides, some interactive buttons or diagrams, an audio to explain the notes and a video of an authentic reciter. The system would be executed automatically where it would display the graphics of each of the verses from surah of Yaasin. For each slide, it will highlight the common mistakes done by the students using a different colour scheme and animated pointers. These animated pointers will be aligned with the actual notes and its corresponding audio that discuss on the common mistakes done by students and the correct tajweed rules to be used for the highlighted section of the verse as shown in Fig. 10.3. The interactive components that were included in the system are play/pause buttons, a replay button, a progress diagram, outline and notes tabs and previous and next buttons. Basically, students are able to control on how the contents are displayed to them. They were able to select whatever contents by selecting on the given buttons, diagram or tabs. Students are also able to change the way the contents are being displayed as shown in Fig. 10.4. Figure 10.4 illustrates an alternative view where students were able to see the reciter in a clearer view. It is a way to simulate the traditional way of teaching in a computerized environment. An audio-enhanced presentation mode was more effective than text mode of promoting learning as revealed by de Oliveira Neto et al. (2015).

The complete system can be distributed to students either by providing them with an actual CD or giving them link to the system through the Internet. The final product is an executable file where it can be used at almost all computer platforms. Another set of data of 51 diploma students (session 2 2014/15) was collected after

Fig. 10.3 The screen that shows an actual implementation of the e-tajweed Yaasin

Fig. 10.4 The screen that shows simulation of the traditional learning in a computerized environment

the implementation of a pilot test. The result was evaluated by comparing the number of mistakes which follow the same evaluation process, to the students from the previous semester (session 1 2014/15).

10.5 Result and Discussion

After the implementation of the pilot test, the students (session 2 2014/15) were also being evaluated based on the nine different tajweed rules as shown in Table 10.1. It was found that the number of mistakes done by the students has reduced when compared to the previous students (session 1 2014/15) who were not using the E-TajweedYaasin system. The comparison of the number of mistakes for students who did and did not undergo pilot testing is shown in Fig. 10.5. Based on Fig. 10.5,

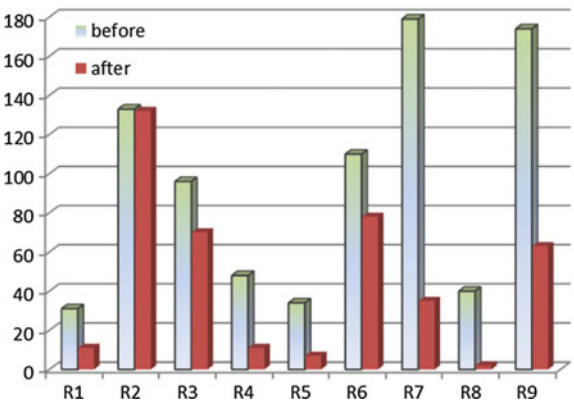

Fig. 10.5 Comparison of numbers of mistakes for each tajweed rules before and after the implementation of the E-Tajweed Yaasin system

the number of mistakes for the nine different tajweed rules has reduced significantly except for the rules of 'IkhfakHakiki' (R2), 'IdghamMa'alGhunnah' (R3) and 'WajibulGhunnah' (R6). For the mentioned rules, the number of mistakes has not reduced significantly since the implementation of these rules involved with a lot of Arabic letters. For example, the mistakes that occurred for 'IkhfakHakiki' rule were due to students need to memorize and identify fifteen Arabic letters while they were reading the verses of the Yaasin surah. From result obtained before the implementation of the pilot test, it was found that students were having problems for tajweed rules of 'Mad Lazim' (R7), 'MakhrajHuruf' (R9) and 'IkhfakHakiki (R2). It can be noted that students have improved their reading for the 'Mad Lazim' (R7) and 'MakhrajHuruf' (R9) tajweed rules.

This study has shown that students' readings of the Yaasin surah have improved after the implementation of this interactive system. In this system, students are given an opportunity to be directly involved with the learning process since they are able to actively interact with the contents and instructions. E-TajweedYaasin system is a way to facilitate the learning of tajweed. The concept of 'syafawiah' for the learning al-Quran is still applicable since the best way to learn and teach tajweed is through face-to-face interaction with the presence of an experienced teachers as mentioned in the surah Anbiya' verse 7 (Al-Quran) which can be translated as:

> Before thee, also, the messengers We sent were but men, to whom We granted inspiration: If ye realise this not, ask of those who possess the Message.

10.6 Conclusion

The study was done to improve the learning of tajweed for surah of Yaasin for diploma students at UniversitiTeknologi MARA at Negeri Sembilan branch. It can be concluded that the E-TajweedYaasin system can bring benefits to the instructors and students. It can benefit the instructors because it will reduce the overall time of the instructors to give guidance to students. Students are able to do self-study at their own pace regardless of place and time. The interactive contents allow users to learn, identify mistakes that are commonly made and view the correct tajweed for each verses in surah of Yassin. The combination of notes, animations, audios and videos in a complete package is able to simulate the learning process of Tajweed of the surah of Yaasin. In future works, E-TajweedYaasin system can be further expanded to include some methods of assessment such as quizzes or recorded audios from users to test the students' understanding and reading.

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Chapter 11
An Empirical Study: Learning Programming Using eLearning

Rajermani Thinakaran and Rosmah Ali

Abstract Learning programming is not an easy task and students often find this course difficult to understand and pass. A fundamental factor which affects students' performance is their learning efficacy and motivation. In the classroom, educators know how to motivate their students and how to exploit this knowledge to optimize their teaching when a student shows demotivation signs. In eLearning environments it is much more difficult to evaluate student motivation level. The study identified 19 research papers in teaching and learning programming using eLearning. The papers are derived from a number of digital databases which were published in the last two decades. This study found that a majority of the research in eLearning focuses on student knowledge and skills in programming. To motivate the student, visualization, simulation, animation and game-based approaches have been used in the learning process. These approaches focus on making the interaction attractive rather than identifying and diagnosing student motivation state in the eLearning systems. To enhance the learning process in programming using eLearning, student motivation model needs to be considered.

Keywords eLearning · Programming

11.1 Introduction

Programming is defined as the skill of writing codes to instruct computers in a certain language with logical grammar to execute certain task in a computer environment (Anastasiadou and Karakos 2011). Programming is a compulsory

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subject in various undergraduate courses and is normally taught in the first year. It is a necessary skill that must be mastered by these students. The programming subject requires students to understand the programming process stages which consist of problem definition, designing, coding, debugging and maintenance. The subject also demands complex cognitive skills such as reasoning, problem-solving and planning which must be understood and mastered by these students.

However, teaching and learning programming is not an easy task as mentioned by many studies. Many students find this subject difficult to understand and pass due to the required skills. The failure rate for programming subjects and the dropout rate from the course has been in the accumulative trend and was confirmed worldwide (Gálvez et al. 2009; Hwang et al. 2012; Kose and Deperlioglu 2012; Moreno 2012; Othman et al. 2013; Tuparov et al. 2012).

To address these issues, different researchers and educators come out with different approaches to engage the students in learning activities and continue their studies. One of the approaches is based on the computer-based learning or eLearning (electronic learning).

11.2 eLearning Environments

Over the last two decades, the invention in eLearning has been growing rapidly due to advancement in computer and internet technology. eLearning is also known as computer-based learning that includes stand-alone educational systems, web-based learning, mobile learning, computer game-based learning and augmented reality learning. It can be utilized by a wide variety of students, without the restrictions of place and time.

VanLehn (2011) identified two types of eLearning which are Computer-Based Instruction (CBI) and Intelligent Tutoring Systems (ITS). In CBI, the students must solve the problems mentally or on paper and then enter the answers. Feedbacks and/or hints will be provided based on the students' answers. CBI is usually referred to as answer-based tutor because the system cannot trace any of the students reasoning or thought processes (Fig. 11.1).

Chrysafiadi and Virvou (2013) have pointed out that CBI has several limitations compared to actual classroom teaching. The limitations include lack of adaptive and contextual support, lack of flexible support of the delivery and feedback, and lack of cooperative support between student and system. Therefore, to overcome the CBI limitations, researchers (Dehkourdy et al. 2013) expanded their interests on ITS.

ITS is known as a step-based tutor which allows the students to enter information for each step of the problem-solving process just as they would if they were solving the problem on paper. Feedbacks and hints will be provided based on the analysis of the responses to each problem-solving step by the students. In recent years, the development and improvement of ITS has been growing inexorably with involvement of multidisciplinary expertise from the areas of knowledge representation, psychology, databases, artificial intelligence, software engineering and user

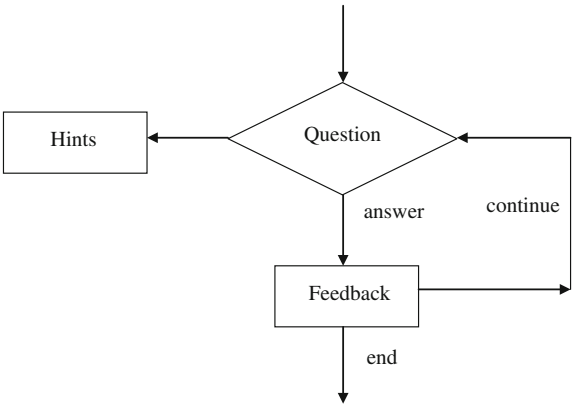

Fig. 11.1 CBI learning process

interfaces. ITS typically refers to: (1) a problem solving system that can support and assist in giving feedbacks and suggestions to students; (2) model-tracing that guesses the student's present mastery and possible next step in order to support problem solving; (3) knowledge-tracing that evaluates the student's capabilities and concept-mastery in order to give new tutorial or topics to learn; and finally, (4) tutorial conversations to support problem solving (Dehkourdy et al. 2013).

11.3 Programming Tutoring Tools

For quite a number of students, grapping the concept of writing computer programs is a problem. For decades, researchers and educators have invented various approaches to overcome the intended problems. One of the approaches is using Programming Tutoring Tools (PTTs) in eLearning environment. PPT is derived from ITS. The idea is to create a learning process where students can receive tutelage, resolve exercises and instant feedbacks similar to one-to-one human based tutoring.

Some of the identified PTTs that are discussed in this paper are actually based on a thorough search for significant papers that were published in quality journals or have been presented at significant international conferences. In addition, these PPTs have been assessed by their particular authors.

PPT such as ADIS (Warendorf and Tan 1997) and IList (Fossati 2008) were developed as a teaching aid for Data Structures course to enhance student understanding on related topics such as linked-lists, stacks, queues, trees and graphs.

J-LATTE (Holland et al. 2009) and @KU-UZEM (Kose and Deperlioglu 2012) were developed to teach programming languages such as Java and C in terms of design and syntax. OOPS (Gálvez et al. 2009) and CIMEL ITS (Moritz et al. 2005) are tutoring systems which cover the Object-Oriented Programming topics. WebTasks (Rößling and Hartte 2008) and ALLIGATOR (Mosconi et al. 2003) are

web-based system built to engage students in an active learning environment by providing them with multiple informative and tutoring feedback components. WebTasks were designed for submitting, testing, and discussing student solutions on Java programming. The platform supports multiple-choice questions, fill-in-the-blank tasks, and uploads the solution for Java class.

ALLIGATOR, a visual programming environment allows students without any particular programming skills to build their own systems by connecting to a web site and visually composing data-flow diagrams. OCLS (Othman et al. 2013) was designed to support the teaching and learning of introductory programming course with the objective to provide supporting virtual learning aids to the students to promote active learning. COLLEGE (Bravo et al. 2005) was developed for facilitating collaborative programming learning. Editing or revising, compiling of the source code, and executing the object programs are the main features of the system. The system also provides collaborative support that comprised an instant messaging tool and a decision-making tool. In addition, the system offers awareness functionalities to facilitate the perception and carrying out of group work.

INCOM (Le et al. 2009) and AutoLEP (Wang et al. 2011) were designed to help novice students in logic programming and to attain programming skills. INCOM coaches students individually as they solve their homework assignments to better prepare them for subsequent classroom activities. Upon request, the system informs the student about possible errors occurring in their solution attempts and provides correction hints to improve their solutions. While AutoLEP can assist students to adequately test and evaluate the computer programs.

ProBot (Moreno 2012) used digital game concept to reinforce and improve students' abilities in programming control structures. The system detects students' errors and misconceptions automatically by using the interface to carry semantic validation. The difficulty levels are increased in the same order as in the course outline. LOs (Tuparov et al. 2012), are simulation-based learning objects for introductory programming course. LOs were developed to help students understand the learning content and to increase the students' motivation regarding the course in self-regulated learning.

Marmoset (Spacco et al. 2006) is a Java programming project submission and testing system. The system also helps the instructor to monitor student progress on a programming assignment at any time. EduJudge (Verdú et al. 2012) was developed based on integration of a submission system into a virtual learning environment. The system allows for the submission, management and automatic evaluation of programming exercises and the development of competitions as part of a Moodle course. WPAS (Hwang et al. 2012) was designed for supporting programming learning activities with various difficulty levels. PASS (Law et al. 2010) is a program submission/assessment system with the primary aim of assisting beginners in learning programming.

11.4 Discussion

All the tutoring tools stated in Sect. 11.3 used multimedia resources to engage the students. The tools used games, visualization, simulation, and animation to deliver the lessons. Some PTTs integrate automated assessment and learning management features to support the learning process. Automated assessment supports a variety of evaluation formats such as assignment, quiz, and test. They also provide an automatic feedback and monitoring of student learning progress.

Table 11.1 Previous research work on assessing motivation in eLearning

Research	Motivation factors	Motivational model/theories
Del Solato and Du Boulay (1995)	Effort, confidence and independency	–Motivational planer –Motivational modeller
De Vicente and Pain (2002)	Effort, confidence and independency	–Keller's motivational theory and ARCS model –Intrinsic motivations taxonomy –Motivational diagnosis model
Zhang et al. (2003)	Attention and confidence	Keller's ARCS model
Beck (2004)	Engagement	
Qu and Johnson (2005)	Confidence, confusion and effort	Keller's ARCS model
Kim et al. (2007)	Confidence and effort	Keller's ARCS model and motivational tactics
Hershkovitz and Nachmias (2008)	Engagement, energization and source	Self determination theory
Takemura et al. (2008)	Importance & Expectation	Keller's ARCS model
Cocea and Weibelzahl (2009)	Engagement, self-esteem, self-regulation and goal orientation	Social cognitive learning theory
Ramaha and Ismail (2012)	Confidence, effort and engagement	Keller's ARCS model
Law et al. (2010)	Self-efficacy, reward and recognition, individual attitude and expectation, effect and clear direction	Self-efficacy theory
Park and Kim (2011)	Self-efficacy, goal orientation, task value and interest	Self-efficacy theory

Chrysafiadi and Virvou (2013) suggested that to become more adaptive or personalized tutoring tools, student characteristics need to be considered. There are a number of student characteristics that have been identified such as knowledge and skills, errors and misconceptions, learning styles and preferences, affective and cognitive factors, motivation and meta-cognitive factors (Thinakaran and Ali 2014). From the identified PTTs discussed in Sect. 11.3, all the tutoring tools were designed to improve student knowledge and skills. Some of these tutoring tools used errors and misconceptions as characteristics in the learning process to improve programming knowledge.

Another important student characteristic is motivation, since motivation is considered as one of the key factors that influence student performance. In PTTs, motivation has been seen as a matter of design. Although designing motivating PTTs is important, keeping students motivated for the whole learning period is one of the main challenges. Due to the importance of motivation, there are a number of researches that aimed to detect motivation state in eLearning. Table 11.1 presents previous research work on assessing motivation in eLearning and the features that indicate the presence of motivation.

11.5 Conclusion

Writing programming involves planning, designing, testing and debugging. To learn how to develop a program, students need to understand the programming language syntax. Difficulty to understand programming logic and concepts often lead to student frustration and lack of motivation to learn programming. Finally, these issues contribute to the high rate of dropout in computing courses. From the studies mentioned in Sect. 11.3, it can be seen that PTT has been used to assist students in their programming learning process. The studies also found that motivation has been seen as a matter of design. Since motivation is an important factor in learning, a motivation model to detect student motivation level needs to be included in tutoring systems. This motivation model can bring many benefits such as detecting student motivation state and providing learning materials to suit student' motivation state. Including the motivation model in PTTs can make them more adaptive, personalized and better-tailored to the students learning needs.

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Chapter 12
A Case Study in Developing the ICT Skills for a Group of Mixed Abilities and Mixed Aged Learners at ITEP in Dubai-UAE and Possible Future RFID Implementations

Turana Al and Gaith K.D. Al

Abstract ICT has a major role in the education process in the classrooms for both students and teachers. Many IT educational projects has been conducted to improve the ICT skills for learners as it became a major key role in education since the use of computers and Internet. Many cases studies have been implemented to determine the outcome of these ICT educational projects in developing the ICT skills, knowledge and awareness. In this paper we will discuss the results and outcomes for a case study which we conducted in one of the major IT educational projects (ITEP) in Dubai-UAE. We will also discuss the questionnaires and self evaluation forms which were used to determine the three skills based learners groups. We present the results of this case study supported by charts and statistics to determine the outcome and development in the ICT skills and understanding which occurred after ITEP was implemented. Also we recommended the implement RFID technology in the labs during the ICT session in the future to overcome some of the issues and problems occurred.

Keywords ICT · ITEP · RFID system · e-learning · Smart labs

12.1 Introduction

The ICT is one of the key elements in today's learning method. Since the Digital revolution took place in the end of the 20th century the teachers as well as the learners start to be more and more depended on ICT either through using one of the ICT tools or through understanding its concept. "Approximately half of the ICT

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professional workforce across Europe is employed by ICT demand organizations spread across multiple industry sectors" (CEN 2014).

In late 2000 the government of Dubai (Dubai education consul) in United Arab Emirates lunched an IT educational project under the name "IT educational project of H.H. Sheik Mohammed Bin Rashid AL Maktoom" referred to as ITEP. This project starts with teaching ICT in high schools of Dubai as well as other cities in UAE. It introduces the new generation of technology as well as the new ICT methods used in teaching. Later in the year of 2005 ITEP expanded and set new goals. It was determined to upgrade the IT skills for all the employees of Dubai government in all the sectors especially in the IT related Areas. The project continued more than 8 years from intensive training to reach its goal.

Initially the ITEP starts in educating the learners in UAE high schools then expanded to the government sector employees in the late 2005. There were tremendous changes in the skills as well as the understanding of the ICT concept among learners who are already in the working force. As a result their ICT skills have improved significantly. In the late 2007 ITEP in association with ICDL (International Computer Driving License) and later on with Cambridge university international examinations started to introduce courses for their clients. The length of the course was 6 weeks for each learners group, as well as 4 to 7 assessments test depending on the client's needs and requests. These tests were controlled by ICDL and were real time tests while ITEP took the training part for the client's learners on its behalf (Sheshadri et al. 2015).

The ITEP clients were from different government sectors such as Dubai electricity and Water department, Dubai Immigration, Dubai International Airport, Dubai Festival city, Dubai Courts, Dubai CID, Dubai Police, AL—Maktoom Hospital, Dubai TV, Dubai High schools, Dubai Ports, Dubai Trade Centre. And the project continued to deliver ICT courses for these departments until 2012.

There were number of similar ICT case studies in other countries which targeted different type of people, such as the rural areas of South West China. Jiake (2011) mentioned that the ICT education process in the rural areas are a long term process and demands a coordination of many complex factors. These factors are equipments, technology, funding, instruction contents, teaching practice and human resources. Cooke and Dawson (2012) conducted a case study of the role of ICT in grade 3 classrooms, they used three data sources, interviews, observations, and questionnaires to collect data. The aim of their research was to determine how ICT can be integrated in grade 6 classroom. Also what are the teacher's and students' self reported competence and confidence regarding ICT in a Grade 6 classroom?

Their finding showed that the use of ICT in the classroom helped and enhanced students learning capabilities. Merriam (2009) stated that a small number of participants in the study reduce the generalizability of the results to the general population. However, the use of a case study design enabled the context and situation to be explored.

The use of ICT in education was also play a key role in language learning (Yunus et al. 2009). Yunus et al. (2009) determined that the majority of the students surveyed (89.4 %) found that students agreed with the questionnaires "the use of

ICT has helped enrich their English vocabulary" and "the use of ICT also helped them better in using English to communicate in their daily conversation".

In Suliman and Guizani (2010) the authors investigated an RFID enabled devices in smart electronic environment which enables learners or trainees to access and activate their work station, by reading the trainee's tag on their ID card by a trainer RFID reader which allows him to extract their profiles from the relevant data base or to use the trainee's mobile phones as an RFID readers to read the tags attached to the teaching materials and equipments.

In The Connected Communities 21 project "teachers worked as partners in the digital learning journey exploring their levels of ICT use, building technology and discipline knowledge, understanding contextual factors shaping their practice and helping them to become change leaders within their school environment and the wider community" (Stevenson et al. 2014).

In this Paper We will outline the improvement that occurred in the ICT skills for a group of mixed ability, mixed age learners by conducting a case study as a part of the ITEP initiation in Dubai-United Arab Emirates and the implementation of RFID systems in the classrooms in order to overcome logistics and organization problems during the class session.

12.2 Background

12.2.1 Use of ICT in the ITEP Classrooms

The ICT tools which were used in the class rooms at the time like overhead, laptops, PC's, internet as well as the software's and applications installed on these machines. The classrooms were well maintained well organized with a PC for each individual. The learners are connected to the internet with full controlled access. The environment was clean and quiet which gives the learner good motivation to study and pay attention. The learners were encouraged to use the lab and share information between each others in a friendly and teamwork manners that allowed them to learn more and built a positive relationship among their colleagues as well as the teacher. This made the learning process fun and useful at the same time.

12.2.2 The Learners

This study was conducted on a group of 20–22 mixed ability, mixed aged between (18–58 years) and from different educational and linguistic background who were employees of the government departments. While conducting our study we divided the learners into 3 groups based on their IT knowledge, experience, skills as well as their age group.

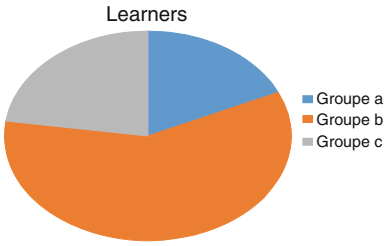


Fig. 12.1 The learners groups and their abilities

a. The first group of the learners was around 3–4 individuals. Their age range over 45+ and has no knowledge of using ICT in education. Moreover they have very limited experience in using computers.
b. The second group consists of 9–12 students, they had well to normal IT skills some of them came from an IT background but engaged with other jobs later during their career. This group age range is between 19 and 52.
c. The third group of the learners consisted of 4–6 learners, they had a very good to excellent IT skills and High ICT ability, the group age range between 18 and 32. See Fig. 12.1 illustrated the learners groups and their abilities.

12.2.3 ITEP Trainers

In general the IT trainers in ITEP were all professionals with excellent IT skills and ICT knowledge, many had experience in teaching and learning as well as conducting many IT technical courses which make them very much in control of the class and delivering the ICT concepts as well as improving the ICT skills for the learners.

12.3 Research Method

12.3.1 Context

This study was conducted in Dubai Electricity and water Department "DEWA" and 'ITEP' centre at the labs of Knowledge village, Dubai, UAE, "Figs. 12.2, 12.3 and 12.4" as part of the IT educational project managed by Dubai human and development Authority, government of Dubai. The Case study used two main data sources collected from the teacher questionnaires and teacher observation during the teaching sessions. The Observation was also done by the ICT trainer who kept a note for the general learner's interaction with computers and the tasks given by the trainer in the end of each session.

Fig. 12.2 Back view of the ICT lab at ITEP in knowledge village Dubai/UAE

Fig. 12.3 Front view of the ICT lab at ITEP in knowledge village Dubai/UAE

Fig. 12.4 Side view of the ICT lab at ITEP in knowledge village Dubai/UAE

12.3.2 ICT Labs

The government of Dubai provided a very well ICT equipped labs without RFID system implementation in all education centers. Advice was sought from a coordinator in each government department in order to arrange a suitable lab in the government sectors which has not been provided with special labs. In general all labs provided was efficient and contain:

1. Computer lab or set of laptops for each student with a ratio of 1 computer for each student connected to a high speed internet some with limited access.
2. Overhead projector and a board to assist the teachers during the teaching session.
3. IT trainer with good technical and ICT teaching skills for each lab.

12.3.3 Class Session and Course Duration

Each course was conducted in a 6 weeks period, 5 days a week. Each session last for 2:30–3 h. The session consist of theoretical part, practical part as well as small quiz or test. Every learner had a book or guide for the session that makes him/her able to practice at home or at work. The curriculum was compatible with ICDL curriculums and tests which include 5 basic modules in the use of ICT (Basic computer introduction, Windows operating system, Microsoft word, Microsoft PowerPoint and Microsoft excel). In some departments 2 additional modules were added to the other 5 which made them 7 modules in total, those additional modules were Internet and Microsoft access.

12.3.4 Aim of Research

The aim of the research in this study was to determine the development and improvement of the skills and understanding in ICT for a mixed aged, mixed abilities and mixed educational background groups of people working in the same work department or environment each with different specialization in UAE.

12.3.5 Questioner and Observation

The questioners were set to determine to what extant did the educational project improved their understanding for ICT, the use of ICT, and their ICT skills. The students were asked to fill a survey questions twice. One at the beginning of first

week and then at the end of last week of the course time frame. This survey quaternaries helped to find out improvement that has been taken place during the course. Such as:

1. Understanding the concept of ICT.
2. Improving the learners ICT skills.
3. Finding new ways to use the ICT skills in the classroom as well as the idea of using Smart labs based on RFID technology.
4. Determine to what extent was the ITEP helpful for the mixed abilities learners to develop their ICT skills?
5. How did the Curriculum and Subjects materials helped to enhance the ICT development of the classroom during the session.

On the other hand the observation was conducted by the trainers himself and he had classified the class upon their age and skills range in the beginning of the sessions.

Most of the observation was based on the questions and answered that the trainer receives from the learners as well as their responses to the tasks asked by teacher and their way in interact with these tasks.

The more the learners achieved these tasks the more their evaluation in using ICT will be developed.

The questionnaire was based on PISA 2003 ICT questionnaire provided by OECD program for International student assessment (2009). The questionnaire mentioned above can be divided into four sections based on the way they will use them. These questionnaires start with learner general information such as his background, age, whether the learner has experience the ICT at home or work. Then in Sect. 12.2 it asks the learners how often he or she used the ICT tools for example: internet, games on computer, spreadsheets, other educational applications, etc.

The questionnaires (Sect. 12.3) also determine the learner's ICT skills by asking "How well can you do each of these tasks on computer?" such as creating a file, open a file, copy a file, move files from folder to another, attach file to an email, create a computer program, use the spread sheet to plot a graph, create presentation, draw pictures using a mouse write and send emails and construct a webpage.

These questions mentioned above were found to determine the ICT skills for each learner at the beginning and at ending of the course.

It also determine the level that he or she can manage and how comfortable they are in using ICT at home, work or in teaching session.

The next set of questions at Sect. 12.4 were designed to determine if the learner have the desire to learn, and whether ICT is playing an important part in his life at work or elsewhere.

Therefore the questions for example like what extend do you agree with the statement "I use computer because I am very interested" and the learner will have four choices to choose from to answer whether he strongly agree, agree, disagree or strongly disagree.

The last section of the questionnaires will ask about the role that the project, course and teacher played in order to develop the ICT skills of the learner, or if they expect or not.

These questioners were filled by learners at the beginning of the course and in the last week of the course period.

12.4 Research Design

At the first day of the course the teacher had to identify the learner's abilities based on a self evaluation questionnaires to determine the learner's background, computer skills and their understanding of ICT. This information's helped the IT teacher to get a clear idea about learners ICT knowledge and uses in their day to day life. This information also helped the teacher or instructor to find out deficiency of the learners in regards to the ICT uses.

These questionnaires are same as mentioned in Sect. 12.3.5 except questions 4 and 5. We sorted the answers into four categories for the question such as "how often you use Internet, games on computer and Spreadsheets, etc. Therefore the learners had to answer one of the followings: (a) either almost every day, (b) a few times a week, (c) once a month or (d) once in a year or never.

The Fig. 12.5 shows that electronic communication such as chat and emails were used almost every day by the majority of the learners as well as the use of Internet than word processing, while computer programming, spreadsheets were used less frequently by the group compare to games, educational software's etc. Use of graphics, music and audio downloads lied in between.

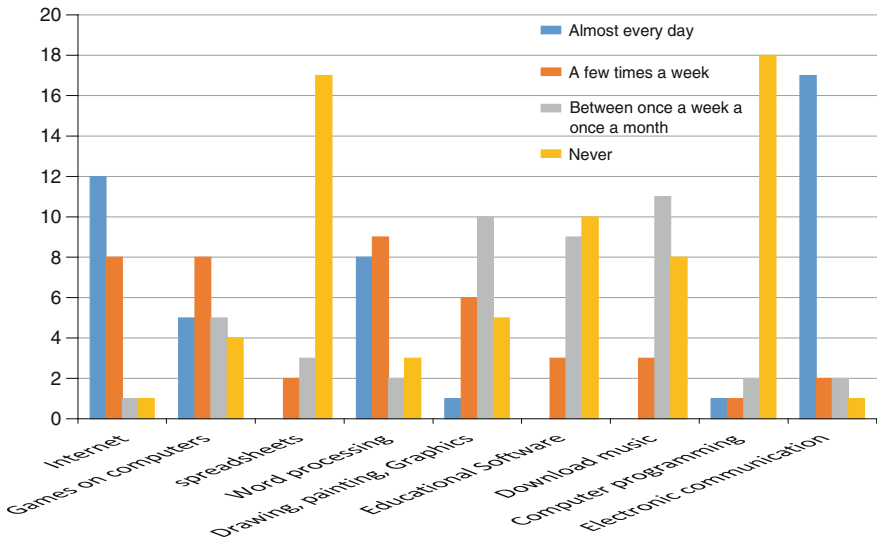


Fig. 12.5 Shows how often learners used different ICT tools before enrolling to ITEP project

The questionnaires answered data were also used to observe the learners performance of effective using ICT tools.

The measurement of the ICT skill level of the learners was conducted by asking them to complete the third section of the self evaluating questionnaires. The questionnaires had 4 answers for each question asked, the learners had to choose one answer from each question, and the answers were:

a. I can do this very well by myself
b. I can do this with help from some one
c. I know what this means but I can't do it
d. I don't know what this means

Each answer was allocated by four categories of points. They are 4 point for answered a, 3 point for b, 2 points for c and 1 point only for the answer d. These ratings were helped to determine the level of the skill or ICT task that the learner was able to achieve before and after the course.

12.5 Discussions

a. Results: After completing from the general evaluation the teacher handed the learners a questionnaires which has to be filled twice during the course time frame as we mentioned before, to observe the ICT skills development before and after the ITEP. These questionnaires were set to determine the ability of the person, what he or she can do as well as their knowledge of the terms used in the ICT field. While in Fig. 12.4 it can be found how the learners may developed their ICT skills during the course. The learners were confidently able to perform most of the tasks which the teacher ask them to do such as creating a spreadsheet or making a power point presentation. The teacher observation as well as the self evaluation questioners showed certain areas and computer tasks that the learner groups did develop during the 6 weeks of course. On the other hand the learners 'from all the groups' continue to struggle with some other tasks such as software programming and creating a database file which leads to the conclusion that although ITEP helped the students to develop most of their ICT skills by improving their ability to achieve the computer tasks, but was unable to cover the more complex ICT skills involved in that short time frame. As for the groups the results were as following:

Group a: low ICT skills ability, mixed age, from backgrounds other than IT. This group showed better understanding for the ICT concept in general. The group was able to perform other basic ICT tasks which they were not able to perform before but they struggled in harder ICT tasks and showed a little development in the medium tasks Fig. 12.6.

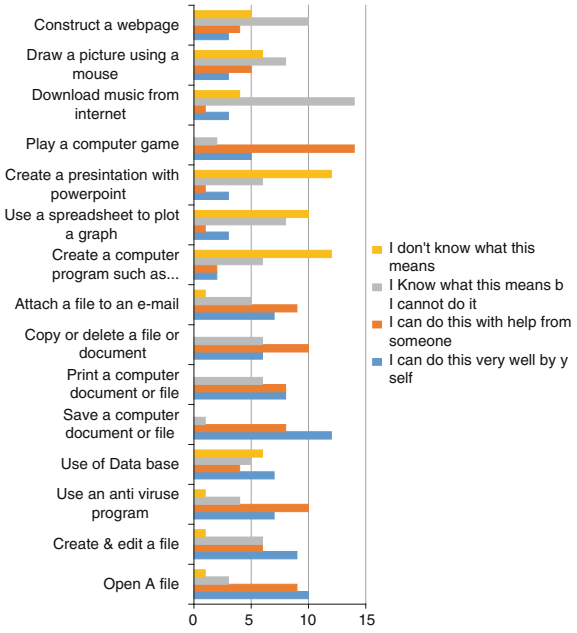


Fig. 12.6 The ICT skills for the group after attending the ITEP course based on self evaluation

Group b: This group was mixed abilities group, mixed age and from mixed backgrounds including ICT background. This group was between very good to excellent in developing most of the ICT areas that the ITEP course covered, they were able to perform most of the ICT tasks requested by the IT instructor to perform on computers. It can be seen huge differences in their skills between the beginning and the end of the course which can be shown in Fig. 12.5.

Group c: This group was a mixed age group, with High ICT ability as it was observed by the teacher in the first week, most of them from IT or engineering backgrounds which involve the use of ICT in their day to day life or during work. The group gained less knowledge from the course and some cases the course was useless to them since they were very much advance with excellent ICT skills. The ITEP did not target this group but still the learners from this group were obligated to attend as a part of their job training, which lead the group to complain as it was a waste of time for them (Figs. 12.7, 12.8, and 12.9).

The teacher also tried to determine how the group understood the concept of ICT in general, taking into consideration the idea as a whole, the learners in general showed a huge difference in understanding the ICT concept as well as developing their skills between the beginning of the course and end of the course. See Fig. 12.10. As we mentioned earlier in Sect. 12.1 the learners had to take a test supervised by ICDL every week in order to find their ICT knowledge, the result was as follows:

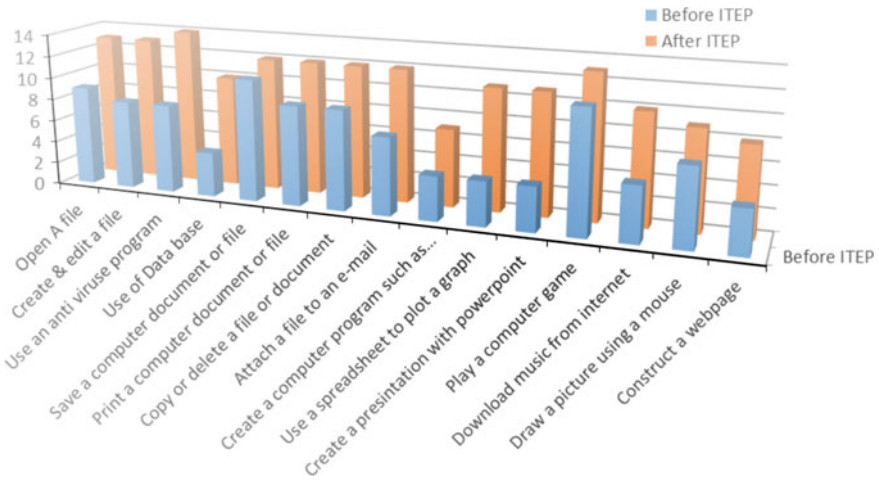


Fig. 12.7 Group 'a' ICT skills development before and after ITEP

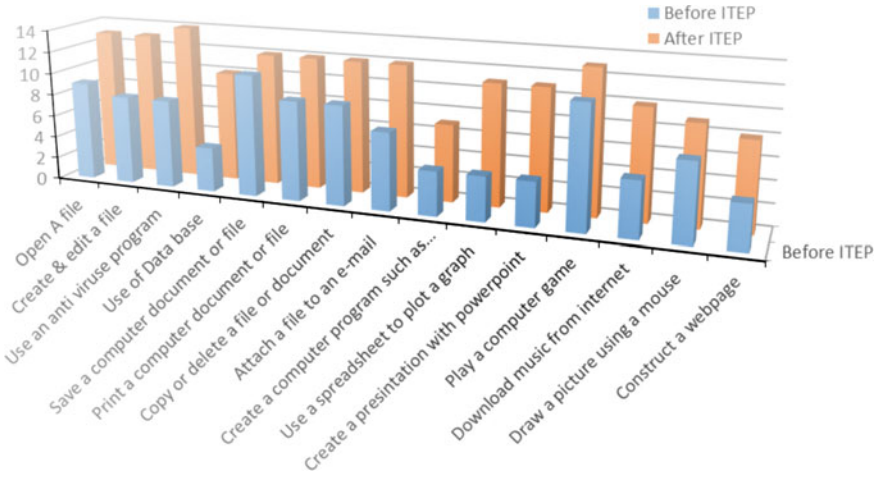


Fig. 12.8 Group 'b' ICT skills development before and after ITEP

1. Passing from the first attempt 72 %
2. Passing from the second attempt 20 %
3. Fail 8 %

b. Using RFID system for future improvement to the ITEP: There were couples of issues which can be improved during the course time frame. One of the main issues during ITEP was learner's attendance. Since it was a mandatory career requirement to attend the course, there were some issues which led to time delay and the reduction of the efficiency during the course time frame, also there was

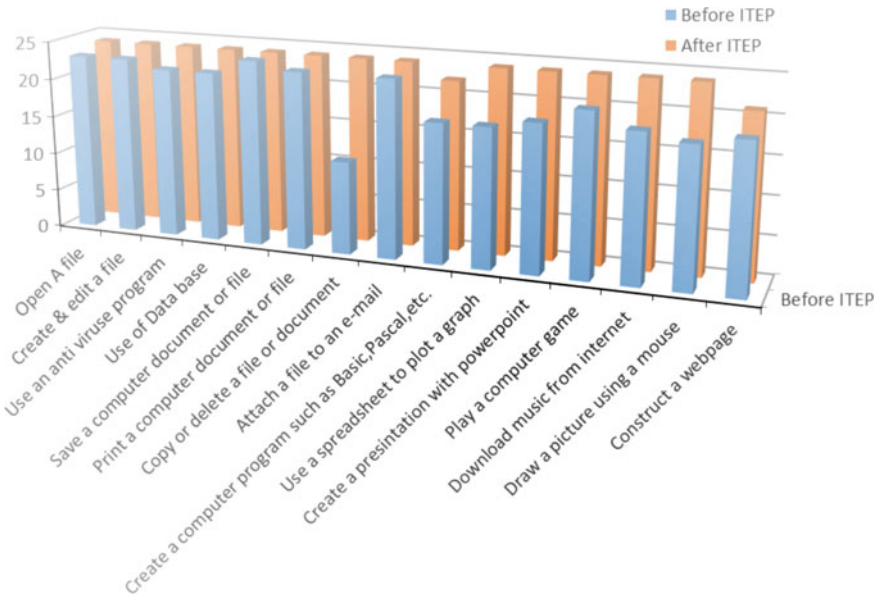
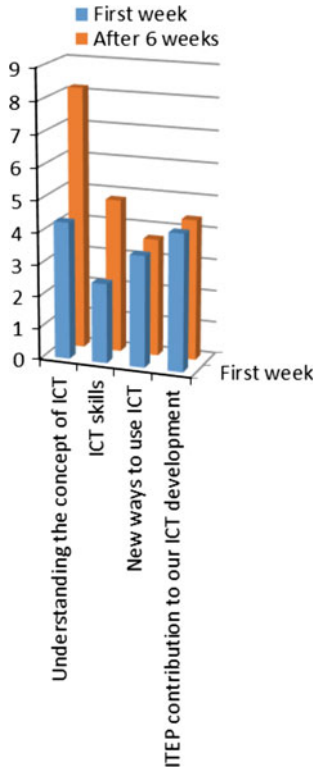


Fig. 12.9 Group 'c' ICT skills development before and after ITEP

Fig. 12.10 Shows the development occurred on the group in understanding the key elements of ICT



the issue of assigning books to the learners since each learner was supposed to receive at least 4 curriculum books during the course. The instructor used to be the person handling these issues which led to more wasted time that can be used in learning instead. Yet these issues remain unsolved and many problems continued to be occurring. To solve the above issues we strongly recommend using an RFID system such as the one proposed in Suliman and Guizani (2010) and Kuljic et al. (2009), RFID devices are very tiny chips with miniature antennae that are attached or embedded within objects for identification and they communicating with the database through a reader (Joseph 2006; Al et al. 2014, 2015). Yet using RFID in ITEP will introduces a number of advantages (Kuljic et al. 2009) such as:

(1) Reduce wasted time to the minimum during classes on round call for learners.
(2) Reduce wasted time in collecting information's from the database as everything can be done automatically.
(3) Analyses and use the database as a source of information for each learner to know their activity time durings.

12.6 Conclusion

From the data shows in figures we can conclude that the ITEP did help the learners in general especially group a and group b to develop their ICT knowledge and Skills as well as their ICT understanding based on the self evaluation questionnaires and observation. Yet ITEP was unable to target the high ability learner group c since the curriculums and materials were so basic to this group. They had so little to add to their ICT knowledge. We suggest defining this group earlier before conducting this course to make them involve with a higher complex ICT skills that can be added to their knowledge. We suggested using an implementation of RFID system to enable smart labs in order to increase the teaching efficiency and reliability for the learning sessions.

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Chapter 13
A Study of Students' Interaction in *Edmodo* Social Learning Platform

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Abstract This article reports on the study undertaken to investigate the interaction that took place in the forum board embedded within the *Edmodo* social learning platform that was used in the delivery of IMK 209-Physical Properties of Food course offered by the School of Industrial Technology, Universiti Sains Malaysia. The samples of the study were 42 students enrolled in the course. Four parameters being investigated, namely, the number of postings by individual student, types of interactions, types of exchanges and distribution of exchanges across the types of interactions. Among the 42 students, the highest posting recorded was 118 postings and the minimum posting was 1 posting. The total postings by all students were 1201 postings with the average posting of 28.6 postings/student. The dominant type of posting was expository with 325 postings (27.1 %). The higher order interactions (explanatory and cognitive) recorded 35.5 % of all the postings. The dominant type of exchanges was student to group/class (S-G/C) with 40.3 % of all the postings. The types of exchanges were mostly students dominated where student to group/class (S-G/C), student to student (S-S) and student to lecturer (S-L) type of exchanges constituted to 87.9 % of all the postings. The distribution of the types of exchanges across the types of dimensions revealed that all types of exchanges followed the

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same overall pattern of distribution. In student to group/class type of exchange, the expository interaction was found to be a dominant one. The impacts of the findings in terms of the role played by the lecturer in the interaction in order to stimulate a deeper level of understanding of the course contents will be discussed.

Keywords e-Learning · Collaboration · Interaction · Social learning

13.1 Introduction

Edmodo is web-based social learning application for teachers and students (Halm et al. 2012). The design is somewhat similar to Facebook but unlike facebook, *Edmodo* contains educational features that are appropriate for the delivery of all levels of education and training. It is free to use and instructors have the control to connect to other teachers as well as to students. It provides safe environment and incorporated various features, such as learning resources tools, assessment tools and communication tools.

One of the main features any *Edmodo* platform is the provision of asynchronous forum board. It is a tool for interaction and group works that helps to clarify issues pertaining to course contents. This tool allowed the written texts to be transmitted back and forth between two or more persons who are at different locations. The exchanges of texts allow issues to be discussed and group members to work together within the community of learners, exploring each other knowledge and idea while providing social support. It also allows a member to observe the contribution of other group members on a defined academic task and provide response to it, thus creating a whole new level of interactions and generating a rich collaborative and interactive learning environment (Healey and Bryan-Kinns 2000).

Cauley (2012) stated that *Edmodo* enable students to undertake collaborative learning with heightened capacity to communicate and interact. The collaborative learning pedagogy shifts the focus from the teacher as the content expert to the role of a facilitator and peer relationships play a significant role in students' educational success (Duncan and Chandler 2011; Halm et al. 2012). When working collaboratively instead of being alone, anxiety and uncertainty are reduced as learners find their way through complex or new tasks. In general, the reduction of anxiety and uncertainty tends to increase the students' motivation and satisfaction with the learning process (Holland and Muilenburg 2011).

The study of interaction between instructor-student, student-student, student-group and student-class especially in e-Learning have attracted immense interest (Syed et al. 2005; Omar et al. 2007; Noorizdayantie et al. 2009; Thach et al. 2014; Teoh et al. 2010). Interaction is a complex variable that has many facets (Kearsely 1995). The main feature of interaction is that it allows learners to receive feedback and taking the appropriate corrections and revision to the concept. As such, interactions are able to engage learners, causing them to reflect on idea and articulate them. Clements and Nastasi (1988) stated that interaction encourage and

facilitate cognition and play important part in promoting learners' intellectual operations and thinking processes. As such, frequent and deeper interaction would lead to better and improved learning outcomes (Trentin 2000).

There are many conceptual frameworks that have been put forward to describe the pattern and structure of interactions in the technology-assisted delivery such as those of Moore (1989), Fulford and Zhang (1993), Robson (1996), Fahy (2001) and Foguem et al. (2015). The framework for this study was based on the interaction model proposed by Oliver and McLoughlin (1997a). This model has been similarly used by Fong et al. (2005), Syed et al. (2005) and Omar et al. (2007). It is a content analysis model consisting of five critical dimensions that provide the multilevel understanding of the interaction processes. The five critical dimensions of the interactions and their corresponding descriptions are depicted in Table 13.1.

In any dialogue exchanges, there are basically two parties involved in the interaction, namely, the initiator and the respondent. These could each be an instructor, student, group or class as a whole. Accordingly, the types of interactions were further classified into category of exchanges as depicted in Table 13.2.

The purpose of this study was to investigate the way the instructor and students used the forum board embedded in the *Edmodo* in the delivery of a conventional full-time course. *Edmodo* was used to supplement and support the conventional face-to-face lecture conducted as scheduled during the entire semester. Specifically, this study attempt to establish pattern of use and look at the extent of interaction as well the preferred forms of interactions and the types of exchanges in the forum board. In undertaking this study, the following research questions were put forward:

a. What is the extent of posting undertaken by each individual student during the entire course?
b. What are the dominant types of interactions in the postings?
c. What are the dominants types of exchanges in the postings?
d. How does the types of exchanges distributed across the types of interactions?

The significance of this study is that provide the insight of not only on the depth of the interaction but also on the relationship between the type of interactions with the types of exchanges that tooks place. The authors have found no reported study

Table 13.1 Dimensions of interactions

Dimensions of Interactions	Description
Social	Establishing and developing rapport
Procedural	Explanation on course requirements and procedures
Expository	Demonstration of knowledge or skills in response to a direct request from one another
Explanatory	Lecturer using student's responses to explain knowledge and develop content
Cognitive	Lecturer providing constructive feedback to a student to reflect and to reconsider an alternative perspective/reality

Adopted from Oliver and McLoughlin (1997a)

Table 13.2 Categories of exchanges

Category of Exchanges	Description
L-G/C	Lecturer initiates and directs at the group/class
L-S	Lecturer initiates and directs exchange at a specific student
S-L	Student initiates and directs exchange at the lecturer
S-S	Student initiates and directs exchange at other students
S-G/C	Student initiate and direct exchange within the group/class

Adopted from Oliver and McLoughlin (1997b)

on the relationship between the dimensions of interactions and the types of exchanges especially pertain to the higher order cognitive interactions that led to meaningful learning.

13.2 Methodology

The data collected for this study were drawn from IMK 209-Physical Properties of Food course offered by School of Industrial Technology, Universiti Sains Malaysia offered during Semester I, 2012/2013 academic session. A total of 42 students enrolled in this course and all of them were involved as participants of the study. The data were collected as soon as the course ended. The analysis of data involved looking at the following parameters in the forum board:

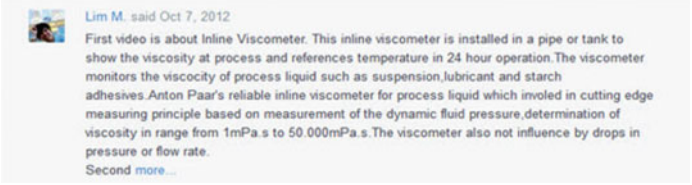
i. Number of postings by each student
ii. Types of interactions
iii. Types of exchanges
iv. Distribution of types of exchanges across the types of interactions

The analysis of data involved transcribing each of the postings to enable complete elucidation of the types of interactions, type of exchanges and distribution of the types of exchanges across the types of interaction. The number of the posting obtained directly from data available in the forum board as depicted in Fig. 13.1.

To elucidate the types of interactions and types of exchanges, a transcription of the posting was conducted. The transcription involved a microanalysis and coding of the interaction patterns and information exchanges into appropriate classifications of interactions as defined in Table 13.1. The classifications were arrived at based on questions, statements and the ensuing replies in the forum board.

Fig. 13.1 Number of posting

Table 13.3 Sample of postings and their categorisations

Categorisation	Sample posting
Social	
Procedural	
Expository	
Explanatory	
Cognitive	

In some cases, a single posting involved multiple interactions. The types of interactions depend on the topic and the instructional intent of the posting. As such, a single posting could therefore contains several types of interactions. The classification of the types of interactions into respective categories were very tedious as it involved looking at the all the postings one by one and painstakingly distinguished each one of them according to their forms and functions.

The validity of the classification process was verified by panel of other researchers. They were required to perform independent coding based on the matrix of classification on sample postings and the results of their classifications were in complete agreement with the actual coding process. Table 13.3 shows sample of postings and their classifications.

13.3 Results and Discussion

13.3.1 Demographic

The demographic details are depicted in Figs. 13.2, 13.3, 13.4, and 13.5. Most of the sample was female (81 %) with majority of them was Malay (71.4 %). Most of them were only average student with 64 % of them were with CGPA ranging between 2.00–3.00. They used the platform quite regularly with 62 % of them used the platform at least 3 times a week.

Fig. 13.2 Gender

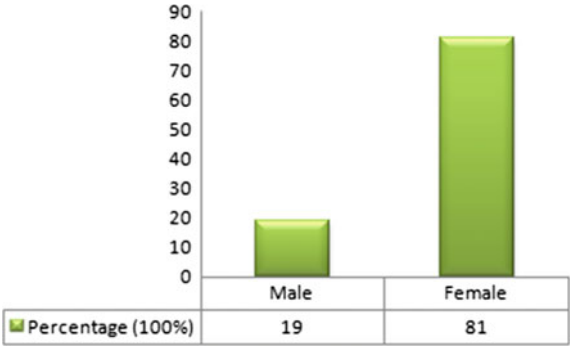
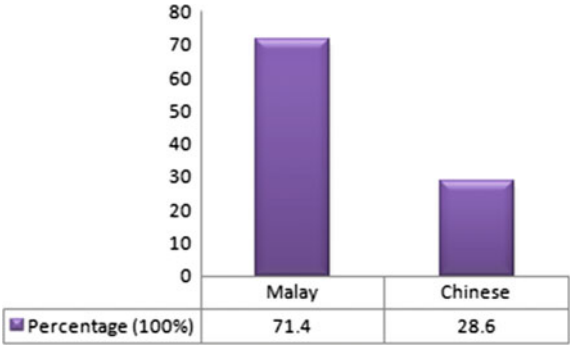


Fig. 13.3 Race



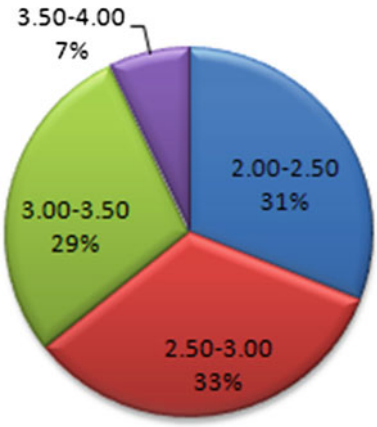


Fig. 13.4 Current CGPA

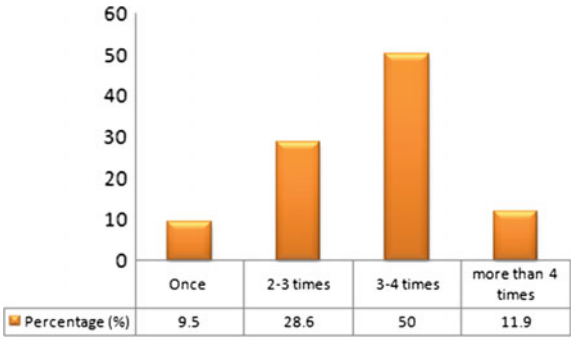


Fig. 13.5 Usage of *Edmodo* in a week

13.3.2 Number of Posting

The number of posting by the students is depicted in Table 13.4. The minimum posting was 1 posting while the maximum posting was 118 postings. The average posting was M = 28.60 postings/student. When all the 42 students were taken into account, the total posting was 1201 postings. Figure 13.6 depicted the number of posting by each student.

Table 13.4 Number of posting by students

Number of Posting by Students	
Minimum	1
Maximum	118
Mean	28.60
Standard deviation	28.85
Total of posting	1201

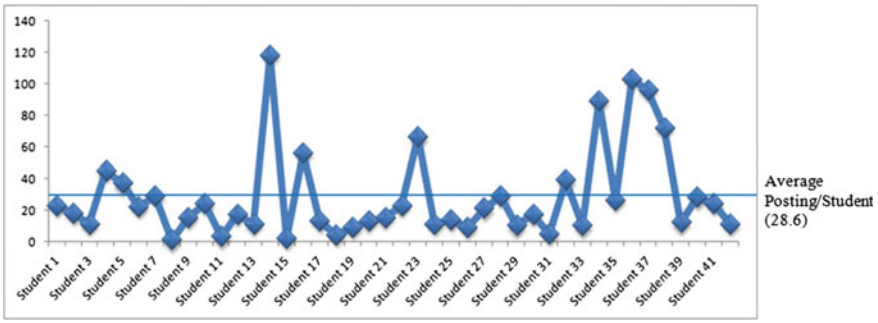


Fig. 13.6 Number of posting by each students

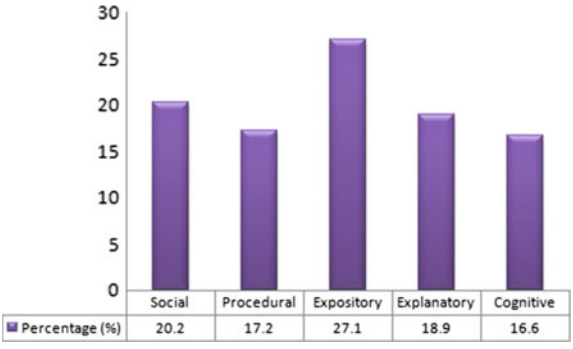
13.3.3 Type of Interactions

The classification of the interaction patterns is depicted in Table 13.5 and shown graphically in Fig. 13.7. It is evident from the table that the dominant types of interactions in the forum board was expository type (27.1 %), followed by social (20.2 %), explanatory (18.9 %) and procedural (17.2 %). The least dominant one was the cognitive type (16.6 %). The expository interaction was regarded as narrative interaction with a lack of potential to lead to higher levels of understanding and knowledge construction. This finding was also consistent with the finding of

Table 13.5 Dimension of interaction

Dimension of Interaction	Number of posting	Percentage (%)
Social	243	20.2
Procedural	207	17.2
Expository	325	27.1
Explanatory	227	18.9
Cognitive	199	16.6
Total	1201	100

Fig. 13.7 Type of interaction



Omar et al. (2007). It is interesting to note that the higher order interaction of explanatory and cognitive interactions recorded 35.5 % of all the postings. Explanatory interactions involve more than direct answer to a query and include a form of negotiation within the interaction. Cognitive interactions involve a constructive feedback to the initiator response and causing the respondents to reflect and reconsider an alternative perspective and reality of the concept being discussed. This indicates that the lecturer has successfully engaged the students in the dialogue and communication that brought about reflection on the contents and the process of learning that stimulated deeper levels of understanding of the course contents.

13.3.4 Categories of Exchanges

There were five types of exchanges being studied, namely, lecturer-group/class (L-G/C), lecturer-student (L-S), student-lecturer (S-L), student-student (S-S) and student-group/class (S-G/C). The results of analysis is shown in Table 13.6 and graphically in Fig. 13.8. The most dominant types of exchanges was the S-G/C (40.3 %) followed by S-S (26.7 %) and S-L (20.9 %). Taking all these three types of exchanges (87.9 %), it is evident that most of the exchanges of interactions were students initiated. The role of the students as central to the learning process is

Table 13.6 Category of exchanges

Category of Exchanges	Number of posting	Percentage (%)
L-G/C	84	6.1
L-S	81	5.9
S-L	285	20.9
S-S	365	26.7
S-G/C	551	40.3

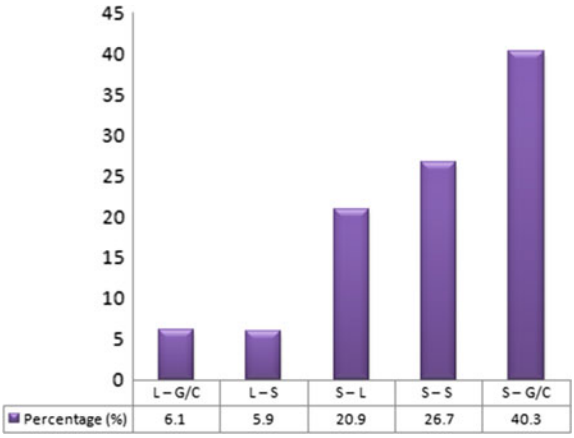


Fig. 13.8 Category of exchanges

Table 13.7 Distribution of exchanges across the type of interactions

	Number of posting					Total
	L-G/C	L-S	S-L	S-S	S-G/C	
Social	22	44	46	82	115	309
Procedural	30	35	62	73	72	272
Expository	32	0	50	105	170	357
Explanatory	0	2	68	59	100	229
Cognitive	0	0	59	46	94	199
Total	84	81	285	365	551	1366

widely espoused by the literature (Kinzie 1990; Atan et al. 2005). The students should play a primary role in initiating the communication that leads to more cooperative and collaborative activities among them, thus increasing the levels of reflective and cognitive activities on their part and promoting high order learning.

13.3.5 Distribution of Types of Exchanges Across the Types Interactions

The distribution of the types of exchanges across the types of interactions is depicted in Table 13.7 and shown graphically in Fig. 13.9. It clear from the result that the distribution of the type of dimension within each of the exchanges showing almost the same pattern. Within each exchanges, the expository interaction is the dominant one followed by social, explanatory, cognitive and the least dominant one is procedural.

It is important to note that the high-order interactions (cognitive, explanatory and expository) are only present in the student-initiated interaction. This is consistent

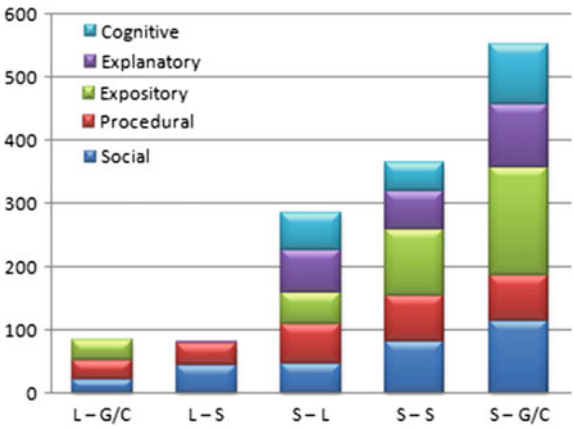


Fig. 13.9 The distribution of type of exchanges across the types of interaction

with the student-centred knowledge acquisition where the knowledge is generated by the students themselves in the interaction and lecturer only played the facilitating role in the interaction processes.

13.4 Summary

This study has shown that the involvement of student in the forum board was very satisfactory as evident with the very high number of postings being recorded from the samples. The classifications of the types of interactions showed the preferred high-order explanatory and cognitive dimensions recorded a satisfactory level indicating a potential to lead to higher levels of understanding and knowledge construction among students. This indicates that the lecturer has played a satisfactory role in probing and negotiating of questions to initiate the student-led collaboration that promote and encourage explanatory and cognitive interactions among students.

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Chapter 14
An Analysis of Organisational Dimension as Predictor to the Intention to Use of e-Training System Among Senior School Administrators

Ahmad Hanizar A. Halim, Effariza Hanafi and Farah M. Zain

Abstract A study has been conducted to investigate the role of organisational dimension (organisational policy and incentive) as predictors to the intention of use of e-training system in the training of senior school administrators. This is part of a larger study that look at the complete eco-systems for effective delivery of e-training at Institut Aminudin Baki, Jitra, Kedah for senior school administrators utilising the e-training system to supplement the conventional delivery of the training. A dedicated questionnaire was developed based on the Technology Acceptance Model (TAM) and administered to a total of 210 participants mostly of the age of 40–49 years old (92 %) and with more than 15 years of service (87.6 %). The study involved first looking at the extent of the relationship between organisational policy and incentive towards perceived usefulness and perceived ease of use and subsequently looking at the relationship between perceived usefulness and perceived ease of use towards the behavioral intention. The relationship between perceived ease of use and perceived usefulness was also investigated. The results show that the organisational policy and incentive have no influence and impact on the perceived usefulness ($\beta = 0.052$) and perceived of use ($\beta = 0.092$). Perceived usefulness has positive and direct impact on the behavioral intention ($\beta = 0.531$, $p < 0.05$). Perceived ease of use on the other hand, has positive and direct impact on the perceived usefulness ($\beta = 0.719$, $p < 0.05$) but has no significant impact

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on the behavioral intention (β = 0.098). The details discussion on the impact of this study towards predicting the acceptance and adoption of the e-training system among senior administrators is discussed.

Keywords e-Training system · Organisational policy and incentive · School administrators

14.1 Introduction

The advent of technology has changed the way training is conducted. The trend is largely due to the new enabling technologies that have facilitated the way the training is delivered. At the Institut Aminudin Baki, Jitra, Kedah, e-training system was deployed to support the conventional training. The institute is under the auspices of Malaysian Ministry of Education and the leading institution for training provider of senior school administrators. The e-training system was used by the participants to support the conventional face-to-face training and aimed at providing efficient and cost effective training. In addition, the deployment is also expected to introduce the learning technology to the senior administrators of schools and promoting the development of knowledge-based school leaders.

The 21st century is the age of accelerating changes. Technology in education is already afoot to disrupt the traditional classroom and school management (Wakefield 2015). Hence, school administrators should play key roles in promoting technologies in school by improving their practice of technology leadership (Hamzah et al. 2014). Their roles are significant, if not a vital, in the success of any instructional initiative within their school (Fullan 2001; Sergiovanni 2006). Research community, however, concluded that teachers' belief structure is incompatible with high-level technology integration (Cuban 2001; Ertmer 2005). Research finding has shown that another explanation for the reluctance lies with school administrators (Shattuck 2010). Therefore, factors determining acceptance and use of technology initiative need among the school administrators need to be unveiled in order to increase technology utilization among the school.

One of important aspect of such technology-based system deployment are the acceptance, adoption and utilization of such system by training participants. The deployment required substantial financial requirement and if the system is not fully utilised, it would lead to financial losses and dissatisfaction among stakeholders. Hence, it is imperative to discover the antecedents which can explain and predict the successful adoption of such system among participants of the institute.

In the research on the adoption and acceptance of any technology-based system, most researchers utilised the Technology Acceptance Model (TAM) proposed by Davis (1989). TAM posits that external factors have an impact to perceived usefulness and perceived ease of use. The perceived usefulness and perceived ease of

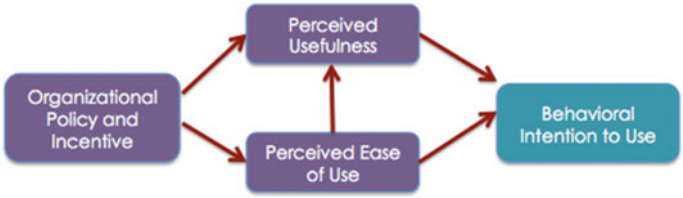

Fig. 14.1 Research model

use are the two determinants that strongly influenced the attitudes towards use and intention of use which in turn influenced the actual usage of the system (Ramayah et al. 2003).

TAM has been used in numerous studies (Ketikidis et al. 2012) and it was very successful as it provides a parsimonious way of predicting the behavioral intention to use any technology-based system (Moores 2012). There were many attempts to improve the predictive power of TAM (Chen et al. 2012) and this was usually done by exploring other external factors that can act as antecedents to the perceived usefulness and perceived ease.

Attempts to extend TAM have generally taken one of these three approaches, namely: i. by introducing factors from related models ii. by introducing additional or alternative believe factors and iii. examining antecedents and moderators of perceived ease of use and perceived usefulness (Wixom and Todd 2005). Either way, the constructs of intention to use, perceived ease of use and perceived usefulness are central to the models as in the original TAM.

In this study, attempt was undertaken to extend TAM by incorporating the external factors in terms of organisational policy and incentives. As mentioned by Davis (1989), there are various external factors or stimuli that influence behaviour and would therefore be antecedents to perceived ease of use, perceived usefulness and finally to the behavioral intention to use. Our research model is shown in Fig. 14.1. As can been seen in the figure, we are proposing that the external variable as the organisational policy and incentive and they have direct and positive impacts on the main component of TAM constructs, namely, the perceived usefulness and perceived ease of use. These two constructs, in turn, have positive and direct impact on the behavioral intention to use. As in other research in TAM, we also posit that the perceived ease of use has a positive and direct impact on the perceived usefulness.

14.1.1 Organisational Policy and Incentive

Organisational policy can be defined as the formal document that specified the actions needed to be carried out with regards to specific topic. The policy enables the process to be undertaken to follow certain set of procedures enabling the output to be more predictable and comply with predetermined standards. In e-learning

initiative, the aim of the policy would be to provide the necessary guidelines on how the initiative is to be carried out with respect to its required domains such as infrastructure, governance, content development, pedagogical, professional development, etc. (MoHE 2010). A study by Peansupap and Walker's (2005) indicated that technology adoption also depends on the management policy, strategies and actions. These facilitating conditions have been identified as having an effect on infusion of a number of new information technology innovations (Lu et al. 2005).

Incentive on the hand is something that drives an individual to carry out certain actions. In e-learning initiative, the incentive is aimed to enhance the participation and lead to continuance of usage. In the study of technology acceptance, Bhattacherjee (1998) found that the interaction between perceived usefulness and loyalty incentive performed significantly better at explaining the continuance intention of use. Naidoo and Leonard (2007) described that the perceived usefulness and loyalty incentives act to jointly impact the continuance intention to use a new technology. In this study, we proposed that the organisational policy and incentive have a positive and direct impact towards the perceived usefulness and perceived ease of use of the e-training system. As such, the following hypotheses were put forward.

H1: There is positive and direct impact of organisational policy and incentive towards the perceived usefulness of e-training system.

H2: There is a positive and direct impact of organisational policy and incentive towards the perceived ease of use of the e-training system.

14.1.2 Perceived Usefulness

Perceived usefulness refer to "…the degree to which a person believe that using a particular system would enhance his or her job performance…" (Davis 1989, p. 477). It is one of the main construct in TAM and has been extensively studied especially in relation to the behavioral attention to use. Most studies confirmed the importance of this construct in affecting the usage of the various technology-based systems (Adam et al. 1992; Losova 2014).

Perceive usefulness capture the extent to which a potential adopter views the system is offering better value over other systems of carrying out the same tasks. A system high in perceived usefulness is one which the user believes there is the existence of a positive use - performance relationship. In other words, the user believes that the use of such a system would yield positive benefit for task performance. In this study, we proposed that the perceived usefulness would have a positive and direct impact towards the intention to use the system. As such, the following hypothesis was put forward.

H3: There is a positive and direct impact of perceived usefulness towards behavioral intention to use the e-training system.

14.1.3 Perceived Ease of Use

The perceived ease of use is defined as…the degree to which an individual believes that using a particular system would be free of mental and physical effort…" (Davis 1989, p. 477). Davis and Wong (2007) stated that perceived ease of use process expectancy as it measures an individual's perception about the level of effort needed to use a system. Many studies have shown that perceived usefulness has a positive and direct impact towards the behavioral intention of use (Pituch and Lee 2006; Sedigh 2013).

A system perceived easier to use than another is more likely to be accepted by users and enhance the behavioral intention to use. At the same time, many studies agree that perceived ease of use has a significant impact on perceived usefulness (Ramayah et al. 2003; Pituch and Lee 2006). In this study, we proposed that the perceived ease of use would have a positive and direct impact towards the intention to use the system. At the same time, we proposed that there is a positive and direct impact of perceived ease of use towards perceived usefulness. As such, the following hypotheses were put forward.

H4: There is a positive and direct impact of perceived ease of use towards behavioral intention to use of e-training system.

H5: There is a positive and direct impact of perceived ease of use towards perceived usefulness of e-training system.

14.2 Methodology

A dedicated questionnaire based on the proposed research model shown in Fig. 14.1 was developed. Each factor of the research model carries with it a group of components which describes part of the factor. The components factors carry similar meaning with the items of the questionnaire. Table 14.1 shows the related components for respective factors as described in the research model.

Items for perceived of use and perceived usefulness were taken from research of Technology Acceptance Model (Davis 1989; Venkatesh and Davis 2000). The items for behavioral attention to use were captured and adopted from Chau (1996) whereas items for the organisational policy and incentive were taken from Khan (2005).

The questionnaire consisted of two parts. Part A consists of demographic questions. Part B consists of items to elicit the participant's perception of each of the variable in the model. All items in the second parts were measured via a 7-point scale ranging from 1 (least agreeable) to 7 (most agreeable). In total, there were 4 variables with 45 items that were used in this study.

The reliability analysis showed that Cronbach's alpha coefficients obtained for all the variables were well above the acceptance level indicating they were within the measurement model. It also indicated good internal consistency and that the measurement was sufficiently reliable (see Table 14.2).

Table 14.1 Factors and related components

Factors	Components
Organisational policy and incentive	Career promotion Reliable stakeholder's Better financial perks
Perceived ease of use	Easy navigation Simple computer jargon Rich multimedia elements Effective online technical skills
Perceived usefulness	Improved course performance Continuous support Synchronous discussion useful
Behavioral intention	Great features A good system for school leaders Helps generate knowledge Helps to understand 'netiquette'

Table 14.2 Reliabilities of the variables

Dimension	Number of item	Cronbach alpha
Organisational Policy and Incentive(OPI)	12	0.908
Perceived usefulness (PU)	10	0.955
Perceived ease of use (PEOU)	13	0.962
Behavioral intention to use (BI)	10	0.920
Total	**45**	

The online questionnaires (Google form) were administered to 216 participants at the end of week 16 of the training programme. A response rate of 97.2 % was assumed from the population to provide 210 sample data for the study. A period of 14 days was allowed for the questionnaires to be completed and submitted. Gentle and regular reminders were sent out to non-respondents with the intention to increase the response rate. The analysis of the data involved the descriptive analysis of the demographic data as well undertaking the multivariate analysis involving correlation and multiple-regression analysis in order to test the research hypotheses.

14.3 Results and Discussion

14.3.1 Demographic Analysis

The results of the demographic are shown in Table 14.3. The table indicates that most of the training participants were male (64.8 %) with majority of them of 40-49 years old (92.4 %). All of them owned a laptop or computer. Most of them were senior school administrator with more than 15 years of service (87.6 %). More than 50 % of them have experience of more than 10 years of using computers

Table 14.3 Demographics characteristic

Classification	Frequency	Percentage
Gender	136	64.8
Male	74	35.2
female		
Age	5	2.4
30–39 years	194	92.4
40–49 years	11	5.2
>49 years		
Possession of computers	100	100
Yes	0	0
No		
Years of service	4	1.9
1–5 years	6	2.9
6–10 years	16	7.6
11–15 years	84	87.6
>15 years		
Computer experience in teaching and learning	23	11.0
1–5 years	58	27.6
6–10 years	57	27.1
11–15 years	72	34.3
>15 years		
Time spent on computer per week	6	2.9
<1 h	50	23.8
1–2 h	40	19.0
2–3 h	53	25.2
3–4 h	61	29.0
>4 h		
Frequently used computer courseware	62	29.5
Word	132	62.9
Power points	2	1.0
Excel	0	0
Programming	14	6.7
Others		

in teaching and learning and more than 50 % of them spent at least 3–4 h per week on computer. The most frequently used computer software is *Powerpoint* followed by *Word*.

14.3.2 Multivariate Analysis

The inter-items correlation for organisational policy and incentive (OPI), perceived usefulness (PU), perceived ease of use (PEOU) and behavioral intention (BI) is shown in Table 14.4. From the table, it can be seen all the variables are significantly inter-correlated between each other. In addition, the analysis did not indicate any problems in terms of multicollinearity among variables in the model.

Table 14.4 Inter-item correlation with dependent variables

	OPI	PU	PEOU	BI
OPI	1.000	1.000	1.000	1.000
PU	0.639**	0.898**	0.575**	
PEOU	0.614**	0.619**		
BI	0.664**			

**Correlation is significant at the 0.01 level (1-tailed)

Table 14.5 Multiple regression analysis

DV	R^2	IV	*b*	S.E. (*b*)	*β*	*t*	Sig. level
PU	0.910	Constant	0.417	0.232		1.799	0.074
		OPI	0.048	0.041	0.052	1.152	0.251
		PEOU	0.632	0.039	0.719	16.069	0.000
PEOU	0.782	Constant	0.419	0.398		1.077	0.283
		OPI	0.096	0.071	0.092	1.361	0.175
BI	0.621	Constant	2.965	0.285		10.390	0.000
		PU	0.470	0.109	0.531	4.298	0.000
		PEOU	0.076	0.096	0.098	0.792	0.429

To test the five hypotheses of the study, three multiple regression analyses were conducted. The first analysis was used to analyse the relationship between (i) organisational policy and incentive as independent variable towards perceived usefulness as dependent variable (OPI -> PU: H1) and (ii) perceived ease of use as independent variable towards perceived usefulness as dependent variable (PEOU ->PU: H5) The second analysis was used to investigate the relationship between the organisational policy and incentive as independent variable towards perceived ease of use as dependent variable (OPI ->PEOU: H2). The third analysis looked at the relationship between (i) perceived usefulness as independent variable towards behavioral intention to use as dependent variable (PU ->BI: H3); and (ii) perceived ease of use as independent variable towards behavioral intention to use as dependent variable (PEOU ->BI: H4).

The results of three multiple regression analyses are shown in Table 14.5. The first analysis managed to explain 91.0 % of the variance in the perceived usefulness of the system. The second analysis explained 78.2 % of the variance in the perceived ease of use and the third analysis explain 62.1 % of the variance in the behavioral intention to use the system.

14.3.3 Organisational Policy and Incentive

The results of analysis of relationship between the organisational policy and incentive towards perceived usefulness (OPI -> PU) revealed that the organisational policy has no direct impact on perceived of usefulness ($\beta = 0.052$). Similarly,

in the analysis of relationship between organisational policy and incentive and perceived ease of use (OPI -> PEOU) revealed that organisational policy and incentive have no direct impact on the perceived ease of use ($\beta = 0.092$). As such, both H1 and H2 were rejected.

These results indicate the organisational policy and incentive have no influence in the successful deployment of e-training system and play no role in the subsequent adoption and acceptance of e-training system by the participants.

14.3.4 Perceived Usefulness

The results of analysis of relationship between perceived useful and behavioral intention to use (PU -> BI) revealed that there is significant relationship between the two variables ($\beta = 0.531$, $p < 0.05$). As such H3 is accepted.

The result implies that perceived usefulness of the e-training system is a significant predictor the behavioral intention to use of the system. Perceived usefulness is the participant's extrinsic motivation which refers of doing something because it leads to separable outcomes such as specific goals or rewards (Ramayah et al. 2003). As such, extrinsic motivation influences individual behaviour due to reinforcement value of outcomes (Moon and Kim 2002).

14.3.5 Perceived Ease of Use

The results of analysis of relationship between perceived ease of use and behavioral intention to use (PEOU -> BI) revealed that there is no significant relationship between the two variables ($\beta = 0.098$). As such, H4 is rejected. Perceived ease of use can be considered as intrinsic motivation (Ramayah et al. 2003). Intrinsic motivation is defined as the doing of an activity because it is inherent satisfying, interesting and enjoyable rather than for some separable consequence. As such, intrinsic motivation refers to performance of an activity undertaken for no apparent reinforcement other than the process of performing the activity. This result implies that perceived ease of use is not the driver and determinant to the actual system usage.

The analysis of relationship between perceived ease of use and perceived usefulness (PEOU -> PU) show that the there is strong and positive impact of perceived ease of use on perceived usefulness ($\beta = 0.719$, $p < 0.05$). As such, H5 is accepted. This result is consistent with previous studies (Ramayah et al. 2003). This indicates that perceived ease of use is very important in influencing the usage of e-training system.

14.4 Conclusion

This study was conducted to investigate the relationship between the organisational policy and incentive to perceived ease of use and perceived usefulness of the e-training system. At the same time, the relationship between the perceived of use and perceived usefulness towards the behavioral intention to use the e-training system was also investigated. The results revealed that the organisational policy and incentive did not play any significant role in perceived ease of use or perceived usefulness of the system. When the behavioral intention was considered as the dependent variable, the result shows that the perceived usefulness was found to be the significant predictor and has positive and direct impact towards behavioral intention to use the system but not the perceived ease of use. Perceived ease of use was also a significant predictor to the perceived usefulness of the e-training system.

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Chapter 15
Interactive Visual Art Education Pedagogical Module: Typography in Visual Communication

Hazlin Aisha Zainal Abidin and Siti Zuraida Maaruf

Abstract Typography is a sub-component in visual communication in which the visualization and function of the compositional structure of typography can create an effective impact of visual communication to the viewers and readers. With technological advancement, typography is seen as an essential component in visual design. This research applies the Design and Development approach (Richey and Klein in Design and development research: Methods, strategies and issues 2007) that focus on the processes of developing an Interactive Typography Pedagogical Module for teaching Visual Communication in the Visual Art Education classroom. For the purpose of this presentation, the research will discuss findings from Phase 2 (Design and Development Process). The Delphi Technique was utilized in this phase to gather data needed for the researchers to construct the Interactive Typography Module to be used in the VAE classrooms. The Interactive Typography Module was developed as an alternative for Visual Art teachers to teach the visual communication syllabus in the Visual Arts Education Curriculum for upper secondary school. The findings of the study showed that an Interactive Typography Module is suitable to be used as a teaching aid to teach visual communication in Visual Art Education Curriculum.

Keywords Typography · Visual communication · Interactive teaching module · Modified Delphi technique

15.1 Introduction

This study aims to develop an Interactive Typography Module for the teaching of Visual Communication in Visual Arts Education at the upper secondary school level in Malaysia. Visual communication is a complex combination of pictures, typographies, photos, illustrations, numbers and crafts (Young 2003). Texts play

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important roles in the society especially when communicating or showing expressions. It is believed that the society is exposed to the textual interests because typography is present and used on a daily basis for various purposed and in assorted areas or spaces (Huerta 2010). Interestingly, the society in general is becoming largely guided by the texts on computers, mobile phones, and television screens. Subconsciously, the society is exposed to innumerable forms of typography which may appear in advertisements, films, photographs, televisions and most interestingly; video games. The use of typography can assist viewers to comprehend the visual produced and the message that it encompasses. Therefore, it would be advantageous for art educators keep them on the mettle when teaching with various techniques with upcoming trends of art forms in Visual Art Education (VAE). Henceforth, the researchers find it appropriate to study on the development of an Interactive Typography Module for teaching Visual Communication at the secondary school level to aid teachers in teaching and learning. Subsequently, the module may be used as a guiding instrument while enhancing VAE pedagogy in Malaysia secondary schools.

15.2 Background of the Research

The teaching and learning of VAE include aspects of fine arts, visual communication, design and traditional crafts (Curriculum Specifications, Ministry of Education: 2002). The present study was conducted based on the needs to introduce new exigencies of the Interactive Typography Module (ITM) in teaching visual communication which is elective subject. Visual communication has been practiced over the centuries since the pre-historic era and used for various reasons such as commercial, education, and artistic expressions (Young 2003). Despite of technological advancement which comes with several means of communication, visual communication remains as an essential part in delivering messages for social and individual purposes (Nakilcioglu 2013). It is identified that the popular art movements like Cubism and Conceptual Art have integrated the use of text and typography to support the creative and art production process (Huerta 2010).

The use of typography is becoming even more prevalent in popular media for communication purposes and in conveying distinctive messages. This is probably what Panzaru (2012) has expected, that the combination of texts and images have higher communicative impact compared to when using either one solely. However, it needs to be forewarned that the use of texts and images in visual communication must be harmoniously composed to get the intended message across and more importantly, etched in the audiences' minds (Young 2003). With this in mind, it is pragmatic to that this research is performed to provide alternative suggestions for teachers when teaching visual communication for VAE.

With technological advancement offering various advantages and alternatives in communication, the mass media takes this opportunity to utilize visual communication at its level best in manifesting innumerable messages to the general public (Young 2003). Thus, it is necessary that secondary school students be exposed to typography for visual communication will definitely advance with the coming years. With visual communication taking its place in the society's daily routines, students will find that typography is instrumental in visual communication which is the focal of the present study. The Interactive Typography Module was designed as a teaching aid to assist VAE teachers in Malaysia's secondary schools and how it is used to the teacher's advantage.

15.3 Connection in Theoretical Framework

In order to construct an Interactive Typography Module for teaching visual communication in the Visual Art Education (VAE) classroom, a few theories have been adopted as the framework in this research. Theory of Ausubel's Advance Organizer was used to exhibit the functions of the module to teachers and subsequently to students. The ASSURE Model was used in the development of the Lesson Plan in providing insights to teachers. Another theory that was used as the framework in the development and design phase is known as ADDIE Model. ADDIE Model was used as the guideline for the researchers to construct an Interactive PowerPoint Slide Presentation (PPT) as well as the Typography Manual Book for teachers. Figure 15.1 shows the Theoretical Framework used in this study:

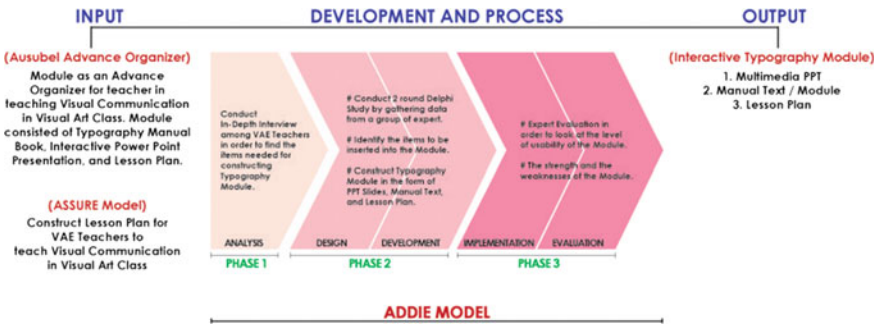

Fig. 15.1 Theoretical framework of this study. Adapted from the Input-Process-Output Game Model (Garris et al. 2002)

15.4 The Development of Interactive Multimedia Teaching Material

The purpose of developing an Interactive Typography Module is to help visual art teachers in their teaching process. The Typography Module is an alternative topic for visual art teachers in teaching Visual Communication syllabus in Visual Art Education (VAE) class. The theory of Ausubel's Advance Organiser was adopted in this study in order to guide the researchers in developing a module that can be the organizer for teachers before they start teaching a topic.

The Interactive PowerPoint Presentation (PPT) and the Typography Manual included in this Module act as the organizer for visual art teachers prior to executing their lesson. The Power Point Presentation (PPT) and the Typography Manual Book were consisted of the suitable topics about typography in helping visual art teachers and guide them in planning or organize their teaching before the lesson. According to Maaruf and Siraj (2013) PowerPoint Presentation has several advantages such as being universal software that is easily accessible to all computer users. This software also has the capability to operate at multiple levels of usage consisting of multimedia authoring; graphics and animation with object-oriented programming that are uncomplicated and effective. The researchers' findings also proved that in developing the application of interactive multimedia, the Department of Education Technology needs to provide trainings and raise the awareness for teachers to take up repurposing technology technique based on their knowledge, skills and aptitude without overloading them with the current teaching loads.

The organizer is to help teachers identify the students' current knowledge about on a general basis. The teachers may probe into the roles of typography in the students' daily activities; they may also look into the uses of typography either deliberately or not. With this module, the teachers will first create his or her understanding in what they want to teach to their students and associate the students' prior knowledge with the new knowledge intended for teaching. This may subsequently help improve teaching and gradually enhanced the teaching and learning of VAE specifically visual communication.

The ASSURE Model is incorporated in the theoretical framework as a guide to create lesson plans in the Interactive Typography Module. Using the PPT as the tool in delivering the content of the Module, teachers will also be guided with the lesson plan. The ASSURE Model provided all the ideal process or step by step needed in helping teachers deliver the instructional content to the students during lessons.

In the development process, the ADDIE Model was used to develop the instructional module. The ADDIE Model in this framework is in line with this study that uses the Developmental Research Design (DDR) implemented by Richey and Klein (2004). The three (3) phases involved in DDR consisting of Phase 1: Need Analysis, Phase 2: Design and Development, Phase 3: Implementation and Evaluation are almost identical with the steps in ADDIE Model that also consists of Analysis, Design, Development, Implementation and Evaluation.

In this theoretical framework, all the steps in DDR have been applied as suggested in the ADDIE Model. The Analysis process in ADDIE Model which is in line with the Need Analysis in Phase 1 of the DDR Model was conducted using the in-depth interview of five secondary VAE teachers from different secondary schools. All the respondents were interviewed to fulfil the first objective of this research which is to identify the needs to construct an Interactive Typography Module in teaching visual communication in visual arts class.

In the Design and Development of ADDIE Model, the two round Delphi Surveys was conducted to fifteen panellists of experts from various backgrounds of art and design. From the data collected in the survey, the researchers then created suitable content to be inserted in the module. Data collected is used to achieve the second objective of the present research which is to identify suitable content to be inserted in the Module.

The component of the Module constructed includes the Interactive PowerPoint Presentation (PPT), Typography Manual Book, and the Daily Lesson Plan. The ADDIE Model was incorporated in the designing of the Typography Manual Book with the Interactive PPT. This is due to the needs to construct one module that can capture students' interests and to have a module that can give positive impact to students during lessons. The steps of the ASSURE Model were incorporated in designing the Lesson Plan to help teachers when teaching Typography in the Visual Communication content. With the help of the lesson plan and having the Interactive PPT, it is hoped that the delivery of the lessons are not only technologically interactive but also able to provide meaningful knowledge and experiences to the teachers and students. This development thus fulfilled the third objective of the research which is to design an Interactive Typography Module in teaching visual communication for VAE.

The next phase applied from the ADDIE Model is Implementation and Evaluation in which the Interactive Typography Module was evaluated by three expert evaluators with backgrounds in Visual Art Education. All of the expert evaluators looked into the levels of usability of the module. Each of the evaluator was given an evaluation form giving their feedbacks on the strengths and weaknesses of the module from their expert perspectives in the VAE course.

15.5 Research Problem

It is suggested by Huerta (2010) that letters and writing symbols presents educators the opportunities to make use of them as creative exigencies in art education. It was further suggested that art educators should consider re-evaluating the use of typography in teaching and learning from lower to higher learning in efforts to uplift the content area in art education. Typography may provide a new division of interest in the area of visual communication specifically in Malaysia education with the rapid growth of visual culture in the society. It would be advantageous to expose learners to the possibilities and variety of typographies for future

development in visual communication which may subsequently provide enhanced knowledge on the aesthetics and skills beyond the classrooms. Additionally, the present module may provide enhanced teaching aid for the teaching and learning of VAE and the arts curriculum. This will not only provide teachers with suggestions for teaching and learning but also serves to provide alternatives for classroom practices and pedagogy specifically for VAE in Malaysia education.

15.6 Research Objective

The aim of this research is:

(a) To identify the items and suitable content to be inserted into the Module.
(b) To identify the suitable teaching instructions and approaches in delivering the Module.
(c) To identify the suitable teaching materials in teaching Typography in the Visual Communication syllabus.
(d) To design and create Interactive Typography Module for teaching Visual Communication in Visual Art class.

15.7 Methodology

This research applies the Design and Develop approach (Richey and Klein 2007) that focuses on the processes of developing an Interactive Typography Pedagogical Module for teaching Visual Communication in the Visual Art Education classroom. In line with the research aim, this research has three phases that contain specific procedures following the sequences outlined in the ADDIE Model. For the purpose of this presentation, the research will discuss findings for Phase 2 (Design and Development Process).

15.8 Research Instrument: Delphi Technique

Data collected in the Needs Analysis phase from the in-depth interview session with five VAE teachers from five different secondary schools is used as indicators for the researchers in the Development and Design phase. Important items were identified from the in-depth interview sessions to construct the survey questions to be used in the next phase. The Delphi Technique was utilized in this phase to gather data needed for the researchers to construct the Interactive Typography Module to be used in the VAE classrooms.

The Delphi method is appropriate to be applied since this study examines a group communication process and it provides effective analysis for group or individual complex problems. Interestingly, this method is a flexible research technique well suited when there is incomplete knowledge about a problem or phenomenon (Skulmoski et al. 2007).

15.9 Data Gathering Procedure

The researchers had implemented two-round surveys in order using Delphi Technique. A set of questionnaire was constructed for data gathered during the need analysis phase. Based on the data collected earlier, the researchers have chosen the items from an in-depth interview performed with five Visual Art teachers teaching in a secondary school. Surveys were distributed to respondents who are experts in the various fields of arts and design.

Before completing the survey, the respondents were presented with a letter informing them the purposes of the survey and the procedures to follow. The respondents were then briefed in details regarding the rationale of the questionnaire and the directions in answering the questions provided before attempting to complete their surveys. They are also required to complete the personal background form for the researchers' documentation purposes of this study. All the data gathered during the surveys are strictly confidential and to be used only for the purpose of this study. The participants were asked to rate each statements using the Lickert scale. The options in the Lickert scale were coded as "Strongly Disagree = 1", "Disagree = 2", "Agree = 3", and "Strongly Agree = 4".

15.10 Research Participants

In using the Delphi Technique, the selection of panellists is important because the validity of the study is directly related to this selection process; that is, the knowledge of the panellist must be relevant to the questions being posed (Dawson and Brucker 2001). All of the fifteen panellists in this study were selected using the purposive sampling technique based on their expertise in related fields.

The panellists for this phase are experts from various fields of art and design consisting of teachers, lecturers, designers, curators, art directors, publishers as well as content makers. The experts in this study however, as stated by Cantrill et al. (1996) are individuals with relevant knowledge and experiences of a particular area. All of the experts selected for this study are those who use typography in their everyday activities. Thus, they are more familiar with the use of Typography in the visual communication fields. Their opinion will give real-life perspectives on the usage of Typography and its importance in the art and design activities. The summary of the panellists of this phase is summarised in Table 15.1.

Table 15.1 Summary of the panelists for Delphi surveys

Sample (panelists)	Number of sample (N)	Sampling technique	Research method
Visual arts teacher	2	Purposive sampling	Surveys (questionnaire)
Lecturers who teach VAE	2	Purposive sampling	Surveys (questionnaire)
Magazine designers	2	Purposive sampling	Surveys (questionnaire)
Broadcasting creative team	2	Purposive sampling	Surveys (questionnaire)
Art director of advertising filed	3	Purposive sampling	Surveys (questionnaire)
Gallery curator	2	Purposive sampling	Surveys (questionnaire)
Instructional designer	2	Purposive sampling	Surveys (questionnaire)

15.11 Data Analysis

The data collected from the surveys were analysed in the quantitative method using the SPSS program. The SPSS program was utilized to obtain the Median, Maximum and Inter-quartile Range from the data of Round One Delphi and Round Two Delphi. Wilcoxan Matched Paired Signed-Rank program was utilized to identify whether there is a difference between data from Round One and Round Two.

15.11.1 Findings

15.11.1.1 Wilcoxan Matched Paired

The quartile readings from Round One were then compared with the quartile reading from Round Two. The rationale behinds the comparison was that the researchers intend to identify whether there is a distinguishing pattern between the two or otherwise. The comparison was done using the Wilcoxan Matched Paired Signed-Rank program. The Delphi Round Two stops here as the surveys have achieved the consensus level from experts. The consensus levels for this study can be referred in the Table 15.2 below.

Table 15.2 Consensus Levels

High consensus	Inter-quartile range 0–1.00
Moderate consensus	Inter-quartile range 1.01–1.99
No consensus	Inter-quartile range 2.00 and above

Table 15.3 shows the reading for Wilcoxan matched paired signed-rank test for both rounds of Delphi surveys for question one. The table presents that out from 10 options, 5 options from Question 1 have higher consensus levels readings between 0.000 and −1.000. While another 5 reveals moderate consensus levels readings from −1.414 to −1.732. The reading shows that there is a significant level between round one and round two Delphi surveys.

Table 15.4 demonstrates the readings for Wilcoxan matched paired signed-rank test for both rounds of Delphi surveys for question two. The table shows that out from 8 options, 4 options from Question 2 have higher consensus levels readings 0.000 for all 4 options. One option showed that the levels consensus is moderate with a reading of −1.414. While the other 3 options shows that there's no consensus levels readings from −2.333 to −2.714 The readings showed that the significant levels between round one and round two Delphi surveys only exist for options that have the high and moderate consensus levels.

Table 15.5 indicates the reading for Wilcoxan matched paired signed-rank test for both rounds of Delphi surveys for question three. The table shows that out from

Table 15.3 Wilcoxon matched paired signed-ranked readings for question 1

	(%)	Median	Mode	Interquartile range	Consensus level	Z	Significant
History of typography	100	4	4	0	Moderate	−1.414	Yes
Types/families in typography	100	4	4	0	Moderate	−1.414	Yes
Anatomy in typography	100	4	4	0	High	−0.577	Yes
The usage of typography	100	4	4	0	Moderate	−1.414	Yes
Rules in typography	100	4	4	1	High	−1.000	Yes
Suitable colours for typography Design	100	4	4	0	Moderate	−1.414	Yes
Examples of design	100	4	4	0	Moderate	−1.732	Yes
Composition in typography	100	4	4	1	High	−0.577	Yes
Other sources from typography blogs and websites	100	4	4	1	High	0.000	Yes
Documentary films About typography	100	4	4	1	High	0.000	Yes

Table 15.4 Wilcoxon matched paired signed-rank readings for question 2

	(%)	Median	Mode	Interquartile range	Consensus level	Z	Significant
Lecture/tutorials	100	4	4	0	High	0.000	Yes
Problem solving (PBL)	100	2	3	1	Low	−2.646	No
Discussion (Q&A)	100	3	4	1	Moderate	−1.414	Yes
Project based learning	100	4	4	0	High	0.000	Yes
Group work	100	2	3	1	Low	−2.333	No
Brainstorm	100	2	3	1	Low	−2.714	No
Technology aided learning	100	4	4	0	High	0.000	Yes
Facilitation	100	4	4	0	High	0.000	Yes

Table 15.5 Wilcoxon matched paired signed-rank readings for question 3

	(%)	Median	Mode	Interquartile range	Consensus level	Z	Significant
Text books/reference	100	4	4	1	Moderate	−1.414	Yes
Computer tools	100	4	4	0	High	0.000	Yes
Sources from internet	100	4	4	0	High	0.000	Yes
Video and audio	100	4	4	1	Moderate	−1.414	Yes
Printed visuals	100	4	4	0	High	0.000	Yes
Blogs/websites	100	4	4	1	Moderate	−1.732	Yes

6 options, 3 options from questions three have higher consensus levels readings 0.000 for all 3 options. While another 3 options show moderate consensus levels readings from −1.414 to −1.732. The reading discloses that there is a significant level between round one and round two Delphi surveys.

15.12 Conclusion

According to Abdullah et al. (2009), education technology fulfils the role as a teaching aid and may be an essential component to teachers. Classroom activities require interesting and creative teaching materials to inspire students to learn. This study focuses on the development of the Interactive Typography Module in enhancing visual communication pedagogy in teaching Visual Art Education (VAE) curriculum. The module were developed based on the data gathered from

the in-depth interviews session as well as Two Round Delphi surveys performed with the fifteen panellist of experts from various background of arts and design. The development of the module was guided by the ADDIE steps of Instructional Design process. The content of the module was built based on the suggestion from the experts, hereby all the contents inside the module has been designed in clearer, easier and more complete to enable and assist VAE teachers during preparation and execution of lessons. The Interactive Typography Module was designed in a complete package consisted of Typography Manual Book, Typography Power Point Slide Presentation as well as Lesson Plan for VAE teachers to teach Typography for Visual Communication syllabus in the Visual Art Education class. The findings from the research performed by Maaruf and Siraj (2013) corroborate with the findings by Kampouropoulou et al. (2011) that multimedia technology is very supportive in the production of an art piece among school students. Hence, these present studies also further demonstrate that technology has a marked influence in the teaching and learning process.

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Chapter 16
MOOC at Universiti Sains Malaysia: Factors Impacting the Teaching and Learning Outcomes of TITAS Course

Saidatul M. Sahimi, Farah M. Zain, Abd Karim Alias, Hanafi Atan and Habibah Ab Jalil

Abstract A study has been conducted to investigate the factors that impacted the outcomes of teaching and learning of Tamadun Islam dan Tamadun Asia (TITAS) course among first year undergraduate students of Universiti Sains Malaysia (USM). This is part of a larger study that looks at the impact of Massive Open Online Course (MOOC) initiative of Ministry of Education Malaysia of four pilot courses offered during the first semester of 2014/2015 academic session. A total of 158 students enrolled in TITAS course responded to the 37 items-questionnaire. The respondents consist of male (15.1 %) and female (84.8 %) and majority of them (86.7 %) are competent in ICT. A factorial analysis was conducted to give patterns and structures to the data and provide a meaningful interpretation to the variables influencing the outcomes of the teaching and learning. The analysis revealed three components that explained a total of 56.80 % of the variance. The first factor is the design of the learning activities (39.80 % of the variance) followed by the access to the learning materials (11.78 % of the variance) and the third factor can be attributed to curriculum compliance of learning course (5.21 % of the variance). The significant of the study is that it revealed of the importance of the

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design of learning activities for the successful implementation and delivery of MOOC. Equally important is the seamless access to the learning materials. Detailed discussion on these two factors will be put forward and as well as the appropriate interventions within the whole MOOC implementation framework.

Keywords Massive open online course (MOOC) · Enhancement in teaching and learning · e-Learning · Learning activities · Learning materials

16.1 Introduction

MOOCs stands for Massive Open Online Courses are online courses aimed at large-scale (hence massive) participation with typical enrollment of more than 1000 students (Masters 2011; Stephen and Jan 2012).The course is open and made available via the Internet. This means that anyone from any parts of the world with adequate Internet connection can enroll the courses offered by top universities in the world for free without any constraints of time and course structure. As far as Malaysian universities are concerned, MOOCs brings immense benefit to the institutions, among others are branding and visibility to the world stage, enhancing quality teaching and learning, promoting niche and expertise and enculturation of life-long learning.

Malaysian Ministry of Education (MMoE) has embarked on strategic program to deploy MOOCs of selected courses from Malaysian public Higher Education Institutions (HEIs). The initiative began in October 2014 with the deployment of four common undergraduate pilot courses to be delivered via MOOCs format utilising 'Open Leaning' platform. These four first year courses were courses to be taken by all twenty public university students and about 2 months into its deployment, the four courses achieved students' enrollment of more than 50,000 students.

MMoE MOOC deployment model consists of number of enablers as the input variable and various implementation objectives as the output variables. The enablers include infrastructure and infostructure, governance, pedagogy, curriculum, content development, professional development and enculturation as the input or independent variables. The output variables or the dependent variables include enhancement of teaching and learning, cost reduction and human resource efficiency, branding and positioning and lifelong learning (Habibah 2015).

In this study, we focus on the enhancement of teaching and learning as the dependent variables, and we seek to find factors that would influence the outcomes of teaching and learning. We proposed that four independent variables, namely, learning activities, content, infrastructure and curriculum that would have direct impact on the outcomes of teaching and learning via MOOCs concept. The model of this study is depicted in Fig. 16.1.

The study is exploratory in nature in order to generate a better model that would predict the factors that affecting the outcomes of teaching and learning. For that

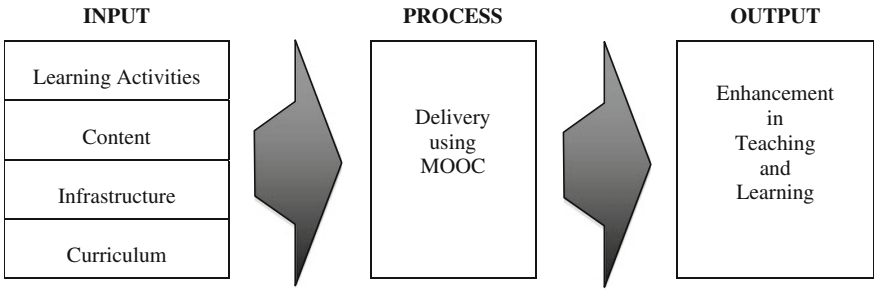

Fig. 16.1 Research model

purpose, an exploratory factorial analysis (Williams et al. 2012) was deployed in this study so that a model would emerge from a relatively large set of latent constructs represented by collection of items of the above attributes as shown in Fig. 16.1.

This study is very important as it provides the insight into factors that affecting the outcomes of teaching and learning via Malaysian MOOCs. Appropriate intervention could be undertaken to ensure that the deployment of Malaysian MOOCs contributes to the desired enhancement of teaching and learning.

16.2 Methodology

Based on the model proposed, a five point Likert scale questionnaire was specially developed consisting of four dimensionsas independentvariables and teaching and learning outcomes as a dependent variable of MOOCs deployment. This was an exploratory study that seeks to find the factors that influence the outcomes of teaching and learning in MOOC learning environment.

The questionnaire consisted of two parts. The first part was to elicit the respondent's demographic details whereas the second part was to elicit the respondent's perception on each of the variables proposed in the model. All the items in the second part of the questionnaire were measured using 5-point Likert scale ranging from 1 (least agreeable) to 5 (most agreeable). In total there were five dimensions incorporated in the questionnaire with 37 items that were used in this study.

The reliability analysis of the questionnaire showed that the Cronbach's alpha obtained was 0.96 indicating high internal consistency and the all the dimensions were within the measurement model.

The questionnaire was put online via Google form and students were briefed and asked to complete the questionnaire. The samples for this study were 337 first year undergraduate students enrolled in TITAS offered by USM during semester I of 2014/2015 academic session. A total of 158 respondents completed the

questionnaire and were subsequently analysed. Factorial analysis was conducted to elucidate the factors that influence the outcomes of teaching and learning.

16.3 Results and Discussion

16.3.1 Demographic Analysis

The demographic analysis showed that most of the respondents were female (84.8 %) and male was the minority (15.1 %). Most of them were Malay (65.8 %), followed by Chinese (26.6 %) and Indian (1.8 %). Majority of them (86.7 %) are competent in ICT. The frequency of usage was moderate with less than 50 % of them accessed the course at least once a week. The demographics details of the respondents shown in Fig. 16.2.

16.3.2 Factorial Analysis

There were two important aspects to be considered when undertaking factorial analysis, namely the sample size and the strength of relationship (Pallant 2013). In

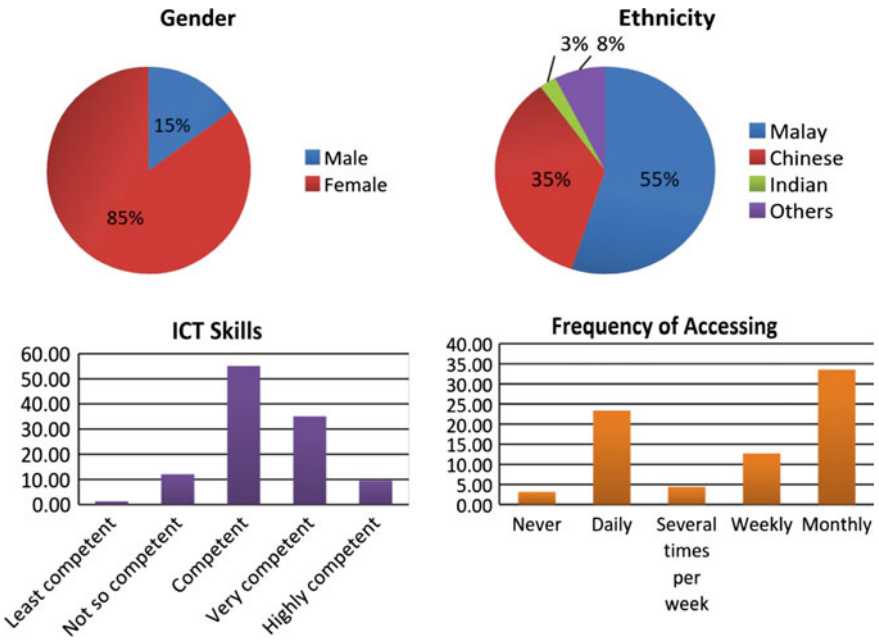

Fig. 16.2 Thedemographics details of the respondents

term of sample size, Tabachnick and Fidell (2001) stated that at least 300 cases were needed for the analysis. However, 150 cases should be sufficient if the solution have several high loading variable (>0.80) (Pallant 2013). In this study, the sample size was 158 students thus fulfilling the requirements. The strength of the inter-correlations among the items could be evaluated using two statistical measures, namely, Barlett's test of Sphericity (significant when $p < 0.05$) or Kaiser-Meyer-Olkin (KMO) (with 0.60 value suggested as the minimum value) (Tabachnick and Fidell 2001).

In this study, we utilised both techniques to ascertain the strength of inter-correlation among items. Table 16.1 shows the KMO analysis which showed that the measure of sampling adequacy (MSA) test recorded a value of 0.908 (>0.60). This indicated that there were inter-correlations amongst variables, hence indicating the appropriateness of factor analysis to be undertaken. The Barlett's Test of Sphericity was significant ($p = 0.000$). As such, this measure also indicates that there existed a correlation matrix with significant correlations amongst the variables and factor analysis was appropriate (Williams et al. 2012).

The principle component factor analysis was conducted to analyse the inter-relationship between variables and to explain these variables in terms of their common underlying dimensions (factors). This analytic technique involved condensing and summarising the information contained in a number of original variables into a smaller set of new, composite dimensions or variates (factors) with a minimum loss of information. In other word, the technique was to search for and define the fundamental constructs or dimensions assume to underlie the original variables.

In this analysis, only factor having latent roots or eigenvalues greater than 1.00 were considered significant. All factors with latent roots less than 1.00 were considered insignificant and therefore disregarded. Table 16.2 shows that only the first five components have eigenvalues of above than 1.00 (12.338, 3.654, 1.616, 1.433, 1.097). These five components explain a total of 64.962 % of the variance.

After the numbers of components have been determined, the components have to be interpreted by "rotating" them. In this study, three components were extracted and rotated. The Varimax rotation technique was used. Table 16.3 shows the rotated components where the loading of each of the variables on the three factors selected were shown. The loading variables of greater than 0.70 on Component 1 were item 27, 24, 28, 15, 19, 16, 29, 25, 18, 23, 17, 30, 13 and 14. While on Component 2, the loading variables of greater than 0.70 were item 7, 5 and 3. Component 3, items 10, 9 and 12 fulfilled the condition.

The Varimax rotation analysis revealed that the items could be segmented into three components, Component 1–Component 3. After analysing the segmented and

Table 16.1 The Kaiser-Meyer-Olkin measure and the Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		0.908
Bartlett's test of Sphericity	Approx. Chi-Square	3325.867
	df	465
	Sig.	0.000

Table 16.2 Total variance explained

Component	Initial eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	**12.338**	**39.800**	**39.800**	**12.338**	**39.800**	**39.800**
2	**3.654**	**11.788**	**51.588**	**3.654**	**11.788**	**51.588**
3	**1.616**	**5.211**	**56.800**	**1.616**	**5.211**	**56.800**
4	**1.433**	**4.622**	**61.422**	**1.433**	**4.622**	**61.422**
5	**1.097**	**3.540**	**64.962**	**1.097**	**3.540**	**64.962**
6	0.947	3.055	68.017			
7	0.916	2.956	70.973			
8	0.810	2.612	73.585			
9	0.740	2.386	75.971			
10	0.658	2.123	78.094			
11	0.628	2.025	80.119			
12	0.574	1.851	81.970			
13	0.552	1.782	83.752			
14	0.525	1.693	85.445			
15	0.487	1.570	87.016			
16	0.447	1.442	88.458			
17	0.407	1.312	89.770			
18	0.376	1.213	90.983			
19	0.335	1.080	92.063			
20	0.310	0.999	93.062			
21	0.297	0.958	94.020			
22	0.289	0.933	94.953			
23	0.242	0.781	95.734			
24	0.232	0.748	96.482			
25	0.209	0.674	97.156			
26	0.195	0.629	97.785			
27	0.167	0.537	98.322			
28	0.151	0.488	98.811			
29	0.141	0.456	99.267			
30	0.132	0.424	99.691			
31	0.096	0.309	100.000			

Bold numbers distinguishes the component with low (below 1.00) and high (above 1.00) values

categorized items, we concluded that Component 1 was the learning activities/material embedded into MOOC, component 2 was infrastructure and component 3 was curriculum.

Subsequent to that, the Oblimin rotation was subsequently conducted. This analysis was undertaken to investigate the inter-relationship between components and how strong is the relation between components to the other two components.

Table 16.3 Rotated component matrix[a]

		Component		
		1	2	3
Q27	The course activities are useful for my learning	**0.848**		
Q24	The content is clear and understandable	**0.841**		
Q28	The content met the learning outcomes	**0.827**		
Q15	The sequence of learning activities helps my understanding of the subject matter	**0.793**		
Q19	Additional resources reinforced my understanding	**0.784**		
Q16	The learning schedule (course plan/lesson plan) suits my learning pace	**0.783**		
Q29	Overall, the quality of content is satisfactory	**0.782**		
Q25	The content is well organized	**0.780**		
Q18	The quizzes enhanced my understanding of the topics covered	**0.765**		
Q23	The content covers the essential aspects of the course	**0.732**		
Q17	Opportunity to interact with large number of students is beneficial to my learning	**0.720**		
Q30	The following activities are useful for my learning: (watching video, forum, assignment, quiz, group activity, interactive presentation, self-learning)	**0.717**		
Q13	The course is well designed	**0.716**		0.328
Q14	Learning through MOOC meets my learning needs	**0.706**		
Q26	The use of multimedia in the course is interesting	0.664		
Q20	Assignments given helped me to achieve the learning objectives	0.664		
Q22	I am able to follow the course at my own pace	0.578		
Q31	The additional resources are helpful (e.g.: link to websites, readings and social media outside *OpenLearning*)	0.549		
Q21	I am able to accomplish the activities on my own	0.459		
Q7	Video are downloadable during class time		**0.805**	
Q5	Streaming video can be accessed during class time		**0.802**	
Q3	Internet speed during class time is bearable		**0.740**	
Q6	Streaming video can be accessed at other times within the campus		0.691	
Q8	Video are downloadable at other times within the campus		0.643	
Q1	I can access MOOC during class time		0.616	
Q4	Internet speed at other times is bearable		0.609	
Q10	The balance between the learning activity and content is sufficient to help my learning			**0.770**
Q9	The content of the course meet the requirement of the syllabus			**0.746**

(continued)

Table 16.3 (continued)

		Component		
		1	2	3
Q12	The learning activities help me to better understand the content			**0.744**
Q11	The learning schedule (course plan/lesson plan) is easy to follow			0.690
Q2	I can access MOOC at other times within the campus			0.392

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization
a. Rotation converged in 4 iterations
Bold numbers distinguishes the component with low (below 0.70) and high (above 0.70) loading values

Table 16.4 Component correlation matrix

Component	1	2	3
1	1.000	0.170	0.492
2	0.170	1.000	0.231
3	0.492	0.231	1.000

Table 16.4 shows component correlation between the three components. The data show that correlation between Component 1 and Component 2 was quite low (0.170) while Component 1 and Component 3 was strongly correlated (0.492). The correlation between Component 2 and Component 3 was also quite low (0.231). The components were considered strongly correlated if the r-value is above 0.30.

The significant findings of this study is that it showed that the learning activities/materials embedded into MOOC was the main factor that influence the outcomes of teaching and learning. Learning activities/materials are strongly correlated with the curriculum. This finding is consistent with the study of Lim and Morris (2009) and Raquel et al. (2010) which also revealed that content and learning activities played pertinent roles in influencing the outcomes of teaching and learning.

16.4 Summary

This study was conducted to elucidate the factors that governed the outcomes of teaching and learning of TITAS course offered in MOOC format at USM. The factorial analysis conducted revealed that three factors emerged as the main factors and they were the learning activities/materials, infrastructure and curriculum. Further correlation analysis between these three factors revealed that the learning/materials are strongly correlated with curriculum. Emphasis should be given on the learning design and its related activities as well as the quality of the content in order to ensure the successful deployment of MOOC.

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Chapter 17
Measuring of Effectiveness of Courseware Content Using Learning Theory for a Programming Subject

Mohd Nor Hajar Hasrol Jono, Rahayu Hasanordin, Shazwani Salleh, Mohamad Ibrahim, Azlan Abdul Aziz and Nor Azilah Mohd Asarani

Abstract The need to integrate multimedia in the process of teaching and learning at all level of education is becoming more significant. Multimedia based e-Learning is seen as an effective alternative in teaching and learning process. This method is able to create a student-centered learning where students are encouraged of being independence; study at their own pace and at their own place. Nevertheless, the rapid development of information and communication technologies (ICT) in today's world has necessitate a new trend in the presentation of information in the form of flash video, which is more easy to understand and accessible instantly to users. The research is undertaken by introducing multimedia courseware by maintaining the concept of Gagne Theory of Nine Events. A new courseware entitled "Introduction to Computer Programming C++" that has been developed using learning theory was being studied to examine the effectiveness of courseware content using learning theory that may allow users to interact simultaneously with

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the material. The courseware content is expected to be an effective teaching aid to entice students in the subject programming. The study was conducted in Faculty Applied Science, Universiti Teknologi Mara Shah Alam. 30 students were selected as respondents. The courseware content evaluation was implemented using a set of questionnaire that used a 5 point Likert scale. The results obtained were very positive and encouraging. Students generally found the multimedia-mediated web-based learning environment were enjoyable and motivating, also were able to demonstrate their learning and skills of the subject area.

Keywords e-Learning · Courseware · Courseware content · Gagne theory of nine events

17.1 Introduction

17.1.1 Background of Study

At present, the usage of multimedia in all degree of learning and educating has turn out to be more significant for the students and instructors. Multimedia based on e-Learning is a great way in instructing and studying process. This method allows the students to complete their training effortlessly at off-hours or from home (Kruse 2002). Furthermore, the growing development in information and communication technologies (ICT) into the sector will provide positive impact to students and instructors within the process of teaching and learning.

Programming language is a useful skill and might contribute benefits to the learners to seek out for a rewarding however it is difficult to learn and it frequently becomes a high failure rates (Robins et al. 2003). Courseware (online learning material) in other word is computer based learning, which refers to the use of computers for the delivery of instruction in an interactive mode is developed using learning theory to help students in learning programming. Hence, using multimedia application for example flash video in the presentation of information nowadays will assist the learners to understand in a better way to convey materials.

17.1.1.1 e-Learning

In Malaysia, e-Learning is no longer a new phenomenon; however it does not end up becoming a hot topic. e-Learning can also be known as distance education or distance learning in which student can study on their own without having to go to class. e-Learning environment has grown to be the most important part of the strategy for conveying online and flexible learning (Toth et al. 2006). It has established itself as option in all degree of education, particularly in higher education, where it is ready to take on a larger role. The dissemination of information

and communication technology (ICT) has enabled existing and new institutions of higher learning in Malaysia to offer their educational services to a wider market place and in many instances, beyond geographic locations (Endut et al. 2012). The demand for education, then again has grown so rapidly in the past few decades makes everything in relation to education is acceptable. In relation with the courseware presentation, it is one of the technique to integrate the use of e-Learning as to ensure the success in teaching and learning.

According to Jono (2013), stated that Dato 'Seri Mohamed Khaled Nordin, Minister of Higher Education Malaysia has ordered the National e-Learning Policy to plan and deliver a framework and direction for the implementation of e-Learning in Malaysian Higher Education Institutions (HEIs) for a period of five (5) years from 2011 to 2015. Hence, it will be capable to move forward to a better aspect of e-Learning and assist to support learning in a more personal, flexible, portable, and on-demand manner.

17.1.1.2 Interactive Multimedia

Interactive multimedia in education and training seems to be the necessity in sharing information and knowledge on the research and practices of using multimedia in many educational surroundings (Mishra and Sharma 2005). Multimedia is the process of delivering message or information in the form of text, figures, images, sounds or moving images which are displayed on a screen and in some cases computer screen and television monitor are used to enhance the learning process.

Interactive multimedia is interesting since there is an opportunity for profound involvement, which captures and holds learners' interests. Interactive multimedia is also attractive because it is multi-sensory by integrating sounds, images, and text. Moreover, it is individualized, which allows the learners to navigate through information to build their own unique mental structures based on exploration.

Holbert and Karady (2008) state studies have shown that people retain 25 % of what they hear, 45 % of what they see and hear, and almost 70 % when they actively participate in the process (Holbert and Karady 2008). Thus, the use of interactive multimedia in lectures can become an important teaching aid to generate active participation from students.

Mayer (2003) strongly claim that the usage of multimedia is an effective teaching and learning tool, as he stated that, "the promise of multimedia learning is that teachers can harness the power of visual and verbal forms of expression in the service of promoting understanding of students" (as cited in Neo et al. 2010). Interactive multimedia is interesting because there is a chance for deep involvement, which captures and holds learners interest and also can help in easing the process of knowledge transfer effectively especially for distance learning program or part time.

17.1.2 Problem Statement

Programming language is a useful skill and may contribute benefits to the students to hunt for a rewarding profession. However, learning a programming subject is challenging for a novice programmer who does not have a programming basic skill (Robins et al. 2003). A study conducted by Norasyikin Zaid and Zaidatun Tasir (2011) stated that the programming language C++ is a programming language that is easy to learn as the basic of programming for students. This is verified by the analysis presented in the database of i-Learn Centre of Academic & International Affairs Division of the Universiti Teknologi MARA where it is shown that based on the fourteen faculties under Science and Technology cluster, ten faculties offer Programming C++ as their basic programming course.

In addition, according to Teague and Roe (2009), the introductory programming subject usually has high failure rates (Teague and Roe 2009). This is also supported by the analysis from internal resources of Universiti Teknologi Mara, Shah Alam based on the statistics gained from the Faculty of Applied Sciences only, the students who fail in programming subject are more than 25 % whereas percentages of control failure is 10 %. Then again, the first year students from the Faculty Applied Science need to study programming subject even though they are not exposed to any programming concepts. This would be the integral part of the integration of courseware in teaching and learning that would bring positive impact for students' better understanding with anticipation it will lead the reduction number of failures.

As far as research goes, it does not appear to be much research in Malaysia that is actually done in this e-Learning in courseware especially in the area of learning theory on the failure of programming subject. Consequently, inadequacy of systematic teaching and learning materials especially using learning theory towards programming subject that can encourage more comprehensive study should be conducted to provide appropriate teaching and learning materials and course content. Besides that, the dissemination of knowledge related to the course will be more systematic, efficient and effective. It possibly will be able to encounter the requirements of students who are less interested in learning programming that could help students to develop and strengthen their performance in the classroom. This objective of this study is to examine the effectiveness of courseware content using learning theory for programming subject. The findings would assist in developing better courseware contents, becoming good references and resources activities for the programming subject in future.

17.2 Literature Review

17.2.1 Introduction

The use of information technology in education has grown rapidly. The present of e-Learning is about creating and using computer-based systems to well support

learning activities (Rosenberg 2001). Students can learn by way of themselves without going to the class as long as they have an internet connection and a personal computer. The combination of multimedia and e-Learning pedagogy will produce the effectiveness of learning pedagogy in order to assist students in their learning process. Numerous practices of e-Learning have been developed around the world and show the exciting innovations to improve individual learning (Zhang and Nunamaker 2003).

17.2.2 Benefits of e-Learning

According to Liaw (2007), some great benefits of e-Learning have been mentioned in lots of articles (Bouhnik and Marcus 2006; Liaw et al. 2007; Raab et al. 2002; Shotsberger 2000). Bouhnik and Marcus (2006) mentioned that e-Learning has four benefits. First is the freedom to decide when each online lesson will be learned. Second is less of dependence on the time constraints of lecturers. Third would be the freedom to express their views and ask questions, without limitations. Finally, the accessibility to the course's online materials at students' own selection.

Students will be able to begin the process of learning anywhere and at any time when they are free. Thus, they will be more focused and able to improve their performance. They also do not need to meet with their lecturers often because they already have effective learning materials that can be a source of reference in studies. e-Learning can be a medium for students to do an online discussion with the lecturer and their peers. At present, the academic field can placed course materials online for students to access and also come out with online activities as well as discussions to improve students' understanding and encourage deeper learning (Endut et al. 2012).

Learners can proceed through the training program at their own pace and in their own place where they are able to access the e-Learning course at any time in their own needs. Thus it is actually assist students in learning programing due to it takes about ten years of practice to make the novice programmer to expert programmer (Nandigam and Bathula 2013) learn how to develop a program is difficult. Novice programmer needs a lot of time to learn to be an expert programmer hence they require a source of reference that may help them regardless of time and place.

17.2.3 Gagne Theory of Nine Events

The first one of educational psychologists to take alongside in combination all of the mechanisms of an instruction theory, from setting goals to measure performance was Robert Gagne (Tennyson 2010). Theory of Gagne Learning Model (1985)

highlights on the intentional or purposeful learning, which is the type of learning that, occurs in school or specific training programs (Jono 2013).

The nine events of instruction are the best solution for learning process. It makes use of all aspects of testing, practicing, and uses the information that will be shown (Skaria 2006). Robert Gagne's 'Nine events of instruction' framework outlines a few key activities that should be included in a course and helps to decide the order through which activities should be delivered to learner. The nine events are; gaining attention, informing the learner of the objective, stimulating recall of prior knowledge, presenting information, providing guidance, eliciting performance, providing feedback, assessing performance, and enhancing retention and transfer.

In general, it is not only the practice of instructional design has a strong influence on the work of Gagne but as well the methods that courseware is designed and hardware is used for instruction will provide a strong effect (Thomas 2010). In continuation of learning theory research, multimedia developers will capable to incorporate the concept of teaching and learning with multimedia applications. It is important to have such knowledge so as to develop effective courseware to be delivered to students. Teaching theory Robert Gagne is considered to be a major contributor to the design approach of teaching and training.

17.2.4 The Concept of Courseware

Education Resource Information Center (ERIC), USA, the courseware is defined as a comprised of computer software and additional documentation that is written specifically for instructional applications. Thus, courseware will also be defined as computer software that gives instructional material to students. Courseware may also be known as the computer Aided instruction (CAI) or computer Aided learning (CAL) (Marina 2013).

Courseware (online learning material) in other word is computer based learning, which refers to the use of computers for the conveying of instruction in an interactive mode which at this time are recognized as trend in supporting teaching process (Hei and Chien 2006). It is advisable that a precondition for effective web based courseware design in higher education is cautious consideration of the traditional body of knowledge in the field of instructional design which should serve as a basis for long term tendencies in the design process.

This body of knowledge consists of theories of instruction and courseware design aspects that concern hypermedia structure, learner control, feedback, interactivity, and screen design elements. Besides, the end-users' input have to be sought as it could make sure above and improve understanding on the implementation of the new medium of higher education (Monthienvichienchai and Melis 2006).

Krnel and Bajd (2009) summarized the following views on computer assisted learning. Firstly, learning with online learning material is more successful

compared to live lessons, secondly video simulation and the combination of graphic and audio presentation used in this will cause learning become easier, thirdly it is adjusted to students through various learning styles and fourthly it assists the review based on the approach to learning (Krnel and Bajd 2009). Students can more focus on what information are being deliver compared to explanation from instructors. This is because they are difficult to capture or imagine the information that is being delivered.

17.2.5 Courseware Content

Courseware content consist of the criteria that expose to what degree of instructional material allows students had interesting learning experience that provide for mastery of the content. Instructional material should have these criteria to develop interesting learning experience such as readability, uniformity of language, terminology, and notations, availability of the course syllabus, comprehensiveness of the lecture notes, modularity of the course content, possibility to select the most suitable learning unit, opportunity to choose the most appropriate learning path, top-down, bottom-up or combined approach, and availability of assignments with or without solutions (Vladoiu and Constantinescu 2012).

When considering only the specific learning resources such as a small unit, a course module and a lesson, the learners may be attracted in numerous aspects related to resource for example accuracy, fairness, self-satisfied, context, relevance, availability of multimedia inserts, and resource's correlation with the whole course (Vladoiu and Constantinescu 2012).

Courseware in content management does not concern on how the content is situated on the screen but how it is presented in the courseware. The content of this courseware involves syllabus of Introduction to Computer Programming subject. The Content is divided into a number of topics in the syllabus. Respondents' assessment framework focuses on the content, objectives, accuracy with the existing syllabus, descriptions, examples and a few of different things. In content management, some of the things which are to take a look at are how the content of the courseware, the examples provided and the exercises are offered within the courseware.

For content, the way in which the content is organized, the difficulty level, the suitability of the content material to the learners and the language used are evaluated. The content should be in a logical order. It should be organized from easy to difficult with increasing levels of difficulty gradually. To avoid sequential effects in a multimedia presentation, the selection should be given to the user to choose the level of difficulty that suits them. In terms of its suitability of the contents, it should suit the target users and are adequate in quality and quantity (Fetter 1984; Marina 2013).

H1 Gagne's theory of nine events is associated with courseware content

17.3 Methodology

This research was conducted to identify the effectiveness of courseware presentation using learning theory for a programming subject. Gagne's nine event of instructions leaning theory developed by Robert Gagne was chosen. The evaluation of courseware presentation is professed in the process of courseware development involving the use of multimedia elements and interactivity elements found in the application; text, graphic, color, audio, video and animation as mentioned in the Gagne learning theory.

In order to achieve the objectives, a purposive sampling method is selected. Questionnaires were distributed to 30 respondents that were identified as a control group that has been using the courseware were identified. The respondents comprised of first semester's students from the Faculty of Applied Sciences, UiTM Shah Alam that used the courseware for "Introduction to C++ Computer Programming" subject for two months. The students then evaluated the courseware presentation that they have used during teaching and learning process to quantify the effectiveness of it with their studies. In completing the questionnaire, respondents were required to choose from a 5 point Likert scale and analyzed using Statistical Package for the Social Sciences (SPSS) software.

17.4 Findings

17.4.1 Cronbach's Alpha Test of Reliability

It is valuable to compute using Cronbach's Alpha as it delivers core constancy dependability for any scales or subscales (Gliem and Gliem 2003). The reliability measurement is based on Sekaran (2005). If the scale is less than 0.6, it is considered as poor. Meanwhile, if the scale results in range of 0.6 to less than 0.7 will be moderate. Although, the scale result will be good and very good if the scale range in 0.7 to less than 0.8 and 0.8 to less than 0.9 respectively. The higher the reliability, it will in excellent consistency that is 0.9 to 1.0. The Cronback's Alpha result for courseware content was 0.830 and associated as reliable and consistent.

17.4.2 The Effectiveness of Courseware Presentation

The hypothesis that will be tested was:

H1 Gagne's theory of nine events is associated with courseware content

The result of Pearson Correlation Coefficient Test between Gagne's theory of nine events associated with courseware content indicates that r value = 0.570** and

P-value = 0.001. Since (P = 0.001 < 0.01), H0 is **Rejected**. Therefore, Gagne's theory of nine events is significant with courseware content. The r-value is used to determine the relationship between the hypotheses. There are very strong if r-value (0.90–1.00), strong (0.70–0.90), medium (0.40–0.70), weak (0.20–0.40) and very weak (<0.20). Since r-value = 0.570, the relationship between Gagne's theory of nine events is associated with courseware content is **Medium**.

17.5 Conclusion and Recommendation

Findings of the data for the respondents showed positive attitude toward most of the given statement in distinguishing the effectiveness of courseware using learning theory in assisting the Programming subject teaching and learning process. The attained finding from 30 respondent shows that the students agree to all given statements and highly agreed that courseware is effectiveness using learning theory also able to help their learning process.

Based on the research design and analyzed effects from this research, it can be concluded that the analysis results were consistent with the literature review, where the courseware content using learning theory for programming subject meet the requirements that support active learning and flexibility to improve the quality of students and programming subject. Furthermore, the results also shown that the courseware produced was effective and met the needs of targeted users. It is expected that this study will fulfill the latest learning approach to enhance learning of students' acquisition in learning programming subject. Theoretically findings could be used to produce other courseware that can encourage students to become more attracted in learning other subjects taken at the Universiti Teknologi Mara or different universities.

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Chapter 18
Blended Learning Mode: An Analysis of the Practices Among UiTM Pahang Lecturers

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Abstract The emergence of blended learning mode for its ubiquity has gradually replaced the conventional teaching approach in the educational contexts. In UiTM Pahang itself, majority of the academicians have adopted blended learning mode in their teaching and learning. Universiti Teknologi MARA (UiTM)'s official Learning Management System (LMS) which is known as i-Learn portal, is widely used by both registered and unregistered blended learning instructors in conducting all blended learning activities. However, since there is no proper mechanism or tool used to check whether the blended learning practices at UiTM Pahang is achieved in terms of total time spent on i-Learn portal, it is difficult for the Head of i-Learn Unit, UiTM Pahang to gather and submit the data to UiTM Pahang's higher authority on the number of registered blended learning instructors that have fully achieved the required total hours spent on i-Learn portal every semester. Thus, blended learning tracking form and blended learning tracking template were designed to ensure that the learning mode is fully practiced by the respective registered lecturers. Data on the usage of online learning by the registered lecturers

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was obtained from the distribution of blended learning tracking forms by the i-Learn representatives from all faculties. The data were then entered into the blended learning template for immediate result and analysed descriptively using SPSS version 21. The findings showed that majority of all the registered lecturers have fulfilled their online hours spent on LMS and only a small number of them failed to do so. It is hoped that by using the blended learning tracking template, the monitoring process as well as the management practices would become more efficient and systematic in the future.

Keywords Academicians · Blended learning · i-Learn portal · Management practices

18.1 Introduction

The blended learning method has been used for the past several years and become common among university lecturers and students in recent years in conducting teaching and learning sessions. The emergence of information technology for its ubiquity has encouraged the adoption of blended learning mode in higher educational institutions especially in Universiti Teknologi MARA (UiTM).

Blended learning has been accepted and practically implemented in UiTM Pahang as one of the delivery methods to conduct teaching and learning processes. The combination of face-to-face lecture sessions and computer mediated technology enables instructors to get benefits in both conventional teaching approaches and Internet versatility of Web 2.0 technologies. Besides using i-Learn portal as UiTM's official LMS, blended learning instructors may also use some of the aplications in web 2.0 for education such as Edmodo, Socrative, Geogebra, GlogsterEdu, Mindmeister, and Educreation among others in replacing face-to-face lecture sessions or supporting the teaching and learning processes.

To ensure the blended learning approach is successfully implemented, students and instructors' involvements in online activities needs to be measured and monitored in accordance to the stipulated rules. The instructors are monitored by i-Learn Centre, UiTM Malaysia in three criteria; uploading at least seven files on the LMS, posting two online assessments and conducting three online discussions or forums. Nevertheless, there is no proper mechanism or tool used to check whether the blended learning practices at UiTM Pahang as well as at UiTM Malaysia is achieved in terms of total time spent on i-Learn portal. As an initiative, the i-Learn Unit of UiTM Pahang has materialised a distinct procedure in monitoring participation of blended learning(BL) instructors to ensure that 30 % of the contact hours for each registered course is virtually fulfilled. Hence, the main objective of this study is to inform the top management of UiTM on the achievement of blended learning practices at UiTM Pahang by analysing the data gathered and entered in

the blended learning template. From the template, the i-Learn Unit of UiTM Pahang is able to identify the number of registered blended learning instructors that have fully achieved the required total hours spent on i-Learn portal every semester.

18.2 Literature Review

The implementation of blended learning has been widely practiced in higher educational institutions nowadays. The operational alignment of blended learning implementation with the institutions' goals and objectives should be analysed to make sure the consistency of faculty development as well as the students learning support mechanisms (Moskal et al. 2013). As the blended learning approach is on the rise in UiTM, the academicians are suggested to embrace the traditional values of face-to-face teaching and assimilate the best practices of online learning as proposed by Mironov et al. (2012). This was also supported by Mouzakis (2008) who proposed that ICT teachers in Greece who participated in the survey were satisfied with the knowledge they acquired from the training on blended learning and collaborative learning process. The teachers also stated that they adapted well to the blended learning process requirements as they have already begun to integrate the ICT in their daily teaching practice. Therefore, it can be seen that adopting blended learning encouraged the learners to engaged in advance interactive experiences in the classroom and at the same time provided learners with multimedia-rich content at anytime and anywhere with the availability of internet access. Moreover, the approach allows the instructors and learners to have more flexibility in transferring knowledge.

The participation of lecturers in online learning need to be monitored from time to time to ensure that the university' objectives can be achieved. Thus, a performance measurement (PM) system has to be used to achieve the vision of the university (Francisco et al. 2003). PM systems consist of a number of measures and one of the most referenced is Kaplan and Norton's Balanced Scorecard (BS). The BSC measurement model integrates the financial measures that have been used previously, with other types of measures to form a four-dimension scorecard. It also realised the importance of the intangible assets opposite to the traditional financial perspective. According to Francisco et al. (2003), although there was no methodology proposed to develop performance measures and no solution developed to derive the lead indicators from lag indicators, this model fits with the measurement of such an intangible asset as knowledge.

Furthermore, in a study conducted by Francisco et al. (2003), knowledge management is defined as leveraging the intellectual assets of the company to meet defined business objectives. KM solutions should be measures according to the business objectives. It is believed that knowledge management and performance measurement systems can be adapted by the LMS administrators in UiTM to monitor the performance of all registered blended learning instructors in the LMS in

one summarised report because PM systems have been commonly accepted as a manner of monitoring business performances and cover most of the domains of management. Nevertheless, less research has been done to see the usefulness and effectiveness of designed report template especially in tracking the performance of blended learning instructors in education.

18.3 Methodology

The process of tracking registered blended learning instructors was done by tracking the total hours spent by the instructors in i-Learn portal for the courses and groups registered. i-Learn Unit in UiTM Pahang materialised a standard procedure to measure the total hours spent on i-Learn portal. The stored record in the tracking system generated tracking report and will be documented for future references. The flowchart in Fig. 18.1 depicts the process of blended learning tracking in UiTM Pahang.

All registered lecturers as blended learning instructors needed to submit their tracking report to the faculty's i-Learn representatives after the semester ended. The form as shown in (Fig. 18.2) which contained the course code, course name, contact hours per week, total number of groups registered and total hours spent on i-Learn portal provided by i-Learn Unit was required to be filled in by the registered instructors. The record of the total hours spent for the current semester was retrieved from i-Learn portal by selecting the start and end date as shown in Fig. 18.3.

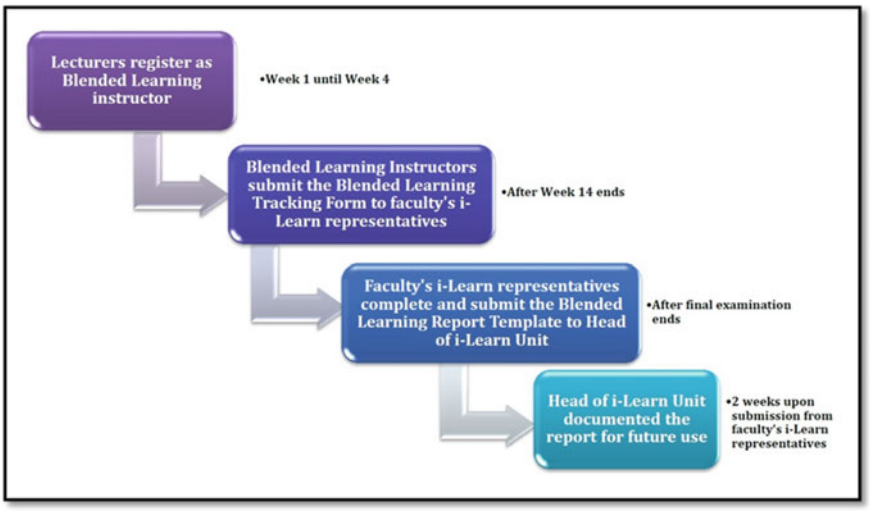


Fig. 18.1 Flowchart for blended learning tracking in UiTM Pahang

"BLENDED LEARNING TRACKING" BAGI SEMESTER _____ 20___

Program Ijazah

Program Diploma

**sila (√) pada yang berkenaan

NAMA PENSYARAH :_____

NO PEKERJA :_____

FAKULTI :_____

LAPORAN MENGIKUT KOD KURSUS

Bil	Kod Kursus	Nama Kursus	Jam Bersemuka (Contact Hour) bagi seminggu	Jumlah Kumpulan didaftarkan	Jumlah Jam di Portal i-Learn

Sekian, terima kasih.

_____

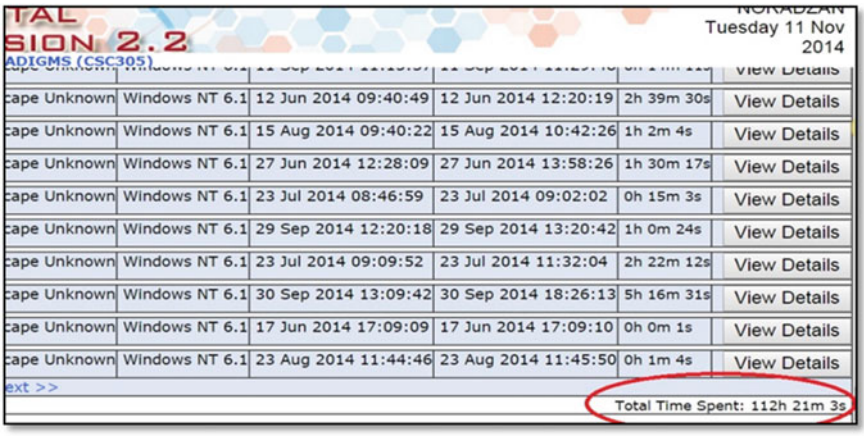
(tandatangan pensyarah)

**Sila sertakan lampiran "tracking" bagi setiap kod yang didaftarkan.

Unit iLearn
Bahagian Hal Ehwal Akademik
Universiti Teknologi MARA Pahang
26400 Bandar Tun Abdul Razak Jengka, Pahang
MALAYSIA

Fig. 18.2 Blended learning tracking form

Upon submission of the blended learning tracking form from all respective blended learning instructors, the data received was then transferred to the report template by faculties' i-Learn representatives. The template summarised whether the lecturers achieved 30 % of total contact hours in the semester (Fig. 18.4). The template was created using Microsoft Excel 2010 by Azmi Salim, a lecturer from Faculty of Business Management, UiTM Pahang which comprised of;



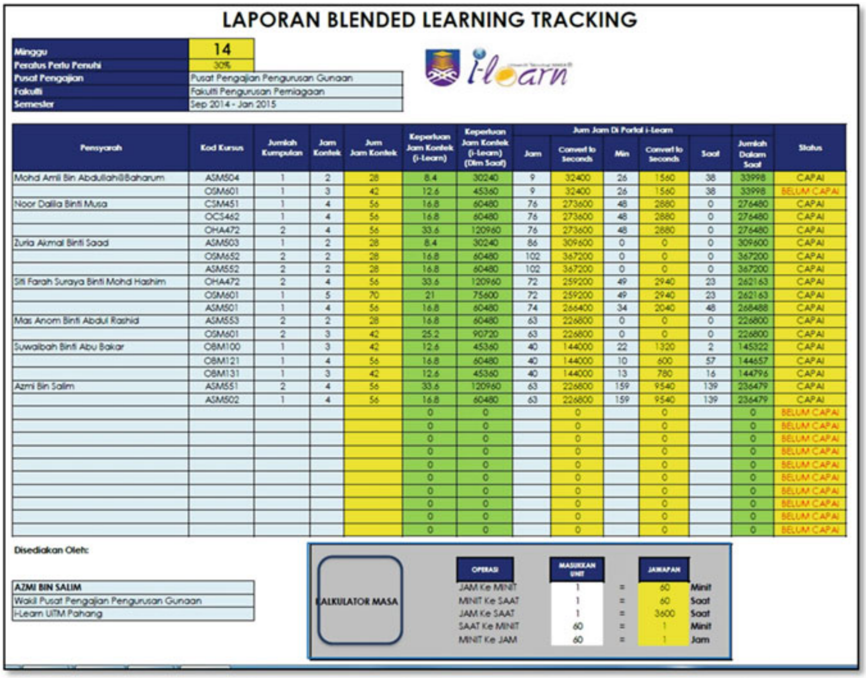
TAL
SION 2.2
ADIGMS (CSC305)
NORAZLAN
Tuesday 11 Nov 2014

cape Unknown	Windows NT 6.1	12 Jun 2014 09:40:49	12 Jun 2014 12:20:19	2h 39m 30s	View Details
cape Unknown	Windows NT 6.1	15 Aug 2014 09:40:22	15 Aug 2014 10:42:26	1h 2m 4s	View Details
cape Unknown	Windows NT 6.1	27 Jun 2014 12:28:09	27 Jun 2014 13:58:26	1h 30m 17s	View Details
cape Unknown	Windows NT 6.1	23 Jul 2014 08:46:59	23 Jul 2014 09:02:02	0h 15m 3s	View Details
cape Unknown	Windows NT 6.1	29 Sep 2014 12:20:18	29 Sep 2014 13:20:42	1h 0m 24s	View Details
cape Unknown	Windows NT 6.1	23 Jul 2014 09:09:52	23 Jul 2014 11:32:04	2h 22m 12s	View Details
cape Unknown	Windows NT 6.1	30 Sep 2014 13:09:42	30 Sep 2014 18:26:13	5h 16m 31s	View Details
cape Unknown	Windows NT 6.1	17 Jun 2014 17:09:09	17 Jun 2014 17:09:10	0h 0m 1s	View Details
cape Unknown	Windows NT 6.1	23 Aug 2014 11:44:46	23 Aug 2014 11:45:50	0h 1m 4s	View Details

ext >>

Total Time Spent: 112h 21m 3s

Fig. 18.3 Total hours spent retrieved from i-Learn portal



LAPORAN BLENDED LEARNING TRACKING

Minggu	14
Peratus Perlu Penuhi	30%
Pusat Pengajian	Pusat Pengajian Pengurusan Gunaan
Fakulti	Fakulti Pengurusan Perniagaan
Semester	Sep 2014 - Jan 2015

Pensyarah	Kod Kursus	Jumlah Kumpulan	Jam Kontek	Jum Jam Kontek	Keperluan Jam Kontek (i-Learn)	Keperluan Jam Kontek (i-Learn) (Dlm Saat)	Jum Jam Di Portal i-Learn					Jumlah Dalam Saat	Status
							Jam	Convert to Seconds	Min	Convert to Seconds	Saat		
Mohd Amli Bin Abdullah@Baharum	ASM504	1	2	28	8.4	30240	9	32400	26	1560	38	33998	CAPAI
	OSM601	1	3	42	12.6	45360	9	32400	26	1560	38	33998	BELUM CAPAI
Noor Dalila Binti Musa	CSM451	1	4	56	16.8	60480	76	273600	48	2880	0	276480	CAPAI
	OCS462	1	4	56	16.8	60480	76	273600	48	2880	0	276480	CAPAI
	OHA472	2	4	56	33.6	120960	76	273600	48	2880	0	276480	CAPAI
Zuria Akmal Binti Saad	ASM503	1	2	28	8.4	30240	86	309600	0	0	0	309600	CAPAI
	OSM652	2	2	28	16.8	60480	102	367200	0	0	0	367200	CAPAI
	ASM552	2	2	28	16.8	60480	102	367200	0	0	0	367200	CAPAI
Siti Farah Suraya Binti Mohd Hashim	OHA472	2	4	56	33.6	120960	72	259200	49	2940	23	262163	CAPAI
	OSM601	1	5	70	21	75600	72	259200	49	2940	23	262163	CAPAI
	ASM501	1	4	56	16.8	60480	74	266400	34	2040	48	268488	CAPAI
Mas Anom Binti Abdul Rashid	ASM553	2	2	28	16.8	60480	63	226800	0	0	0	226800	CAPAI
	OSM601	2	3	42	25.2	90720	63	226800	0	0	0	226800	CAPAI
Suwaibah Binti Abu Bakar	OBM100	1	3	42	12.6	45360	40	144000	22	1320	2	145322	CAPAI
	OBM121	1	4	56	16.8	60480	40	144000	10	600	57	144657	CAPAI
	OBM131	1	3	42	12.6	45360	40	144000	13	780	16	144796	CAPAI
Azmi Bin Salim	ASM551	2	4	56	33.6	120960	63	226800	159	9540	139	236479	CAPAI
	ASM502	1	4	56	16.8	60480	63	226800	159	9540	139	236479	CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI
					0	0		0		0		0	BELUM CAPAI

Disediakan Oleh:

AZMI BIN SALIM
Wakil Pusat Pengajian Pengurusan Gunaan
i-Learn UiTM Pahang

KALKULATOR MASA

OPERASI	MASUKKAN UNIT		JAWAPAN	
JAM Ke MINIT	1	=	60	Minit
MINIT Ke SAAT	1	=	60	Saat
JAM Ke SAAT	1	=	3600	Saat
SAAT Ke MINIT	60	=	1	Minit
MINIT Ke JAM	60	=	1	Jam

Fig. 18.4 Blended learning tracking template

i. Blended Learning Instructors' Name
ii. Course Code
iii. Total Number of Groups
iv. Total Contact Hours
v. Total Time Spent on i-Learn Portal in Hours and Minutes

The last column in the template indicated the status of total hours spent on i-Learn portal whether blended learning instructors fulfill the requirements on the LMS or not for each courses they registered. If the blended learning instructors did not fulfill the requirements, they were not being penalized, instead they were advised to fulfill the requirements for the following semester.

The complete report was submitted to Head of i-Learn Unit and documented for future references and uses.

The data obtained from the report template were also analysed using the Microsoft Excel 2010. Descriptive analysis such as percentages was used to discover whether the registered lecturers from different faculties have achieved 30 % of total contact hours along the semester.

18.4 Findings and Discussions

18.4.1 Demographic Profiles

18.4.1.1 Respondents' Demographic Profile

Table 18.1 represents the descriptive statistics of the respondents' profile. This study indicated that 127 lecturers, 484 groups and 102 courses were registered for blended learning mode during Semester June—October 2014 (diploma session) in UiTM Pahang. During Semester March—July 2014 (Degree Session) only 7 lecturers, 14 groups and 9 courses were registered for BL mode. It was probably because the number of lecturers teaching the degree session was not as many as the number of lecturers teaching diploma students. However, the number of registered lecturers for BL mode has decreased in Semester December 2014—April 2015 (diploma session) whereby only 94 lecturers, 337 groups and 75 courses were registered. The reason was because of the number of students' enrollment that was decreasing every semester for the past few years. The data was obtained from i-Learn Management System.

Altogether there are 9 faculties in UiTM Pahang (refer Table 18.2). Every faculty except for the Academy of Contemporary Islamic Studies (ACIS) would have at least one lecturer who would register as BL instructor during Semester December 2014—April 2015 (diploma session).

Table 18.1 Descriptive statistics of reposndents' demographic profile

No.	Semester	Total number of registered courses	Total number of registered groups	Total number of registered BL instructors
1	Diploma Session (Nov 2013—March 2014)	6	10	4
2	Diploma Session (June 2014—October 2014)	102	484	127
3	Degree Session (March 2014—July 2014)	9	14	7
4	Degree Session (September 2014—January 2015)	63	115	44
5	Diploma Session (December 2014—April 2015)	75	337	94

Table 18.2 List of faculties in UiTM Pahang

No.	Faculty
1	Faculty of plantation and agrotechnology (AT)
2	Faculty of applied science (AS)
3	Faculty of business management (BM)
4	Faculty of computer science and mathematics (CS)
5	Faculty of sports science and recreation (SR)
6	Faculty of accountancy (AC)
7	Faculty of civil engineering (EC)
8	Academy of language studies (APB)
9	Academy of contemporary islamic studies (ACIS)

18.4.1.2 Statistics on the Registered Lecturers as Blended Learning Instructors in UiTM Pahang

Table 18.3 indicates the overall statistics of registered blended learning instructors in UiTM Pahang. The result showed that 88 (93.62 %) blended learning instructors did send their report to the respective i-Learn representatives and only small number of the blended learning instructors (6.38 %) did not send their report on the total hours spent on i-Learn portal.

Based on Table 18.4, the Faculty of Business Management (BM) had the highest number of lecturers who registered as BL instructors during the diploma session (Semester Dec 2014—April 2015) and out of 32 lecturers under that faculty, only 3 lecturers failed to send their tracking forms to the faculty representative of i-Learn. On the other hand, only 8 out of 20 lecturers from the Academy of Language Studies (APB) managed to send their tracking forms to their faculty representatives. The reason because most of the lecturers under that faculty were given new course codes and groups in the third or fourth weeks after the semester begun and they had already registered themselves as BL instructors at that time. Once they were given new course codes and groups after that, they could not proceed with the blended learning implementation as they had to conduct their teaching and learning in the classrooms most of the time.

Table 18.3 Descriptive statistics on the registered lecturers as blended learning instructors in UiTM Pahang

Items	Total	Percent (%)
Registered lecturers	94	100
Registered lecturers who did send the tracking form	76	80.85
Registered lecturers who did not send the tracking form	18	19.15

Table 18.4 registered lecturers as blended learning instructors in UiTM Pahang By faculty

Items	AT	AS	BM	CS	SR	AC	EC	APB	ACIS	Total
Registered lecturers	3	11	32	21	2	3	2	20	0	94
Registered lecturers who did send the tracking form	3	11	29	19	2	2	2	8	0	76
Registered lecturers who did not send the tracking form	0	0	3	2	0	1	0	12	0	18

18.4.1.3 Statistics on Courses That Achieved 30 % of Total Hours Spent on i-Learn Portal

Table 18.5 represents the overall statistics on courses that achieved 30 % of total contact hours spent on i-Learn portal. From the findings, it shows that 65 (59.09 %) out of 110 courses registered for blended learning approach had achieved 30 % of total hours spent on i-Learn portal. Another 40.91 % courses failed to achieve the targeted total hours should be spent on i-Learn portal. It implies that majority of the registered blended learning instructors managed to achieve the objectives set by the i-Learn Centre to ensure the blended learning approach is successfully implemented.

Table 18.6 shows the courses that achieved 30 % of total hours spent on i-Learn portal by faculty in UiTM Pahang. The results reported that courses from the Faculty of Business Management (BM) that registered for blended learning activities had the highest number compared to other faculties in achieving the 30 % of total hours spent on i-Learn portal. Nonetheless, 10 out of 14 courses from the Academy of Language Studies (APB) did not manage to achieve 30 % of total hours spent on i-Learn and it indicated that lecturers from that faculty need to improve their teaching and learning activities using blended learning in the coming semester if they still want to practise blended learning approach.

Table 18.5 Statistics on courses that achieved 30 % of total hours spent on i-Learn portal

Items	Total	Percent (%)
Number of registered courses available in UiTM Pahang (diploma semester December 2014—April 2015)	1636	100
Number of courses registered with i-Learn	110	7
Number of courses that achieved 30 % of total hours spent on i-Learn portal	65	59.09
Number of courses that did not achieve 30 % of total hours spent on i-Learn portal	45	40.91

Table 18.6 Courses that achieved 30 % of total hours spent on i-Learn portal by faculty

Items	AT	AS	BM	CS	SR	AC	EC	APB	ACIS	Total
Registered courses (code)	3	13	45	25	4	3	3	14	0	110
Courses (code) that achieved 30 %	1	7	27	18	4	2	2	4	0	65
Courses (code) that did not achieve 30 %	2	6	18	7	0	1	1	10	0	45

18.5 Conclusion and Recommendation

Tracking the participation in i-Learn portal for blended learning instructors in UiTM Pahang has been done since 2014 as blended learning becomes one of the delivery methods being used by most of the instructors. The materialised procedure enabled the blended learning instructors to keep track of their activities and keep them aware of their total hours spent on the portal. This procedure also helps in generating documented reports and to be used as evidences and references for future research. Nevertheless, improvement and enhancement on the template need to be done, such as (1) user friendliness, (2) data security—avoidance of template's alteration from other users, and (3) auto generate charts as report summary. These further recommendations shall set the template to its optimum capability.

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Chapter 19
Students' Perceptions of Blended Learning and Achievement

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Abstract Blended learning is perhaps becoming the most prominent instructional delivery solution to education. There is limited research focusing on the students' perceptions of blended learning based upon their achievement. Thus, the purpose of the study was to examine the relationship between students' perceptions of blended learning and their course achievement. Students' perceptions were assessed based upon four factors namely convenience, engagement, overall satisfaction and perceived learning outcome. The study sample was a group of students taking a tourism-related course in a major university in Malaysia. Online survey and e-mail interviewing were employed to collect data. Data were analyzed using both descriptive and inferential statistical tests. Results of the study show that regardless of achievement, students had positive perceptions of convenience afforded by blended learning. In terms of engagement in blended learning, high-grade students had more positive perceptions than low-grade students, particularly in such respects as viewing online and face-to-face as enhancing each other, propensity to ask questions in the course, improved quality of interaction with other students and a feeling of connectedness with other students in the course. Both group of students

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expressed satisfaction with the blended course. In terms of learning outcome, high-grade students had a more positive perception of improved understanding of key course concepts, while low-grade students had the predisposition to feel uncertain about this item. Their preferred learning formats for lectures, quizzes/tests and discussions were blended learning, entirely online learning, and traditional face-to-face learning, respectively.

Keywords Blended learning · Course achievement · Perceptions

19.1 Introduction

The emergence of new information and communication technologies has paved the way for educators and instructors to create a ground-breaking online or electronic learning environment that enhances the entire teaching and learning process (Wu et al. 2010; Lopez-Perez et al. 2011). One such learning environment is known as blended learning. Also termed as hybrid learning, blended learning generally refers to any thoughtful integration of learning delivery methods, including most often traditional face-to-face classroom with asynchronous (text-based Internet) and/or synchronous (face-to-face) online learning (Wu et al. 2010; So and Brush 2008; Garrison and Kanuka 2004). Thus, the teaching and learning process takes place both in the classroom and online, where the online portion becomes an expected extension of traditional classroom learning (Jusoff 2009). Today many higher educational institutions across the globe have started to adopt blended learning as their prominent instructional delivery alternative (Jusoff 2009; Wu et al. 2010).

There is a considerable amount of research on blended learning, particularly focusing on the benefits of blended learning, students' experiences of blended learning, and a comparison of traditional face-to-face learning, blended learning and entirely online learning (see Cooner 2010; Castle and McGuire 2010; Lei 2010; Means et al. 2010; Lopez-Perez et al. 2011, Poon 2012). There is limited research focusing on the students' perceptions of blended learning based upon their achievement (Bliuc et al. 2011; Owston et al. 2013; Zacharis 2015; Tosun 2015). Thus, the present study aimed to fill the gap in the literature by examining the relationship between students' perceptions of blended learning and their course achievement. Specifically, students' perceptions were assessed based upon four factors namely convenience, engagement, overall satisfaction and perceived learning outcome.

19.2 Literature Review

Blended learning refers to any integration of learning delivery methods, including most often traditional face-to-face classroom with asynchronous (text-based Internet) and/or synchronous (face-to-face) online learning (Wu et al. 2010;

So and Brush 2008; Garrison and Kanuka 2004). The term focuses on the principal role of computer-based technologies (e-learning systems), emphasizing access and flexibility, improving classroom teaching and learning activities, and markedly changing the way individuals learn (Graham 2006). It integrates instructional materials via audio, video and text, e-mail, live chat sessions, online discussions, forums, quizzes, assignments and conference calls (Thorne 2003; Wu et al. 2010). So and Brush (2008) recognized three types of combination in a blended course namely learning activities, students, and instructors. Many higher educational institutions across the globe have started to adopt it as their prominent instructional delivery alternative (Jusoff 2009; Wu et al. 2010).

Blended learning is a flexible approach that goes beyond time, location and cultural constraints (Collis and Moonen 2001; Jusoff 2009). It offers some of the conveniences of fully online courses without completely forfeiting face-to-face contact (Collis and Moonen 2001). Blended learning develops students' capacity for reflection, hence, improving their learning experience (Cooner 2010). In blended learning, students get familiar with other students (Jusoff 2009). Blended courses allow students to directly communicate with their instructors, and if needed, receive instant feedback, support and guidance (Castle and McGuire 2010; Poon 2012). Furthermore, blended learning facilitates the review and control of learning (Osguthorpe and Graham 2003). Using different teaching and learning methods and having extra learning materials allow students to develop a more profound understanding of the subject, improve their analytical skill, promote positive perceptions of the teaching received and give students more independence in the learning process (Lei 2010; Ginns et al. 2007). On average, blended courses have higher success rates and lower withdrawal rates compared to face-to-face courses and fully online courses (Means et al. 2010). Lopez-Perez et al. (2011) learned that blended learning helps to reduce dropout rates and increase exam pass rates. The researchers further indicated that online learning activities support and complement (not replace) face-to-face classes; hence, the joint effect contributes positively to the students' final marks. However, some other prior studies (such as Bliuc et al. 2011; Mitchell and Honore 2007) have argued that achievement in blended courses is impacted by a number of factors including students' perceptions of learning, their ability to accept responsibility for their own learning and the extent to which interactivity takes place outside of the classroom. For instance, Bliuc et al. (2011) pointed out students will tend to obtain better grades if they adopt a deep approach to learning.

19.3 Method

The sample of the study was students enrolled in the course Tourism Geography offered by the program Diploma in Tourism Management in Universiti Teknologi MARA Sabah, Malaysian Borneo. Total student enrolment in the course was 162 for the past three semesters (June 2013—September 2014) when the course became a blended course. Tourism Geography was selected as the course

Table 19.1 Reliability statistics

	Cronbach's Alpha	Number of items
Satisfaction with BL	0.849	8
Perceptions of convenience	0.752	6
Perceptions of engagement	0.866	13

required students' active participation both in the traditional face-to-face and online learning environments. Students attended lectures face-to-face and did group presentations. For the online component of the course, students engaged in group discussions, watched and made comments about the videos posted by the lecturer and took their quizzes and tests online. An online questionnaire was developed and the link was sent to the targeted students via Facebook. Participation in the survey was voluntary. 42 students responded to it. The questions for the questionnaire were adapted from existing survey questions, particularly those of Owston et al.'s (2013). The researchers also added several questions based upon prior studies. The questionnaire consisted of five sections: section A dealt with general/demographic information and experience of blended learning; section B comprised 6 scale items probing into perceptions of convenience; section C contained 13 items dealing with perceptions of engagement; section D consisted of 8 scale items dealing with satisfaction and learning outcomes; and section E asked respondents about their preferences for learning format. E-mail interviewing was conducted after analysis of quantitative data was performed to understand the respondents' perceptions better, particularly in understanding the reasoning for certain findings. Of the 42 questionnaire respondents, only 17 responded to the e-mail interviewing.

Reliability test was performed on all the scale items. As shown in Table 19.1, the Cronbach's alpha coefficients for satisfaction, convenience and engagement were 0.849, 0.752 and 0.866 respectively, indicating a high level of internal consistency for the scale with the chosen sample.

Data analysis was done using the Statistical Package for Social Sciences (SPSS). Descriptive statistical test was performed on sections A and E to obtain frequencies, means and standard deviations. Independent-samples t-test was performed to compare groups (high-grade students and low-grade students) in terms of their perceptions of blended learning (i.e. convenience provided by blended learning, engagement in blended learning, overall satisfaction with blended learning and learning outcome perspectives). Eta squared was also calculated to determine the effect size.

19.4 Results and Discussion

19.4.1 Respondents' Profile and Experience of Blended Learning

As indicated in Table 19.2, the majority of the respondents (82.9 %) were female in the age group of 18–24 (97.6 %). This corresponds with the fact that the number of

Table 19.2 Respondents' profile

	Item	%		Item	%
Gender	Female	82.9	Means of commuting to university	By shuttle bus provided by university	36.6
	Male	17.1		By public transport	2.4
Age	18–24	97.6		I drive	19.5
	25–35	2.4		My family/friend drives me	14.6
Course grade	A+/A (4.00)	10.6		I live on campus	26.8
	A− (3.67)	16.8	Number of working hours per week on average	I am not working	87.8
	B+ (3.33)	33.5		1–9 h	2.4
	B (3.00)	19.5		20–29 h	2.4
	B− (2.67)	4.9		More than 40 h	7.3
	C+ (2.33)	4.9	Sufficient training and guidance in the use of blended learning?	Yes	76.2
	C (2.00)	9.8		No	23.8
			Level of achievement	High-grade students	61
				Low-grade students	39

female students majoring in Diploma in Tourism Management in Universiti Teknologi MARA Sabah is significantly higher than male students who account for only about 30 % of the approximately 300 students. None of the students failed the course (obtaining a grade of C− or lower). Almost half of them (41.4 %) obtained a very good grade with GPA of at least 3.33. There were eight grades. The researchers classified the top four (A+, A, A− and B+) as high grades and the bottom four (B, B−, C+ and C) as low grades. Based upon this classification, two groups were created namely high-grade students and low-grade students. As indicated in Table 19.2, there were more high-grade students (61 %) than low-grade students (39 %). Additionally, most of the respondents (73.2 %) lived off campus, commuting to the campus mainly by the shuttle bus provided by the university (36.6 %). The majority of them (87.8 %) did not work. In terms of the respondents' experience of blended learning, most of them (76.2 %) agreed that they had sufficient training and guidance in the use of blended learning methods.

Also, as indicated in Table 19.3, the respondents strongly agreed that blended learning teaching and learning methods were adequately explained both in the course information/lesson plan and by the lecturer. Therefore, they were aware of what was expected of them, both in the traditional face-to-face and online learning settings.

Table 19.3 Respondents' experience of blended learning methods

	Mean[a]	SD
Blended learning teaching and learning methods were adequately explained in the course information/lesson plan	1.95	0.731
Blended learning teachings and learning method were adequately explained by the lecturer	1.98	0.680

[a]Based on a 5-point Likert scale where 1 = strongly agree and 5 = strongly disagree

19.4.2 Respondents' Perceptions of Convenience Provided by Blended Learning and Course Achievement

As demonstrated in Table 19.4, there was no significant difference in perceptions of convenience scores for high- and low-grade students. The calculated eta squared values indicate that the magnitude of the differences in the means was small or very small, except for items 2 and 3 which had medium effects. The respondents, regardless of their course achievement, had positive perceptions of convenience afforded by blended learning. Of particular interest was the respondents' perception of technological problems, such as poor internet connection, experienced in blended learning. The response means were between strongly agree and agree for both high- and low-grade students. Results from the interview revealed that some of the respondents did not have reliable Internet connection. Some living on campus depended on the university's computer labs or library for Internet access. They complained that at times the Internet connection was slow, that they could be

Table 19.4 Respondents' perceptions of convenience and achievement

Item (Compared to typical face-to-face course…)	Response mean[a]		Sig. (2-tailed)	η^2
	High-grade students	Low-grade students		
Not having to come to campus as often	2.32	2.50	0.613	0.02
Reduced travel time and related expenses each week	2.16	2.56	0.218	0.06
Improved opportunity to access and use course content/materials	1.83	2.25	0.056	0.09
Experienced technological problems	1.76	1.94	0.553	0.02
Course required more time and effort	2.16	2.13	0.900	0.00
Was not easy to get help when encountered a problem	2.13	2.31	0.531	0.03
Overall, blended learning offered convenience and flexibility	1.85	1.81	0.892	0.00

[a]Based on a 5-point Likert scale where 1 = strongly agree and 5 = strongly disagree

timed out all of a sudden (this situation was especially frustrating when the students were in the middle of taking an online quiz or test where multiple attempts were prohibited), and during peak hours, they would have to wait before a computer would be available for their use. Some others living off campus went to Internet cafes (cost could be an issue in this case) or places where Wi-Fi was available. A few used mobile broadband whose quality of Internet connection was rather poor or unreliable.

19.4.3 Respondents' Perceptions of Engagement in Blended Learning and Course Achievement

As shown in Table 19.5, a significant relationship was found between student response and grades on four of the Likert items (items 1, 5, 7 and 8). A very large effect was found ($\eta^2 = 0.23$) for the item asking respondents if they were likely to

Table 19.5 Respondents' perceptions of engagement and achievement

Item (Compared to typical face-to-face course…)	Response mean[a]		Sig. (2-tailed)	η^2
	High-grade students	Low-grade students		
Online and FTF components of BL enhanced each other	1.80	2.44	0.008	0.12
Course was well organized and easy to navigate	2.04	2.25	0.340	0.04
Web resources in the course were useful	2.00	2.19	0.423	0.03
Was more engaged in the course	2.08	2.25	0.472	0.03
Was likely to ask questions in the course	1.96	3.19	0.000	0.23
Felt that amount of interaction with other students increased in the course	2.28	2.50	0.396	0.04
Felt that quality of interaction with other students was better in the course	2.16	2.69	0.037	0.09
Felt connected with other students in the course	2.04	2.69	0.015	0.11
Felt isolated during the course	3.20	3.25	0.916	0.05
Felt that amount of interaction with lecturer increased in the course	2.16	2.56	0.112	0.07
Felt that quality of interaction with lecturer was better in the course	2.12	2.38	0.402	0.04
Was overwhelmed with information and resources in the course	2.42	2.69	0.361	0.04
Felt more anxious in the course	2.80	2.75	0.880	0.00

[a]Based on a 5-point Likert scale where 1 = strongly agree and 5 = strongly disagree

ask questions in the blended course. High-grade students agreed that they did, while the opposite was true for low-grade students. Some of the high-grade students commented that while they were less active in asking questions in class (for such reasons as did not feel comfortable raising questions in front of the whole class, lecturer did most of the talking, did not know what to ask as time did not permit them to engage in deep thinking), they liked to ask questions in the online discussions out of curiosity about what their classmates posted, and had more time to think and ask. A quite large effect ($\eta^2 = 0.12$) was found for the item asking respondents if they perceived the online and face-to-face course components of blended learning enhanced each other. For this item, high-grade students rated significantly more favourable than low-grade students. This finding contradicts with the finding of Owston et al.'s (2013) that revealed a medium effect for this item. Results from the interview revealed that those who rated this item favourably believed that the online portion was a natural part of the blended course, and that they needed to be good at both in order to do well in the course. They understood that the online and face-to-face components were related, complementing each other. Those who rated this item less favourably failed to see that connection or value. For them, what they did in the online learning and in the classroom learning were two separate things, and that blended learning was mainly implemented to 'keep up with the modern educational cultures'.

Another item that had quite a large effect size ($\eta^2 = 0.11$) asked the respondents if they felt more connected with other students in the blended course, in comparison to a typical face-to-face course they had taken. Again, high-grade students rated this item significantly more favourable than low-grade students. Some of the high-grade students commented that they particularly valued the group's online discussions that provided them with the liberty to pose questions and exchange ideas or viewpoints, and helped them to learn more about other students. The latter finding confirms Jusoff's (2009) opinion that students get familiar with other students in blended learning. Some of the low-grade students commented that 'we have to do it. It is part of the course requirements'. Evidently, they were more concerned about making postings as a partial fulfilment of the course requirements, and not about replying to other students' postings or exchanging ideas/viewpoints. There was a significant difference in the mean scores of improved quality of interaction with other students in the course for high- and low-grade students, although the effect size was moderate ($\eta^2 = 0.09$). Hara and Kling (2000) pointed out that e-learning environments could cause students to experience feelings of isolation. But that was not the case for the respondents who had negative perceptions of feeling isolated. This is probably because unlike fully online learning, blended learning offers some of the conveniences of the former without sacrificing the values of traditional face-to-face learning (as mentioned by Collis and Moonen 2001). The remaining items had only small and medium effects (except item 13 whose effect was negligible), and high-grade students had more positive perceptions of them, except for items 9 and 13 (negative statements).

19.4.4 Respondents' Perceived Learning Outcomes, Overall Satisfaction and Course Achievement

Overall, both high- and low-grade students were satisfied with the blended course, and given the opportunity, they would take another course that had both online and face-to-face features in the future. More than half of them (66.7 %) stated that they would choose blended learning format if the same course was being offered in a different format (see Table 19.7). As indicated in Table 19.6, there was a significant difference between high-grade students and low-grade students in six of the Likert items (items 3, 4, 5, 6, 7 and 8), with medium effects. High-grade students had a more positive perception of improved understanding of key course concepts, while low-grade students had the predisposition to feel 'not sure' about this item. Additionally, the findings show that high-grade students had a higher level of motivation/self-regulation (had strong time management skills, accepted responsibility for own learning and were motivated to succeed). This is in line with the findings of McCoach and Siegle's (2001) that motivation/self-regulation appeared to be stronger predictors of academic achievement than attitudes toward school and teachers. It also confirms So and Brush's (2008) viewpoint on the increased importance of students' self-motivation and self-management in blended learning environments as there was less in-class time and more emphasis on self-regulated learning. Moreover, low-grade students had a rather negative perception of online discussions being a value-added component of a blended course. For them, they

Table 19.6 Respondents' perceived learning outcomes, overall satisfaction and achievement

Item	Response mean[a]		Sig. (2-tailed)	η^2
	High-grade students	Low-grade students		
Overall, I was satisfied with this course	1.83	2.00	0.449	0.03
Given the opportunity, I would take another course that has both online and FTF components in the future	2.04	2.31	0.259	0.05
The course improved my understanding of key concepts	1.84	2.38	0.036	0.10
I have strong time management skills	2.17	2.75	0.050	0.09
I accept responsibility for my own learning	1.56	2.06	0.031	0.10
I am motivated to succeed	1.75	2.31	0.027	0.10
Online discussions are just a formal requirement of the course rather than a valued component	2.40	1.75	0.028	0.10
I am more concerned about just making postings in the group discussions than engage in deep thinking	2.60	1.88	0.011	0.12

[a]Based on a 5-point Likert scale where 1 = strongly agree and 5 = strongly disagree

were just a partial fulfilment of course requirements; thus, their attitude toward online discussions was more of 'as long as I post something'. This finding is in line with Bliuc et al.'s (2011) findings that students were more likely to perceive online discussions as a formal course requirement and that they were more concerned about just making postings than engage in deep thinking.

19.4.5 Respondents' Preferred Learning Medium

Table 19.7 shows that both high- and low-grade students preferred a blended learning format for lectures over attending lectures entirely face-to-face and accessing lectures entirely online (61.9, 33.3 and 4.8 %, respectively).

In terms of preferred medium for discussion, there were almost equal numbers of students preferring entirely face-to-face and blended learning, with the pendulum swung toward entirely face-to-face. Comparing the two groups, it was discovered that high-grade students preferred discussion in a blended format, while low-grade students preferred discussion in an entirely face-to-face format. Perhaps this could explain the low-grade students' low perception of connection with other students in the blended course, as discussed in Sect. 4.3. Low-grade students' preference for classroom discussion could also be related to Bliuc et al.'s (2011) findings that in face-to-face discussions, students could elaborate more. In their interview responses, some low-grade students commented they preferred classroom discussion as that allowed them to express themselves better. This is particularly true as they had a rudimentary grasp of English. The online discussions were a formal requirement of the course; thus, they had to be approached using good, formal, polite English. Those respondents admitted that they were still required to use English in classroom

Table 19.7 Respondents' preferred learning medium and achievement

Item	Group	Learning medium (%)		
		Entirely FTF	Entirely online	Blended
Same course	High-grade students	26.9	0	73.1
	Low-grade students	37.5	6.3	56.3
	Total	**31**	**2.4**	**66.7**
Lectures	High-grade students	42.3	3.8	53.8
	Low-grade students	18.8	6.3	75
	Total	**33.3**	**4.8**	**61.9**
Discussion	High-grade students	38.5	15.4	46.2
	Low-grade students	56.3	12.5	31.3
	Total	**45.2**	**14.3**	**40.5**
Quizzes/tests	High-grade students	23.1	65.4	11.5
	Low-grade students	18.8	62.5	12.5
	Total	**21.4**	**64.3**	**11.9**

discussions. However, classroom discussions were more 'forgiving' than online discussions as the students could use non-verbal cues to help them express themselves, and in a desperate situation, use some Malay words to complete their sentences. Additionally, lecturers usually helped them by dropping hints or making word suggestion when the students got stuck in a vocabulary rut. They further commented that when knowledge of the subject matter being discussed was not good, poor English could add to the predicament.

In terms of preference for quizzes/tests, most of the respondents, regardless of their achievement, preferred entirely online (64.3 %) over entirely face-to-face (21.4 %) and blended (11.9 %). Some of the respondents commented that taking quizzes/tests entirely online helped them perform better in those assessments as 'if truly needed, and time allows it, we can try to locate the answer somewhere'. Additionally, they were shown the results and the correct answer for each question. They further commented that for assessments conducted in the traditional way, it usually took one to two weeks to get the results. They also commented that the massive drawback of taking assessment entirely online was if their Internet access got disconnected when they were in the midst of taking it, and multiple attempts were not allowed. That was when frustration kicked in and the problem was prolonged when the lecturer was not very sympathetic by allowing them to take the quiz or test again.

19.5 Conclusion

Blended learning is becoming a major trend in the education systems across the globe. It could be the best teaching and learning method as it adopts the finest qualities of both traditional face-to-face learning and online learning. This study examined the relationship between students' perceptions of blended learning and their course achievement. Perceptions were examined in terms of convenience, engagement, satisfaction and learning outcome. Regardless of achievement, students had positive perceptions of convenience afforded by blended learning. The only inconvenience they encountered was technological problems, particularly poor Internet connection, that could impede the smooth process of the online component of the course. In terms of perceptions of engagement in blended learning, high-grade students had more positive perceptions than low-grade students, particularly in such respects as viewing online and face-to-face as complementing or enhancing each other, propensity to ask questions in the course, improved quality of interaction with other students and a feeling of connectedness with other students in the course. Low-grade students had the perception that blended learning was implemented for the sake of 'keeping up with modern educational cultures'. Both high-grade and low-grade students did not experience a feeling of isolation in the online component of the blended course, a factor that can affect the students' satisfaction with any form of e-learning. Additionally, both group of students expressed satisfaction with the blended course and, given the opportunity, would

take another course that has both face-to-face and online components in the future. In terms of learning outcome, high-grade students had a more positive perception of improved understanding of key course concepts, while low-grade students had the predisposition to feel 'not sure' about this item. With regard to preference for learning formats, both high-gade and low-grade students preferred blended learning over traditional face-to-face learning and entirely online learning for lectures. For quizzes or tests, both groups preferred to take them entirely online primarily because online assessments allowed them to receive their grades instantly. When it comes to discussion, class discussion was preferred over blended and entirely online formats, although high-grade students had the tendency to prefer online discussion. Low-grade students commented that class discussion helped them express themselves better, particularly because they could elaborate more and deal with language barrier (i.e. poor English proficiency).

19.6 Limitations of the Study

The sample size of the study was small, and the respondents were undergraduate students from the Faculty of Hotel and Tourism Management, Universiti Teknologi MARA Sabah. Thus, the findings of the study may not be able to represent the entire student population of the University. There is a need to extend the study to include more students from different faculties for a better representation.

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Chapter 20
Identification of Social Presence for e-Learning: An Initial Multiphase Activities for Requirements Engineering

Noorihan Abdul Rahman and Shamsul Sahibuddin

Abstract Social presence is an element for social interaction which a person perceived as 'real' in mediated communication. During interaction, the learners need to feel comfortable in order to interact among themselves for promoting active knowledge sharing. A sub-field of Software Engineering known as Requirements Engineering (RE) plays an important stage for e-Learning developers to elicit and to implement e-Learning for supporting active social interaction among learners. This paper reveals on how the knowledge of RE can be used in order to identify what is needed for providing e-Learning which is able to support social presence. The author uses multiphase mixed method design in order to initiate the identification of social presence requirements in RE activities. This paper also elaborates Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) of social presence factors in e-Learning. As the conclusion, the paper concludes the importance of social presence factors as the social presence requirements for developing e-Learning for active social interaction.

Keywords e-Learning · Learners · Requirements engineering · Social presence · Social interaction

20.1 Introduction

Requirements Engineering (RE) is an activity that exists within the realm of Software Engineering (SE). RE is an iterative process which impacts the software quality, and it is essential to meet the demands of the various stakeholders with

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various skills and backgrounds (Pandey et al. 2010). According to Sutcliffe (2002), RE is closely related to SE; however, SE focuses on 'designing the thing right' whereas RE concentrates on 'designing the right thing' (Sutcliffe 2002). Requirements elicitation is a very important phase in RE. Having a malfunction process in requirements elicitation may invite project failure in the development of the software (Kausar et al. 2010). In implementing collaborative application such as e-Learning, it is crucial to design the application that can support active participation among users for knowledge sharing. To elicit or gather requirements, this research focuses on social presence support in e-Learning application. In order to support social presence features, the requirements of social presence in the collaborative application can be elicited by using the requirements elicitation process as an initial stage to express the stakeholders' ideas. There is research which highlights the importance of eliciting human activity in e-Learning since e-Learning portrays social interaction through online activities (Uden 2007). Therefore, by investigating the elements of social presence in e-Learning activities, the requirements elicitation techniques should provide a way for the stakeholders to mutually understand the requirements for social presence and hence maintain connectedness among users in e-Learning. A proper requirements elicitation technique may encourage the stakeholders to obtain more accurate requirements (Dalpiaz et al. 2013; Dzung and Ohnishi 2009; Farfeleder et al. 2011; Kaiya and Saeki 2006; Kitamura et al. 2008; Konaté et al. 2013; Liaskos et al. 2011; Raspotnig et al. 2012; Shibaoka et al. 2007; Thurimella and Maalej 2013) of social presence in e-Learning.

This paper elaborates the topic by using four sections. The first section gives an overview of social presence in collaborative application. The second section reveals on Requirements Engineering (RE). The third section elaborates initial multiphase activity for identifying social presence factors. The fourth section reveals a preliminary result of EFA and CFA review. The last section concludes Study One result.

20.2 An Overview of Social Presence

Social presence is defined as a sense of connectedness that is related to the users' interaction in order to send or receive messages during communication. Walther (1992) described social presence as "the degree of awareness of another person in an interaction, and the consequent appreciation of an interpersonal". In virtual communications, social presence is needed in order to gain a sense of connectedness albeit through an interface. In a computer-mediated communication environment, social presence refers to the user's degree of feelings, perceptions, or reactions being connected to another intellectual entity, involving a subjective quality of the communication medium related to the concepts of intimacy and immediacy (Short et al. 1976). Social presence is important in order to reduce the socio-technical gaps in a particular system development and therefore increase the interaction and collaboration among the users (Bani-Salameh and Jeffery 2011; Bilandzic and Foth 2013; Frankl and Bitter 2013; Ghosh et al. 2012; Howe and

Schnabel 2012; Keengwe et al. 2013; Kreijns et al. 2003; Medeiros et al. 2013). Social presence plays its role in the social place regardless of face-to-face communication or in social networking, and this includes e-Learning applications since e-Learning is a virtual medium for learners to communicate among themselves. In virtual communication, social presence is needed to gain a sense of connectedness albeit through an interface. The feeling of connectedness is important in social interactions in order to allow collaboration activities like exchanging information, discussions, problem solving, and resolving conflicts or disagreements.

20.3 An Overview of Requirements Engineering

Requirements Engineering (RE) is an activity in the software development process which is carried out for information gathering purposes. During the process, related information from the stakeholders is recorded and analyzed. By doing so, the requirements engineer is able to produce a system requirement document for the software development process. RE is an activity that exists within the realm of Software Engineering (SE). RE is required before software development begins in order to produce accurate requirements. It helps to attain the necessary goals which signify the users' needs and support the requirements negotiation (Mishra et al. 2008). RE is important since it is considered the process of discovering requirements and then analysing the requirements that have been discovered. Once they are discovered, the requirements are modelled and specified as business and user requirements (Nguyen and Shanks 2009).

RE can also be described as a number of processes such as requirements elicitation or requirements discovery, requirements analysis and reconciliation, requirements representation or requirements modelling, requirements verification and validation, and requirements management (Laplante 2009). Figure 20.1 reveals that RE is divided into requirements development and requirements management.

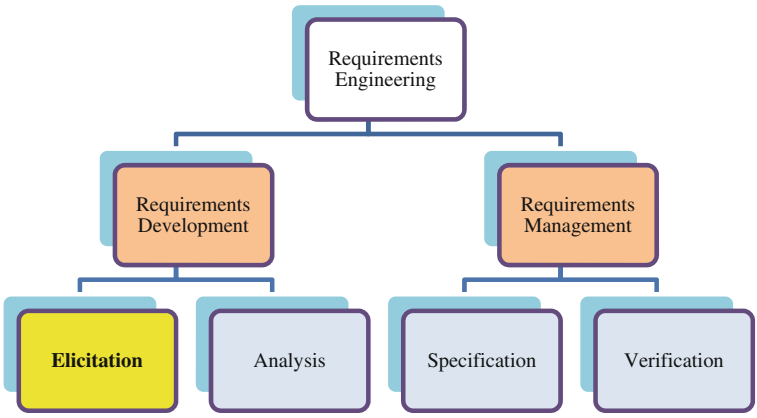

Fig. 20.1 Sub-disciplines of requirements engineering (Sommerville 2007)

20.4 Initial Multiphase Activity for Identifying Social Presence Factors

The authors use multiphase mixed method design as a guide for producing a preliminary result for requirements elicitation process. Multiphase consists of Study One, Study Two and Study Three. However, this paper only focuses on an initial phase of multiphase, whereby Study One is conducted for identifying possible social presence factors. Figure 20.2 illustrates how the Study One of multiphase can assist to achieve the goal towards requirements elicitation process by obtaining the stakeholders' feedback. During multiphase, the analysis of the quantitative data and the qualitative data is refined quantitatively as well as qualitatively in order to explore the participants' view more in depth (Aramo-Immonen 2013; Creswell and Clark 2011; Palinkas et al. 2011; Teddlie an Tashakkori 2006). In this paper, the data from the survey towards existing e-Learning application was collected in order to classifiy possible social presence factors that are related to active participation in e-Learning.

20.5 Exploratory Factor Analysis

Study One was executed in this study to provide a quantitative analysis for the proposed conceptual model according to the literature survey that has been previously conducted. The questionnaires were distributed through the survey technique in order to gain responses concerning the existing e-Learning which the respondents were using. In order to produce potential factors for the requirements elicitation process, the study involved numerical measurements from the testing hypothesis H_{A1}, H_{A2}, H_{A3} and H_{A4}.

H_{A1} The Students' Perceived Attention (PA) has a significant effect on Social Presence (SP)

H_{A2} The Students' Perceived Relevancy (PR) has a significant effect on Social Presence (SP)

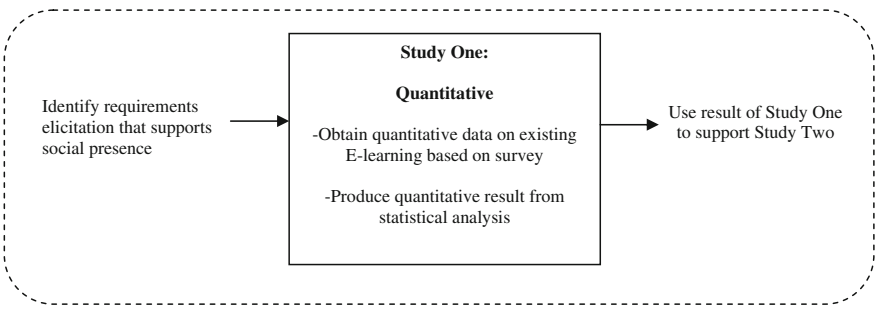

Fig. 20.2 Initial multiphase activities for study one

H_{A3} The Students' Perceived Confidence (PC) has a significant effect on Social Presence (SP)

H_{A4} The Students' Perceived Satisfaction (PS) has a significant effect on the and Social Presence (SP)

The quantitative method was used in this research since this research is concerned with a sample of the population. A sample was needed which could represent the entire population that was being studied (Chen et al. 2009; Hair et al. 2010; Lowhorn 2007; Wang and Wang 2009). Another aspect of the quantitative method is including data sampling in the collection of data. This allows generalizable results from the analysis (Glesne and Peshkin 1992). The data from Study One was obtained from the users' feedback from three local universities in Malaysia. This data was treated as raw data since it was the initial data from the e-Learning users as the primary source. In Study One, the pilot study involved 136 respondents from the Faculty of Computer Science and Mathematics of Universiti Teknologi MARA (UiTM). As for the main study, there were 261 respondents from the Faculty of Computer Science and Information Technology of Universiti Tun Hussein Onn (UTHM), and 118 respondents from the Faculty of Informatics of Universiti Sultan Zainal Abidin (UniSZA). Once the feedback was obtained from the respondents, it was keyed in using the SPSS statistical analysis and analyzed using the AMOS. Since this research used the SEM for statistical analysis, the author has applied the recommendation from Hair et al. (2006) and also Wang and Wang (2009) which stated that in order to achieve sufficient data, the recommended sample size of respondents for the SEM analysis is between 100 and 400.

20.5.1 EFA and Reliability Analysis

Demographically, the 80 respondents who participated in this study were obtained from the Faculty of Computer Science and Mathematics at the UiTM. Most of the samples were female (71.3 %). These students had previously used e-Learning applications and all of the respondents were full time students of the university. The Exploratory Factor Analysis (EFA) was performed for each factor in the proposed

Table 20.1 KMO and Bartlett's test for items in each factor

Variable/construct	KMO	Bartlett's test		
		Approx chi-square	Degree of freedom	Significant
Social presence	0.898	911.03	78	<0.001
Perceived attention	0.772	265.38	36	<0.001
Perceived relevancy	0.883	627.49	45	<0.001
Perceived satisfaction	0.794	181.61	6	<0.001
Perceived confidence	0.881	1024.93	153	<0.001

conceptual framework. Before conducting an EFA, the results of the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity were examined to determine the appropriateness of the factor analysis. Table 20.1 shows KMO and Bartlett's test for items for each factor.

The process was done in SPSS 16. The Principal Component factor analysis (PCA) with Varimax Rotation was performed for each of the constructs. Then, the results of the Kaiser Meyer Olkin (KMO) and Bartlett's test were reviewed. A KMO value of greater than 0.6, and the significance value of Bartlett's test of less than 0.05 indicated that the data was adequate to proceed with the Exploratory Factor Analysis (EFA). The Principal Component was used as the extraction method and the Varimax was used as the rotation method to run the EFA. This was carried out to analyze the interdependencies among the observed variables and underlying theoretical constructs or factors, so that the underlying structures of observed variables could be discovered (Jung and Lee 2011). Table 20.2 illustrates the number of components for each variable with the total variance explained respectively in percentage as well as the number of components or measuring items for each of the underlying factors.

Table 20.2 Number of components for each variable with total variance explained

Variable/factors	Number of components	Total variance explained (%)
Social presence	2	71.77
Perceived attention	2	60.71
Perceived relevancy	2	72.73
Perceived satisfaction	1	72.89
Perceived confidence	4	73.16

Table 20.3 Factor loading and Cronbach's Alpha for social presence

Item	Factor Loading	Cronbach's Alpha
P1	0.70	0.94
P2	0.85	
P3	0.81	
P4	0.84	
P5	0.88	
P6	0.88	
P7	0.82	
P8	0.67	
P9	0.69	
P10	0.83	
P11	0.79	
P12	0.53	
P13	0.67	

Note Principal Component was used as the extraction method and Varimax was used as the rotation method. The KMO = 0.90, Bartlett's Test Sphericity value; $p < 0.001$, Total Variance Explained 71.77 %

To elaborate, factor loading and Cronbach's Alpha value for each factor that is highlighted in this research are shown from Tables 20.3, 20.4, 20.5, 20.6 and 20.7.

Table 20.4 Factor loading and Cronbach's Alpha for perceived attention

Item	Factor loading	Cronbach's Alpha
A1	0.69	0.74
A2	0.80	
A3	0.73	
A4	0.82	
A5	0.83	
A6	0.83	
A7	0.78	
A8	0.69	
A9	0.77	

Note Principal Component was used as the extraction method. Varimax was used as the rotation method. The KMO = 0.77, Bartlett's Test Sphericity value; $p < 0.001$, Total Variance Explained 60.71 %

Table 20.5 Factor loading and Cronbach's Alpha for perceived relevancy

Item	Factor loading	Cronbach's Alpha
R1	0.91	0.93
R2	0.83	
R3	0.56	
R4	0.68	
R5	0.78	
R6	0.76	
R7	0.83	
R8	0.80	
R9	0.81	
R10	0.81	

Note Principal Component was used as the extraction method. Varimax was used as the rotation method. The KMO = 0.88, Bartlett's Test Sphericity value; $p < 0.001$, Total Variance Explained 72.73 %

Table 20.6 Factor loading and Cronbach's Alpha for perceived satisfaction

Item	Factor loading	Cronbach's Alpha
S1	0.72	0.87
S2	0.85	
S3	0.91	
S4	0.92	

Note Principal Component was used as the extraction method. Varimax was used as rotation method. The KMO = 0.79, Bartlett's Test Sphericity value; $p < 0.001$, Total Variance Explained 72.89 %

Table 20.7 Factor loading and Cronbach's Alpha for perceived confidence

Item	Factor loading	Cronbach's Alpha
C1	0.92	0.91
C2	0.68	
C3	0.80	
C4	0.84	
C5	0.70	
C6	0.88	
C7	0.60	
C8	0.63	
C9	0.74	
C10	0.74	
C11	0.61	
C12	0.70	
C13	0.63	
C14	0.76	
C15	0.86	
C16	0.88	
C17	0.85	
C18	0.86	

Note Principal Component was used as extraction method. Varimax was used as the rotation method. The KMO = 0.88, Bartlett's Test Sphericity value; $p < 0.001$, Total Variance Explained 73.16 %

20.5.1.1 Social Presence

For the 'Social Presence' factor, the KMO value was 0.90 and Bartlett's Test of Sphericity was significant ($p < 0.001$). The Total Variance Explained was 71.77 % and the Overall of Cronbach's Alpha was 94 %. All suggested items were included in this domain with a factor loading range from 0.53 to 0.88.

20.5.1.2 Perceived Attention

For the 'Perceived Attention' factor, the KMO value was 0.77 and Bartlett's Test of Sphericity was significant ($p < 0.001$). The Total Variance Explained was 60.71 % and the Cronbach's Alpha was 74.0 %. All of the suggested items were included in this domain with a factor loading range from 0.69 to 0.83.

20.5.1.3 Perceived Relevancy

For the 'Perceived Relevancy' factor, the KMO value was 0.88 and Bartlett's Test of Sphericity was significant ($p < 0.001$). The Total Variance Explained was

72.73 % and the Cronbach's Alpha was 93.0 %. All suggested items were included in this domain with a factor loading range from 0.56 to 0.91.

20.5.1.4 Perceived Satisfaction

For the 'Perceived Satisfaction' factor, the KMO value was 0.79 and Bartlett's Test of Sphericity was significant ($p < 0.001$). The Total Variance Explained was 72.89 % and the Cronbach's Alpha was 87.0 %. All suggested items were included in this domain with a factor loading range from 0.85 to 0.92.

20.5.1.5 Perceived Confidence

For the 'Perceived Satisfaction' factor, the KMO value was 0.88 and Bartlett's Test of Sphericity was significant ($p < 0.001$). The Total Variance Explained was 73.16 % and the Overall of Cronbach's Alpha was 91.0 %. All suggested items were included in this domain with a factor loading range from 0.60 to 0.92. As a conclusion, the results of the EFA produced in this research shows that the observed variables or measuring items that were used in this research were found to be under their own factors respectively such as SP, PA, PR, PS, and PC which were identified earlier in the literature study.

20.6 Confirmatory Factor Analysis Summary: Convergent Validity

This paper also depicts Confirmatory Factor Analysis (CFA) summary which after the EFA has been carried out. The data for the CFA was obtained from the self-administered survey which was distributed to the e-Learning users from the Faculty of Computer Science and Information Technology of UTHM and the Faculty of Informatics of the UniSZA. The samples were clustered based on the faculties in each university, which were selected using the cluster sampling technique. Table 20.8 shows the preliminary data screening on the number of questionnaires distributed, number of questionnaires returned, and the percentage of the response rate for answered questionnaires.

Table 20.8 Preliminary data screening

University	Number of questionnaire distributed	Number of questionnaire returned	Percentage of response (%)
UTHM	261	165	63.22 %
UNiSZA	118	104	88.14 %

Table 20.9 The confirmatory factor analysis (CFA) report summary for all constructs

Variable/construct	Item	Factor loading
Social presence	P1	0.78
	P3	0.85
	P4	0.78
	P5	0.80
	P7	0.76
	P8	0.79
	P9	0.68
	P13	0.73
Perceived attention	A1	0.63
	A3	0.76
	A4	0.76
	A5	0.81
Perceived relevancy	R5	0.77
	R7	0.86
	R8	0.84
	R9	0.83
Perceived satisfaction	S2	0.78
	S3	0.87
	S4	0.88
Perceived confidence	C13	0.80
	C14	0.82
	C15	0.85
	C16	0.87
	C18	0.82

Convergent validity is fulfilled when the items have a satisfactory factor loading. Factor loadings can be described as the relationships between the latent constructs in a specific study, which the study has visualized based on the conceptual framework established from the literature study. All items described in Table 20.9 had a factor loading range between 0.63 to 0.88, which exceeded the cut-off point of 0.6, which was suggested by Chin (1998). Therefore, the below items will be included in the structural model.

20.7 Study One Review

Study One provides empirical justification that the stated constructs such as Perceived Attention (PA), Perceived Confidence (PC), Perceived Relevancy (PR), and Perceived Satisfaction (PS) have a significant and direct influence on Social Presence (SP). These constructs have been evaluated through the SEM and were proven to support the research hypotheses H_{A1}, H_{A2}, H_{A3} and H_{A4}. The process of

evaluating latent constructs using the SEM was initiated by having a conceptual framework whereby the independent variables and the dependent variables were identified with the support of the literature study.

Study One was conducted at Universiti Teknologi MARA (UiTM), Universiti Sultan Zainal Abidin (UniSZA), and Universiti Tun Hussein Onn Malaysia (UTHM). All of the respondents had Computer Science or Information Technology backgrounds which have represented the population of e-Learning students for this research. The represented samples helped to meet desired research objectives (Adnan and Tasir 2014) as well as to generalize findings based on the drawn population (Kotrlik and Higgins 2001). By using the data samples, the structural model of social presence was evaluated, and the model of social presence factors was accepted by having one latent construct and four factors which were discussed earlier. To summarize, those factors were revised in the SEM and it was found that each had a significant effect on Social Presence, which signified that they are possible factors of the requirements elicitation for the e-Learning domain.

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Chapter 21
Periodontal Risk Assessment Application for the Usage in Dental Clinic

Erni Noor and Muhamad Hilmi Zainal Ariffin

Abstract The prevention and treatment of periodontal disease is based on accurate diagnosis, reduction or elimination of causative agents, risk management of the disease. The practice of available risk assessment involves dental care providers identifying patients and populations at increased risk of developing periodontal disease. While several tools have been proposed to assess the risk of periodontal disease, none of it were develop to be as web based screening tool during the first visit to the periodontology clinic. Objective: To develop a periodontal risk web based tool of individuals using the modified Spider web periodontal risk assessment model to be used during first dental visit. Materials and Methods: Four entities from the original model were retained in the new model: bleeding on probing, probing depth, tooth loss and smoking. The entities that were added included various aspects of risk assessment like diabetes, socioeconomic factors and stress. A comprehensive evaluation of the functional diagram were done in a form of web based tool to provide an individualized total risk profile. Results: Utilizing a periodontal risk web based tool during first visit may helps dental professionals predict the potential for developing periodontal diseases and allows them to focus on early identification and to provide proactive, targeted treatment for patients who are at risk for progressive/aggressive diseases. Conclusion: The development of modified Periodontal risk assessment web based tool may help clinicians to identify subjects with an impaired periodontal prognosis as well as determine the impact of treatment on periodontal prognosis.

Keywords Periodontal patient · Periodontal risk assessment · Risk factor

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21.1 Introduction

The prevention and treatment of periodontal disease is based on accurate diagnosis, reduction or elimination of causative agents, risk management and correction of the harmful effects of the disease (Dhulipalla et al. 2015; Genco and Borgnakke 2013). From a clinical point of view the stability of periodontal conditions reflects a dynamic equilibrium between bacterial challenge and an effective host response. Whenever changes occur in either of these aspects, homeostasis is disturbed.

Performing periodontal risk assessment involves dental care providers identifying patients and populations at increased risk of developing periodontal diseases (Lang et al. 2015). Risk assessment limits the requirement of undertaking intricate periodontal therapy, the betterment patient outcome and, in due course, limits the oral health care cost (Braun et al. 2015). The awareness of risk factors as well aids in the identification and treatment of co-morbidities in the general population as many periodontal disease risk factors are common to other chronic diseases such as diabetes, cardiovascular diseases and stroke (Axelsson and Lindhe 1978; Axelsson et al. 1991; Naorungroj et al. 2015). A proper appreciation of these factors is compulsory to avert and manage periodontal disease in the population. The risk factors to which the subjects are exposed may vary in different populations and hence knowledge of the factors is essential for subjective diagnosis and prediction of risk. Recognition of risk factors of periodontal disease and their possible role in progression of the disease process has changed the preventive and therapeutic success.

A variety of risk assessment models for periodontal disease are in well used, such as the Oral Health Information Suite (OHIS) and the Periodontal Risk Calculator (PRC). But, these models have been used prospectively or retrospectively to assess and analyse the individualized total risk profile at the onset of treatment and interpretation of data from a risk assessment model (Garcia et al. 2009). Periodontal Risk Assessment (PRA) model by Lang and Tonetti (2003) and modified Periodontal Risk Assessment model by Chandra (2007) are primarily retrospective, where information is gathered to assess the risk for a patient during the supportive periodontal therapy or after active therapy has been completed. (Chandra 2007; Lang et al. 2015)

While undertaking the risk assessment procedure, if a potential risk is identified, a solution or plan of action should be build upon. This can have a major impact on clinical decision making. Hence, it is evident that the diagnostic process must be done during first dental visit of the multilevel risk profile. It should be understood that, so far, the use of individual risk profiles to determine the content and frequency of preventive services has been demonstrated to be very cost-effective (Axelsson and Lindhe 1978). The objective of this present study is to develop the present Periodontal Risk Assessment tools to be applied during first dental visit.

21.2 Problem Statement

A proper understanding of the factors involved is crucial in the assessment process, as each individual factor has its own sub-criteria of judgement. For an un-trained personal it is difficult for them in assigning the patients risk, as multiple tedious calculations are needed. For example the calculation of the bone to tooth ratio, bleeding percentage etc. This is one of much reason this periodontal risk assessment is overlook by many.

Without proper understanding the criteria of the risk assessment, explanations to patient the need of such assessment and reason for the examination done may be difficult. The attempt of elucidation the risk involve to the patient is important as it may motivate the patient the change his or her lifestyle to suit your treatment need.

Time is an issue in obtaining a proper periodontal risk assessment, with patient waiting and desire for prompt treatment, some clinician would overlook doing periodontal risk assessment as it is time consuming with all the criteria and calculation involved. By this they may overlook one of the most important part of treatment which is managing the risk involve, without managing the risk and risk factors one may never appropriately manage the patient's condition.

Conventionally, such risk assessment are done at the final stage of visit, and was designed post treatment, the risk are determined after the treatment done. Risk assessment is best done before treatment or concurrently during treatment, as without managing the risk one does not appropriately handle the condition. By doing it at early part of the treatment, we can motivate the patient and plant awareness and realization of having periodontal problems to the patient. This in turn will help in patient compliance towards treatment ad compliance come with motivation and realization.

21.3 Materials and Methods

21.3.1 The Concept of Modified UITM Periodontal Risk Assessment

The diagnostic process must be done during first dental visit on a continuous monitoring of the multilevel risk profile using application on the web using laptop or smart phone. Four entities from the original model were retained in the new model: bleeding on probing, probing depth, tooth loss and smoking (Lang and Tonetti 2003). The entities that were added included various aspects of risk assessment like diabetes, socioeconomic factors and stress.

A comprehensive evaluation of the functional diagram was done in a form of web based tool to provide an individualized total risk profile. The patient's risk assessment for recurrence of periodontitis may be evaluated on the basis of a number of clinical conditions whereby no single parameter displays a more

paramount role. The entire spectrum of risk factors and risk indicators ought to be evaluated simultaneously;

1. Percentage of bleeding on probing,
2. Prevalence of residual pockets greater than 4 mm (^{3} 5 mm),
3. Loss of teeth from a total of 28 teeth,
4. Loss of periodontal support in relation to the patient's age,
5. Systemic and genetic conditions, and stress,
6. Environmental factors, such as cigarette smoking.

Each parameter has its own scale for minor, moderate and high-risk profiles. A comprehensive evaluation of the functional diagram will provide an individualized total risk profile and determine the frequency. Oral hygiene instruction videos such as toothbrushing techniques, flossing and others will be embedded in the program.

21.4 Discussion

Based on the limitations of previous PRA model, the proposed Modified PRA model with considering four entities from the PRA risk assessment model were retained in the new model: BOP, probing depth (PD), tooth loss and smoking. The entities that were added in the new model included various aspects of risk assessment, especially risk factors (diabetes, and tooth deposits or factors that may retain deposits) and other risk determinants such as socio-economic factors and stress (Beck 1994).

The second modifications that are to make the PRA tools available on web and can be assess easily using smart phone/table. Thirdly, oral hygiene instruction videos such as tooth brushing techniques, flossing and others will be embedded in the program. In turn, patient adherence to a self-care oral health regimen is a key component to successful periodontal disease management. Evaluation of risk factors and customizing the individual treatment plan accordingly in the broadest senses can bring renaissances in the traditional approach to oral health care.

21.5 Conclusion

The development of modified Periodontal risk assessment web based tool may help clinicians to identify subjects with an impaired periodontal prognosis as well as determine the impact of treatment on periodontal prognosis.

Risk assessment can help predict a patient's risk of developing periodontal disease and improve clinical decision making. The management of the patients risk factors predicts the progression of the disease as well as justification towards the

treatment provided. The clinical practice of risk assessment may reduce the need for complex periodontal therapy, improve patient outcomes and ultimately reduce oral health care costs. The incorporation of oral hygiene instruction video may encouraged patient to actively involved in periodontal disease management by following the advised routine oral hygiene instructions.

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Chapter 22
Students' Perceptions of New Web 2.0 Tools' Usage in Classroom Instruction

Abdul Fattah Abd. Gani, Aeimi Ruzanna Abu Hassim and Eliyas S. Mohandas

Abstract The constant advancement in ICT technology has resulted in the creation of various, new web-based learning tools or Web 2.0 tools. However, despite having students who are highly adaptable to innovative computer technologies, some instructors are hesitant to utilise the novel online tools. In the bid to try and change the mindset, the researchers took the initiative to explore and incorporate three new Web 2.0 tools in a classroom context. 43 students were involved in the study, in which they were exposed to the use of Prezi, Kahoot! and TodaysMeet through various learning activities during an official academic semester. Subsequently, they were asked to respond to an 11-item questionnaire to find out their perceptions of the new tools. The findings of the study indicated that the students have positive perceptions of the Web 2.0 tools being used in classroom instruction; they thought it helped them to focus, made their learning fun, and encouraged them to be more engaging during class. Furthermore, they even recommended for such tools to be used more often during their learning process.

Keywords Kahoot! · Perceptions · Prezi · TodaysMeet · Web 2.0 tools

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22.1 Introduction

Since the early 1990s, Malaysia has been significantly invested in improving her Information and Computer Technology (ICT) capabilities. This can be traced back to the establishment of her first Internet service provider called JARING which stands for Joint Advanced Integrated Networking in 1992. From that point onwards, the country's access to ICT technology has improved tremendously. According to a survey on worldwide internet use by World Bank in 2013, for every 100 people in Malaysia, 67 would have access to the Internet (World Bank 2015). Moreover, with the increasing popularity of devices like the smartphones and tablet computers, the demand for internet access is expected to rise significantly over the years.

In terms of demographics, 73 % of internet users in Malaysia are aged between 16 and 24 years of age (Statista 2015). With toddlers already knowing how to operate their iPads even before they learnt their ABCs, it is no wonder that the younger generation in the country are more inclined to the use of ICT in almost everything that they do. Realising the need to address this growing trend among youngsters, different quarters particularly the higher education sector are evolving and incorporating the advantages of ICT into their trade. As a result, e-Learning are gradually becoming more prominent in various university courses.

22.2 Literature Review

Recent developments in e-Learning technology have allowed instructors and learners alike to take advantage of countless applications by way of applying them into the classroom setting. Lecture slides on specific courses can be shared on university Learning Management Systems (LMS), assignments can be posted via email, and discussions are held frequently in online discussion forums. These features have allowed the higher education sector to be more effective and highly flexible to both instructors and students. Furthermore, as e-Learning technologies advance, new applications and softwares with educational potentials are invented. Some of the new inventions are called Web 2.0 tools.

22.2.1 Web 2.0 Tools

Web 2.0 tools are applications that allow users to collaborate, contribute and customise contents on web sites as well as publish their thoughts instantaneously (Heafner and Friedman 2008). Since most Web 2.0 tools have an open access, their contents are highly adaptable; they can be updated countless times by different users to fit their specific needs. Due to this flexible feature, a lot of Web 2.0 tools

have gained immense popularity around the world (Churchill 2011). Some of the more popular tools include Facebook, Skype and Wikis.

According to Schuck et al. (2010), the new generation of learners are increasingly active users of Web 2.0. Thus, in the effort to make their classroom more relevant to the changing times, there is a need for educators or instructors to explore and utilise the various new Web 2.0 tools available online. This is not to say that the popular, more established tools like Microsoft PowerPoint or LMS are either obsolete or ineffective. But rather, exploring and utilising new tools would grant instructors more flexibility to vary their teaching methods and avoid the learning process to be dull and somewhat routine. Yet, some instructors may be hesitant to move out of their comfort zones and develop new skills to keep up with the new technologies (Naidu 2004).

22.2.2 Previous Studies on Web 2.0 Tools

There have been many proponents of the use of Web 2.0 tools in various learning settings (e.g. Barrett 2013; Heafner and Friedman 2008). In their bid to find a realistic evidence to the perceived usefulness of Web 2.0 tools in education, Hew and Cheung (2013) conducted a review of research studies related to the impacts of Web 2.0 tools' usage in K-12 and higher education settings. The review found that evidence directly related to the effectiveness of the use of Web 2.0 tools is still rather weak. However, the general perception of Web 2.0 tools being utilised in classroom setting is generally positive. This is because the tools did not seem to cause any detrimental effects to students' learning. Thus, it is believed that Web 2.0 tools are not a hindrance to the learning process and should be encouraged in classrooms.

As mentioned by Hew and Cheung (2013), the practical evidence for the usefulness of Web 2.0 tools is still rather weak. One of the probable reasons for this is the hesitance of some instructors to use these new tools more significantly in their class. For instance, Gaffar et al. (2011) conducted a study to assess 45 instructors' use of Web 2.0 tools in the University of Guyana. The study found that, although the instructors are utilising Web 2.0 tools, the usage is mostly restricted to making announcements and discussions only. The tools are not used actively in classroom instruction. In addition, the Web 2.0 tools that the subjects used are rather dated. While tools such as YouTube, Wikis, and Skype are still relevant, they are not exactly new. This shows that instructors are still not maximising or exploring the use of new Web 2.0 tools.

22.2.3 The Current Study

The current study explored and incorporated three relatively new Web 2.0 tools into the classroom context. The main objective is to find out students' perceptions of the use of these new tools. Based on the data obtained from the present study, appropriate recommendations were made with regards to the use of the following new Web 2.0 tools.

22.2.3.1 Prezi

Prezi is an online, cloud-based presentation tool that can be used to present information for various projects. It can be a good alternative to Microsoft PowerPoint or SlideShare. The main difference between them and Prezi is the latter allows all of users' information to be placed on a single canvas. Whenever access to specific parts of a presentation is needed, all users have to do is zoom in and out of the canvas. There is no need to go through clutters of slides just to find a single piece of information. It saves time and is easier to use. Additionally, Prezi is compatible with various mobile devices. Therefore, as long as users have smartphones or iPads with internet connection, they will be able to access their presentation from virtually anywhere. However, Prezi requires a stable internet link. For this reason, it may not be suitable for users working in areas with limited or no access to internet.

22.2.3.2 Kahoot!

Kahoot! is a web-based, game-like quiz platform that can be utilised by classroom instructors to create a fun and interactive learning environment. Instructors basically need to log in and set a quiz on related topics prior to the class. Once the class is in session, the instructor will only have to ask students to take out their mobile devices such as smartphones and log into the quiz. The quiz begins in real time, in which everyone logged in will get to see the questions at the same time with equal opportunities to answer. Kahoot!'s system basically records students' answer and their response time. Students who managed to get the most accurate answers in the fastest time wins the quiz. The weakness with Kahoot!, similarly to Prezi, is that it requires devices with stable internet connection. If a student does not have either one of those, they will not be able to participate in the quiz for the day.

22.2.3.3 TodaysMeet

TodaysMeet can be accessed at https://todaysmeet.com/. This Web 2.0 tool allows its user to participate in a virtual group discussion. Its functions and features are

similar to the social media Twitter which is highly popular among young learners. So, if instructors wish to initiate a discussion, all they have to do is log in, set a topic, and wait for the students to start conversing. Additionally, if some students are rather shy to share their opinions in the discussion, they can opt to post replies anonymously. Yet, in the same way Prezi and Kahoot! are limited, TodaysMeet also depends on good internet connection. Therefore, it might only be suitable for classes located in urban areas where access to internet is reliable.

22.3 Methodology

This study was conducted to investigate students' perceptions of new Web 2.0 tools' usage in classroom instruction. It is 'pseudo-qualitative' in nature as the data for the study was drawn from human response via Likert scale questions which were then adapted into numbers as suggested by Dermo (2009). By virtue of perception being something related to human feelings or emotions, data elicited from it is typically considered as qualitative. However, the researchers of the study opted to quantify the data in order to draw appropriate generalisations and make informed decisions as proposed by Cohen et al. (2003).

22.3.1 Participants

A total of 43 students were involved in the study. Out of the 43 students, 7 were males and 36 were females. They were aged between 21 and 24 years old when the study was conducted and were enrolled in a diploma course taught by one of the researchers. Their selection into the study was done at random: no specific criteria were imposed. Coincidentally, when asked to rate their computer literacy and confidence in using devices such as smartphones, all 43 of them rated themselves as "highly proficient" or "proficient". This shows the trend of learners in the current age as described by Xiao (2013); they are "native speakers" of the digital language of computers. Therefore, they should have no problem participating in a study where multiple e-Learning tools were being utilised.

22.3.2 Procedures

Participants of the study were exposed to the use of new Web 2.0 tools which include Prezi, Kahoot! and TodaysMeet throughout the semester during teaching and learning sessions. The usage of each Web 2.0 tool was done separately in a few sessions. The rationale for this move was to enable participants to familiarise themselves with the relatively new tools. Consequently, they would be able to

maneuver the tools to complete tasks given to them during classroom instruction without much difficulty.

22.3.2.1 Prezi

In the beginning of the semester, participants were introduced to the online presentation tool Prezi which would serve as an alternative to the ever-popular Microsoft PowerPoint. The objective was to investigate the participants' perception of a new tool that has similar features with Microsoft PowerPoint being used in class. They were taught some basic knowledge in using Prezi. Subsequently, after the subject matter of the class was delivered, the participants were divided into groups and instructed to create their own presentations using the tool. The instruction was given via i-Learn Portal, the university's Learning Management System (LMS), as shown in Fig. 22.1.

Upon completion of the task, participants would then submit their work by embedding their Prezi presentations on i-Learn Portal. By embedding their Prezi presentations on i-Learn Portal, all of the participants would be able to review each other's works. They could suggest improvements to one another and further improve their skills in using Prezi for other projects.

22.3.2.2 Kahoot!

After the presentation task was done, an enhancement activity was introduced in a separate session. Enhancement activities are basically tasks given to students to strengthen their understanding on a subject matter taught in a previous class. Typically, such activities are done by teachers or instructors by asking questions for students to answer. This could be done either verbally or in written form. Additionally, in the effort to make the process more interactive, some instructors may conduct the enhancement activity in the form of a competition. However, in

Fig. 1 Instruction given to participants in carrying out a task using Prezi

this study, the researchers opted to utilise the Web 2.0 tool called Kahoot! as an alternative to the usual question-and-answer method. The purpose for this was to look into the participants' perception of a new tool that could assist in making the question-and-answer process in class more engaging.

Kahoot! served as a game-like enhancement activity in the form of short quizzes. After every lesson taught throughout the semester, participants were given a short quiz in Kahoot! and they were required to enter a game pin at https://kahoot.it/. Prior to that, a set of questions was designed by the instructor pertaining to the lesson. The questions were then uploaded at https://getkahoot.com/. One of the interactive features of Kahoot! is each question will be given certain points based on the correctness of the answer as well as how fast the question was answered. At the end of the quiz, the top five scorers' names will be displayed on the main screen together with their scores.

The short quizzes via Kahoot! were conducted a few times with other topics related to the course. This was done to ensure participants were well-versed with the tool before their opinion of it was gauged.

22.3.2.3 TodaysMeet

Prior to the current study, the instructor of the class usually would conduct discussions with his students as a follow-up to the presentation and enhancement activity. These discussions are useful to gauge students' understanding of the topic previously taught during the presentation. In addition, it could assist students to retain the knowledge gained from doing the enhancement activity. Moreover, if the students have comments or other things they would like to share, they could do it during the discussion which is conducted online using the i-Learn Portal.

In the current study, the online discussions were carried out using TodaysMeet as an alternative to the i-Learn Portal platform. The objective was to investigate the participants' perception of a new tool that has discussion features similar to the i-Learn Portal. Following the enhancement activity, participants were required to access TodaysMeet in their own time and participate in a discussion. They were instructed to post their comments with regards to the topic initiated by the instructor. Each participant was given a limit of 140 words for each post.

Similarly with the short quizzes on Kahoot!, the discussions via TodaysMeet were also conducted several times with other topics initiated by the instructor. The rationale for this was to ensure participants were proficient in using TodaysMeet before their perceptions of the tool were studied.

22.3.3 Data Collection and Analysis

This study utilised a questionnaire for data collection purposes. The questionnaire was designed to elicit data on participants' perceptions of new Web 2.0 tools being

Table 1 Questionnaire items on the use of new Web 2.0 tools

No	Statement	Response				
1	I like the use of this Web 2.0 tool in the class	1	2	3	4	5
2	This Web 2.0 tool made the learning process more convenient	1	2	3	4	5
3	This Web 2.0 tool made the class more fun and interactive	1	2	3	4	5
4	My motivation to learn increased because of this Web 2.0 tool	1	2	3	4	5
5	This Web 2.0 tool improved my focus in class	1	2	3	4	5
6	This Web 2.0 tool made me more active in class	1	2	3	4	5
7	I felt more in control of my learning because of this Web 2.0 tool	1	2	3	4	5
8	This Web 2.0 tool made my learning more explorative	1	2	3	4	5
9	This Web 2.0 tool made me perceive the course in a positive manner	1	2	3	4	5
10	I would recommend this Web 2.0 tool to be used more often in class	1	2	3	4	5
11	Explain your reason for response given in statement (10)					

Scale: *1* Strongly Disagree, *2* Disagree, *3* Neutral, *4* Agree and *5* Strongly Agree

used in their classroom instruction. It was administered at the end of the semester, after all three Web 2.0 tools (Prezi, Kahoot! and TodaysMeet) were utilised repeatedly during classroom instruction. The questionnaire consisted of 10 statements about the use of Web 2.0 tools as shown in Table 22.1.

Participants were asked to respond to each statement by stating their agreement or disagreement on a Likert scale of 1 (strongly disagree) to 5 (strongly disagree). At the end of the questionnaire, participants were given an open-ended question to explain their response for the 10th statement. This was done in order to provide the researchers with a more accurate description as to how the participants perceive the use of the new Web 2.0 tools. It is important to note that as the final question is open-ended, the answers provided by participants could be very widely spread. Therefore, the researchers decided to group similar answers together in appropriate categories to ease the data analysis.

22.4 Findings and Discussion

The data obtained from the questionnaire were calculated using the descriptive statistics function in SPSS version 17. The results are as follows:

Based on the data in Table 22.2, it can be observed that participants of the study generally agreed with all of the statements in the questionnaire. The Web 2.0 tool Prezi recorded a total mean and standard deviation of 4.48 ± 0.295, Kahoot! had 4.70 ± 0.136, while TodaysMeet recorded 4.53 ± 0.190. This result suggests that

Table 2 Descriptive statistics for data collected from survey on Prezi, Kahoot! and TodaysMeet

Item	Prezi		Kahoot!		TodaysMeet	
	M	SD	M	SD	M	SD
1	4.44	0.734	4.74	0.441	4.60	0.495
2	4.53	0.592	4.37	0.618	4.33	0.715
3	4.37	0.578	5.00	0.000	4.79	0.412
4	4.65	0.613	4.53	0.505	4.44	0.629
5	4.58	0.499	4.56	0.502	4.47	0.505
6	4.35	0.720	4.91	0.294	4.47	0.505
7	4.30	0.599	4.58	0.587	4.42	0.626
8	4.37	0.489	4.77	0.427	4.56	0.502
9	4.56	0.502	4.63	0.489	4.53	0.505
10	4.60	0.495	4.95	0.213	4.70	0.465
Total	4.48	0.295	4.70	0.136	4.53	0.190

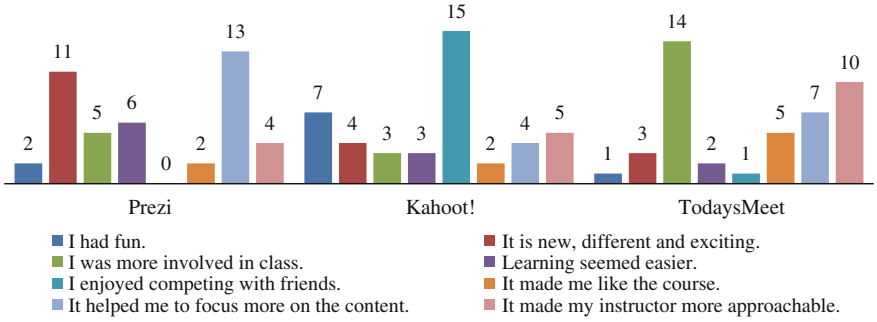

Fig. 2 Participants' reasons to recommend use of new Web 2.0 tools

students involved in the study have a positive perception of the use of new Web 2.0 tools in classroom instruction.

For the 10th statement, the participants showed a strong agreement, which means they would recommend for the Web 2.0 tools to be used more often in class. Figure 22.2 shows the reasons why the participants would recommend the use of Prezi, Kahoot! and TodaysMeet:

Based on data shown in Fig. 22.2, 13 out of 43 participants think Prezi helped them to focus more on the content being taught in class. This suggests that Prezi can actually be an effective alternative to Microsoft PowerPoint in classroom instruction. On the other hand, 15 out of 43 participants recommended the use of Kahoot! as they enjoyed competing with their friends. This suggests that Kahoot! could make the learning process fun and interactive through the use of game-like quizzes. Finally, 14 out of 43 participants thought TodaysMeet made them more involved in class through its interactive discussion platform. Thus, it can be said that TodaysMeet

could be a good alternative for i-Learn Portal as the tool also encouraged students to be more engaged in discussions centered on their learning process.

22.5 Conclusion

In conclusion, long-established tools such as Microsoft PowerPoint or i-Learn Portal are still relevant to be used in today's classroom instruction. However, persistent use of such tools over time might make the class seem routine or downright boring. This study has shown that students of this generation, those who were involved as participants at the very least, are really welcoming of new Web 2.0 learning tools being used in class. The tools made them more focused during classroom instruction, promote fun and interactive environment as well as encouraging them to be more engaged in their own learning. When the learners perceive the tools positively, they increase the chances of successful learning as implied by Hannafin and Cole (1983). Thus, it is recommended that classroom instructors consider exploring new Web 2.0 tools to be incorporated into their classroom instruction.

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Chapter 23
Utilising Twitter for Promoting Active Learning in Teaching and Learning

Jowati Juhary

Abstract Twitter is one of the free micro bloggings available today. Created in 2006, Twitter has about 500 million registered users worldwide. Many scholars have been debating over the use of Twitter in teaching and learning. This paper discusses how active learning can be promoted using Twitter at the National Defence University of Malaysia (NDUM). The concept of back channelling through Twitter is illustrated by looking at the screenshots of tweets and retweets during classroom learning of a course at the NDUM. Observations are the main method adopted in this paper. As a preliminary paper, casual conversations with the students on their opinions about Twitter and back channelling are also discussed. Initial findings suggest two things including the need for proper guides when using Twitter for promoting active learning, and the fact that not all students are able to have access to Twitter may have lessened the impact that it can have onto students.

Keywords Active learning · Back channelling · Tweets · Twitter

23.1 Introduction

In 2006, Jack Dorsey, Evan Williams, Biz Stone and Noah Glass *created* Twitter. Their intention was initially to allow people to post short status/comments (Schwartz 2012) and ever since, Twitter has evolved in terms of its functions that include sharing of pictures, videos and links. Twitter is one of the free micro bloggings available today. Students nowadays respond very well to social media including Twitter because these students are what scholars called the Digital Natives (see Prensky 2010). Borne after 1980s, these students are well versed with

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the use and functions of digital technologies. It is argued that since the students are more *accepting* of new technologies, the learning and teaching processes must also incorporate the use of digital technologies (Cornu 2011). This allows students to have more and better options for their learning tools.

This paper aims to look at Twitter as a tool to promote active learning for a course offered at the Defence University in Kuala Lumpur. This will be part of a bigger research to investigate ways to assist students to learn effectively. The assumption is that through the concept of back channelling, the students are able to communicate using Twitter during face-to-face sessions, and thus remain actively involved in their learning. This assumption is to be tested at the Defence University in Kuala Lumpur, Malaysia. The National Defence University of Malaysia (NDUM) is the youngest public university in Malaysia and since its inception in 2007, about 1000 students have graduated from the university. Being a residential campus, with a total population of about 2120 student population, the students are governed in a manner that instils order and discipline. Students are categorised into two including military cadets and reserved officers, and both categories of students are not allowed to leave campus on weekdays and selected weekends. Therefore, students have to rely on technology, for instance, to get the required *experience* (by this, technology allows the students to read about and watch the current issues/news; to perform online transactions and to socialise).

This paper has two main objectives as detailed below.

(a) To identify how Twitter can be a tool to promote active learning
(b) To investigate how Twitter assists students to be actively involved in their learning

23.1.1 The Significance of the Study

There are various ways to promote active learning during classroom sessions. One of them is through the use of Student-Centred Learning (SCL) approaches including the activities and the learning materials given to the students. Apart from that, the classroom seating arrangement can also contribute to students' active participation during classroom sessions. Because of all these benefits, the researcher argues that perhaps the tools used during teaching and learning can also assist students to be active learners. The use of power point slides, or posters can ignite students' interest. Therefore, the researcher further argues that the use of Twitter can also allow students to be actively engaged by constantly answering questions or posting issues on Twitter during classroom sessions. This is called back channelling and this study is looking at how Twitter and back channelling can help students to become active learners during classroom sessions.

23.1.2 The Assumption and Research Questions

This study does not have a working hypothesis since it is just a preliminary study that looks at how Twitter can be used to promote active learning. Therefore, an assumption is prepared and following that two research questions are developed. The assumption of this paper is that *students can be active learners when they use Twitter to communicate during face-to-face sessions*. Following this assumption, two research questions are listed below,

(a) How does back channelling assist students to be active in their learning?
(b) How do students respond to tweets as a tool to promote active learning?

The research questions will be answered using the data gathered through casual conversations with the students. Screenshots from Twitter are also used to support the analysis and discussion about using Twitter in order to promote active learning during classroom sessions. These screenshots illustrate the tweets and retweets of the students' during classroom learning.

Before discussing further, it is pertinent to look at the organisation of this paper. This paper has five main sections including this introduction. The second section analyses the selected literature for this paper. The third section then proceeds to discuss the methodology adopted in this paper. Next, findings of this paper will be discussed, followed by the last section which closes the paper with conclusions and suggestions.

23.2 Selected Literature

Much of the literature on Twitter and its presence in teaching and learning has been regarded positively. It becomes popular because users can "build up an instant, personalised Twitter feed" (Mollett et al. 2011) that meets the interests of the users. This feature allows students to search and to select the best materials or information, and then share them. Further, Ferenstein (2010) argued that Twitter helps to boost students' engagement in classroom learning because they can tweet and ask questions, and then receive feedback in real time. He then suggested that the tweeting activities *could* continue even after class, and as such this builds a community outside classroom learning. More importantly the community built lasts for a long time even after the completion of the course that uses Twitter (Dunlop and Lowenthal 2009).

Embi (2011) suggested 10 advantages of Twitter in teaching and learning including Twit Board that notifies students of changes to course content or schedules; Micro Write which allows students to perform progressive collaborative writing on Twitter; and Time Tweet which allows students to choose a famous

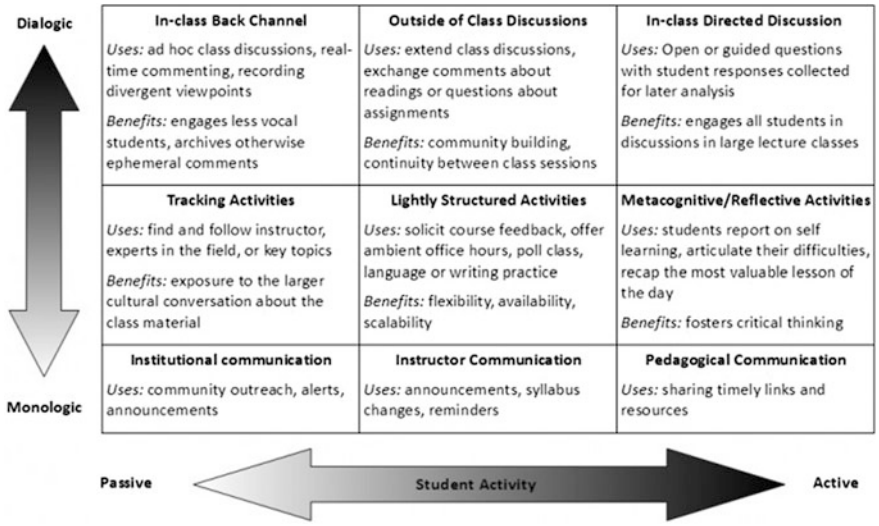

Fig. 23.1 Twitter adoption matrix (original concept by Rick Reo; revised by Sample 2009)

person from the past and create an account for them (then students can mimic the way the person writes or his/her thoughts that can be useful for further discussion). Other researchers have suggested that Twitter is very useful for informal learning, to discover relevant resources and seek assistance from other people (see Dunlop and Lowenthal 2009; Luo and Gao 2012). In addition, McArthur and Bostedo-Conway (2012) found through their quantitative study that Twitter can serve as a valuable tool to supplement the chalk and talk approach to teaching and learning. Further, students could foster critical thinking skills when they use Twitter appropriately.

Twitter can be used in various ways during classroom sessions. As demonstrated in Fig. 23.1, the strategy to use Twitter depends on the learning outcomes that want to be accomplished. As suggested in the figure, students become more active when they become more articulate during the lessons.

Apart from using Twitter for classroom teaching and learning, Twitter is argued to have added an extra value for research projects (Mollett et al. 2011). This is because students are able to share and *project* themselves in the research community using the hashtag sign (#). Users of Twitter would be able to search for students' works by using these dedicated hashtags. According to Mollet, Moran and Dunleavy, Twitter provides more opportunities for crowd sourcing research activities across various academic disciplines. In so doing, students' works will be visible freely, and can be used for revision tools too.

Albeit these positive responses about Twitter and using it in teaching and learning, some may have reservations about Twitter. In a study conducted by Stollak et al. (2011), it was found that students who 'appear' active in social media including Twitter may not be able to perform well in their grades. Although the sample used in the study was relatively small, this should be an indicator on the

needs of the lecturers to plan their lessons when using Twitter in their teaching. This study is further supported by findings of Iorliam and Ode (2014). They suggested that the time spent on social media, the frequency of visit and the total number of online friends have a statistically significant relationship with students' academic performance. What is missing in this debate is the need to educate the students on taking responsibility when using the social media and to use them *more* for their learning process.

23.3 Methodology

The methodology adopted for this study is a case study approach where class observations were employed together with the tweets posted during face-to-face sessions and retweets by the students. As an action research, this study focuses on trying to investigate whether Twitter can be a tool to promote active learning effectively.

23.3.1 Participant Characteristics

The number of students used in this research is small; only 32 students who join in the researcher's group for *Language and Literature* for Semester 2, Academic Session 2014/2015. There are three male students and 29 female students. In terms of categories of students, there is only one military cadet and she is a female student. These students are in the second semester of their first academic year at the NDUM.

23.3.2 Sampling Procedures and Research Design

The reason for the small number of samples is because there is only one class of the course, and the researcher is the only instructor teaching the course for this semester. The face-to-face sessions are three hours weekly (two-hour and one hour slots per week). The researcher employs flipped classroom concept, and thus the face-to-face sessions are dedicated to discussion and debates over critical concepts in the course. In fact, it is observed that back channelling [back channel is a digital conversation that happens concurrently with the face-to-face activities (see Holland 2015)] happened when students tweets during the face-to-face discussion, and the tool used is Twitter.

The students were observed during classroom sessions, and the focus was on their back channelling activities. After the sessions, the researcher then had casual conversations on what they were doing during the discussions and how they

actually used Twitter to tweet and retweet. Students' concerns were particularly of interest to the researcher since the ultimate aim of the bigger research is to investigate ways to help students learn better.

All these explanations above will be further elaborated in the next section on the findings of this paper.

23.4 Findings and Discussion

Based on students' back channelling activities, it appears that students could become 'passively' (because they were looking at the tweets and retweets) active during classroom sessions, and at the same time they were also *busy* commenting orally on the lessons of the day. What this suggests is that students may not find the face-to-face sessions to be uninteresting since they were occupied by their activities during the lessons. To further understand this, this section will analyse the findings according to the two research questions posed earlier, followed by accepting or rejecting the assumption made in the first section of this paper.

23.4.1 Research Question 1

How does back channelling assist students to be active in their learning?

The observations made during classroom sessions by the researcher point to two different scenarios. First, some students became very *quiet* because they were concentrating on tweeting and retweeting during classroom learning. What they were doing was actually back channelling, that is, they were participating in digital conversations with their classmates. They were seen as 'passive' students but they were active on Twitter. Second, some students were very articulate during classroom learning by 're-quoting' answers that they saw from the tweets and retweets. In fact, re-quoting is akin to retweet; the latter is done digitally and the former, orally. To illustrate further, the screenshots below come from one session of the course *Language and Literature* and the hashtag used is #lle2113.

23.4.2 Research Question 2

How do students respond to tweets as a tool to promote active learning?

As seen in Fig. 23.2, students were very positive about the use of Twitter in promoting active learning. This is because they have various tools to be used that can keep them from getting bored, and most importantly, students are always thinking about the answers or how to respond to certain issues presented by the

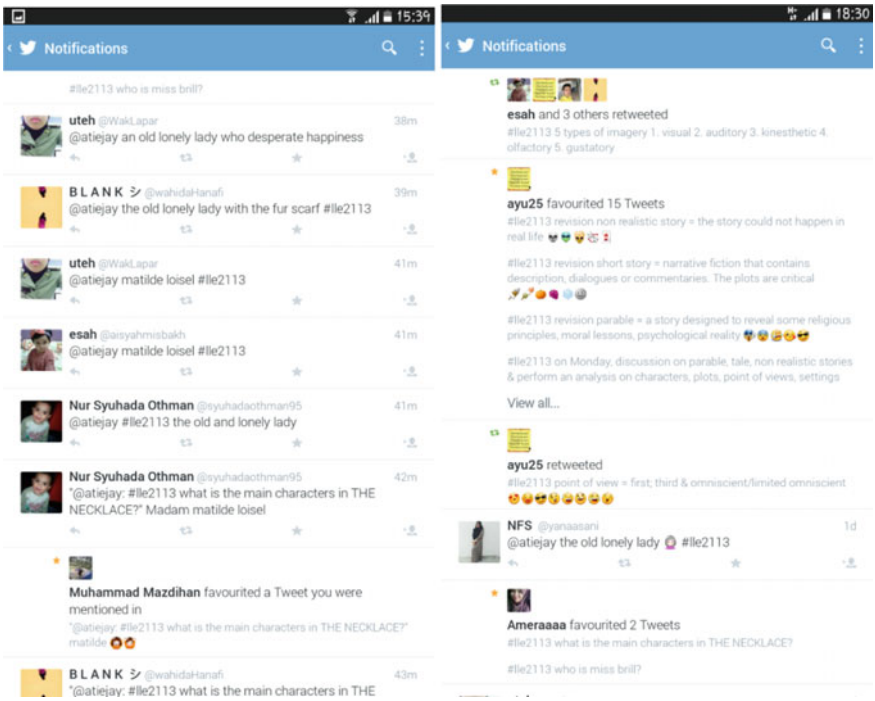

Fig. 23.2 Screenshots from twitter on back channelling activities

researcher or by fellow friends face-to-face or digitally. The responses from casual conversations with the students also support the benefits of using various tools that can give students access to learning easily. For some students, it was fun to use Twitter for the digital conversation; for others, it was a competition to become the first to answer question on Twitter because their responses will be projected on the white screen. Thus, it becomes a motivation for students to learn, and perform well in the class discussion.

23.4.3 The Assumption

The assumption that *students can be active learners when they use Twitter to communicate during face-to-face sessions* can be *conclusively* accepted. Nonetheless, there are some concerns raised by the students when using Twitter to promote active learning. The next two paragraphs discuss these concerns.

The first concern raised by the students is on the accessibility of the Internet or Wi-Fi connection in the classroom. Although Wi-Fi connection is available in all classes, at times, the connection is questionable. This may hinder students' progress

in becoming active learners during classroom sessions. On this issue too, the researcher has to admit that not all students can afford to have smart phones in which the application such as Twitter or Facebook can be installed. Thus, the concern on Wi-Fi access (as well as affordability of smart phones) must be addressed properly by various authorities at the NDUM.

The second concern is on the way Twitter, or any other Web 2.0 tools, is handled and managed by the academics. The researcher argues that Twitter must not be used in every class session. This is because the use of Twitter must serve some functions, for example, for revision purposes. Students must be given various types of tools to learn, and they must make their own decisions on which tools serve them the best. Some students may find that the use of Twitter will *divert* them from the class discussion because they can also browse other applications. Or some students may appear *engage* in learning but in actual fact, they are doing something else for example playing games.

In short, the use of Twitter to promote active learning is acceptable; however, there must be some guidelines on utilising Twitter for classroom learning. The next section will suggest these guidelines.

23.5 Conclusion

The challenges of educating 21st century learners are huge. As Digital Natives, students nowadays are always looking for the fastest way to get information. Using Web 2.0 tools or micro bloggings may be able to retain students' interests and motivation to study. Nonetheless, there must be some guidelines that can be practised in order to allow students to get the best of the learning experience. These guidelines below may be useful to those who plan to use Twitter in their face-to-face sessions.

(a) Inform students about the use of Twitter for the next class. This allows them to be more prepared and allows the academics to ensure that the Wi-Fi access is going to be stable on the day by alerting the technicians.
(b) Plan the lessons well especially on the types of questions to be tweeted to the students. The tweets can be sent before the class commences or they can be sent during the class sessions.
(c) Educate the students on the need to be focus on learning during class sessions. This may hinder them from diverting and doing something else with their smart phones.
(d) Use Twitter *at least* once a month because it is important to vary the teaching and learning techniques during classroom sessions. Students will be less 'excited' if the use of Twitter becomes a routine.
(e) Educate students to write precise and concise statements on Twitter but these statements must be grammatically and structurally appropriate. This will indirectly enhance students' skills in language.

To conclude, Twitter can be a useful tool to promote active learning when it is used accordingly. Active learning allows students to sharpen their communication and critical thinking skills, which are badly needed in the globalised world today. Although Twitter may not be the only one to promote active learning because there are many other tools and approaches, it is a useful one because students carry with them their smart phones (those who have one!). Thus, Twitter has a lot of teaching and learning potentials, and it could be easily accessible during classroom learning.

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Chapter 24
Towards Envisioning the Future of Learning in Malaysia: Development of a Malaysia MOOC Based on the Iterative ADDIE Instructional Design Framework

Norazah Nordin, Mohamed Amin Embi and Helmi Norman

Abstract A new phenomenon that is receiving much attention on the global higher education landscape is the emergence of Massive Open Online Courses (MOOCs). The vision behind MOOCs is for knowledge to be disseminated to a global set of learners in an open learning environment. In line with this vision, Malaysia has recently launched the Malaysia MOOCs initiative, a joint collaboration between the Ministry of Education Malaysia and four public universities. As one of the collaborators, we have developed a MOOC for Ethnic Relation course. The MOOC was developed using a modified version of the ADDIE (analysis, design, develop, implement, and evaluate) framework which we term as the 'Iterative ADDIE Instructional Design Framework'. The chapter discusses our experiences that were faced in the MOOC development process. The chapter also touches on students' perception of MOOCs in terms of attitude, self-efficacy, and anxiety. Implications and future directions are also discussed.

Keywords Massive open online course · Malaysia MOOCs · Analyse, design, develop, implement, and evaluate (ADDIE) · Instructional design · Student perception

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24.1 Introduction

Massive Open Online Courses (MOOCs) have emerged as one of the most researched trends during the past few years (Daniel 2012). MOOCs are different from traditional learning management systems (LMS) due to the fact that the online courses are open to a massive number of students—usually scaling up to thousands of students per course (Siemens 2013). As the number of users are massive, the pedagogy of MOOCs differ from a usual LMS as students are more independent in learning due to the lecturer-student ratio (Liyanagunawardena et al. 2013). In addition, as the learning environment is open to the public (and not restricted to just university students), the learners' requirements can vary and their objectives in learning could be diverse.

To date, past research have indicated that there have been various research on MOOCs conducted in the global context (Liyanagunawardena et al. 2013). However, there have been a lack of studies in the South East Asian context (Hara et al. 2013; Sa'don et al. 2014). Moreover, there are currently limited studies that focus on the instructional design of MOOCs (Kay et al. 2013). In an attempt to fill these gaps, we investigate the development of a Malaysia MOOC with a modified ADDIE instructional design framework and assess the MOOC in terms of students' perception regarding attitude, self-efficacy, and anxiety.

24.2 Method

The method is discussed according to three aspects: (i) the MOOC development using the Iterative ADDIE Instructional Design Framework; (ii) data collection and analysis of the overall analytics; and (iii) data collection and analysis of students' perception in terms of attitude, self-efficacy, and anxiety.

24.2.1 Malaysia MOOCs and MOOC Development Team

In light of this recent advancement in the distance education field, the Ministry of Education Malaysia has collaborated with four public universities in implementing the Malaysia MOOCs inititative which was launched in September 2014. Each university developed a MOOC for undergraduate foundation courses. One of the foundation courses was the Ethnic Relation course. In order to develop the MOOC, we assembled a team that consisted for Teaching and Learning Technologies as project manager, subject matter experts from the CITRA Centre, National University of Malaysia (UKM) and content developers from the Information Technology Centre and Center for Corporate Communications. The platform used for the MOOC is OpenLearning and the MOOC can be found at https://www.openlearning.com/courses/etnik.

24.2.2 MOOC Development Using the Iterative ADDIE Instructional Design Framework

The MOOC was developed using a modified version of the ADDIE (Analyse, Design, Develop, Implement and Evaluate) framework called the " 'Iterative ADDIE Instructional Design Framework'," shown in Fig. 24.1. The framework has five phases which are analyse, design, develop, implement, and evaluate. The difference from the original ADDIE model is in the iteration of the phases, in which the phases are iterated as users/content developers/subject matter experts provide feedback to each of the phases. The iteration stops at the Evaluate Phase when the perceived learning requirements are met.

In the development of the MOOC, the five phases was implemented in two iterations, as illustrated in Fig. 24.2. The first iteration was implemented as the following:

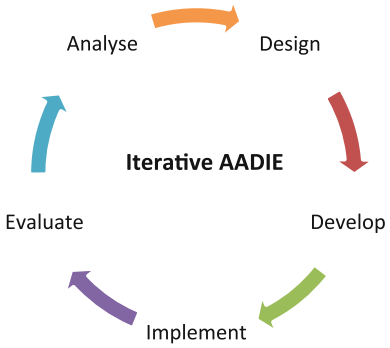

Fig. 24.1 Iterative ADDIE Instructional Design Framework

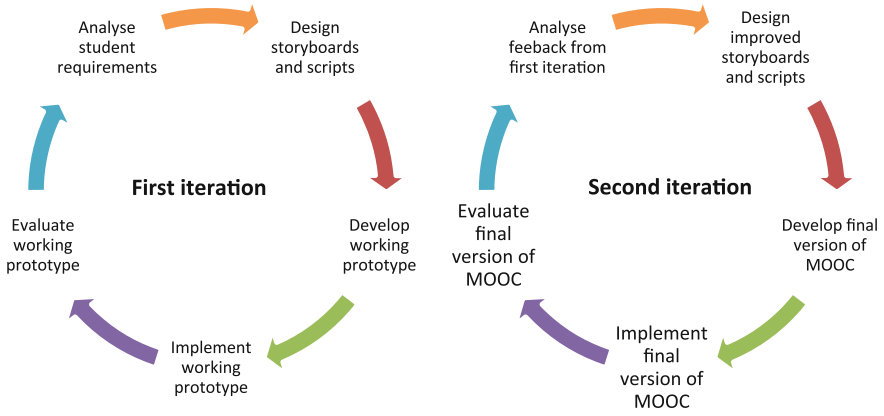

Fig. 24.2 The first and second iterations of the Iterative ADDIE instructional design framework implemented in development of the MOOC

Firstly, in the Analyse Phase, a need analysis was conducted to capture students' requirements in learning about ethnic relations. This was conducted with subject matter experts (i.e. lecturers teaching Ethnic Relation course) as well as end-users (i.e. students). Second, in the Design Phase, the findings from the analysis phase are used to design the learning content and tasks of the MOOC. Here, the designs was produced via workshops with subject matter experts and content developers. Third, in the Develop Phase, the subject matter experts developed storyboards and scripts for the content developers and the storyboards were turned into a working prototype. Finally, in the implement and evaluate phases, the MOOC prototype was tested with the subject matter experts to gain feedback on improvements in terms of learning content and tasks, as well as user interface.

After the Evaluate Phase in the first iteration was completed, the second iteration was initiated. First, the feedback gained in tn the Evaluate Phase in terms of learning content, tasks and user interface was analysed by the content developers (analysis phase second iteration). Next, in the Design and Develop Phases, the MOOC prototype was improved based on the analysis conducted in the previous phase. In these two phases, the final MOOC version was produced. Then, in the Implement Phase, the MOOC was launched for implementation. In the final phase (Evaluate Phase), the MOOC was assessed using online surveys with 1055 students that were enrolled in the course.

24.2.3 Data Collection and Analysis of the Overall Analytics

The overall analytics data was collected from the MOOC via OpenLearning.com's analytics tool. The overall analytics was collected according to the course period which was from September 2014 to early January 2015. The analytics included: (i) the total number of pages in the MOOC; (ii) the total number of students enrolled in the MOOC; (iii) the total number of comments; (iv) the daily active students; and (v) the number of comments and likes made.

24.2.4 Data Collection and Analysis of Students' Perception in Terms of Attitude, Self-efficacy, and Anxiety

The data for students' perception on the MOOC was collected via online surveys. The surveys were distributed to 1055 students who were taking the MOOC course from September 2014 to December 2014. The survey consisted of questions related to technology acceptance (i.e. Unified Theory of Acceptance and Use of Technology or UTAUT model) as well as three other aspects which were attitude, self-efficacy, and anxiety. Attitude was related to students' perceived attitude toward using the technology, while self-efficacy referred to students' perception of

their own ability to complete a task using the technology (Ventakesh et al. 2003; Marchewka et al. 2007). Anxiety referred to students' anxiety state of using the technology. The questionnaire was developed based on the works of Ventakesh et al. (2003) and Marchewka et al. (2007). However, this paper will only include discussion on three aspects which are attitude, self-efficacy and anxiety, and does not focus on the discussion of the UTAUT factors.

24.3 Results

The results are discussed according to: (i) the overall analytics of the MOOC; and (ii) students' perception in terms of attitude, self-efficacy and anxiety.

24.3.1 Overall Analytics of the MOOC

For the overall analytics, the total number of pages of the MOOCs was 387 pages. The total number of students that were enrolled in the course was 16,943 students and the total comments made in the period was 66,837. Figure 24.3 summarizes the number of students that were active on a daily basis. The results indicate that the highest activity of students (around 2000 daily active students) were recorded in first month, between 14 to 20 September 2014. The number of daily active students then decreased as the course progressed where around 500 students were active on a daily basis.

With regards to the total number of comments made in the MOOC over the period of course,

the highest number of comments was from 7 to 19 December 2014 and the lowest was at the initial period of the course (21 August–14 September 2014) as

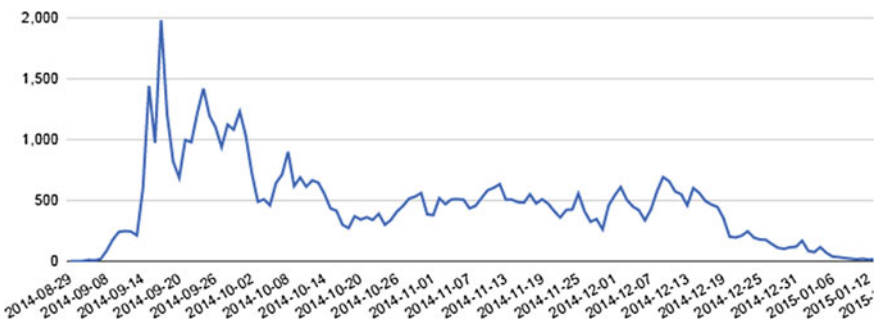

Fig. 24.3 Daily active students of the MOOC

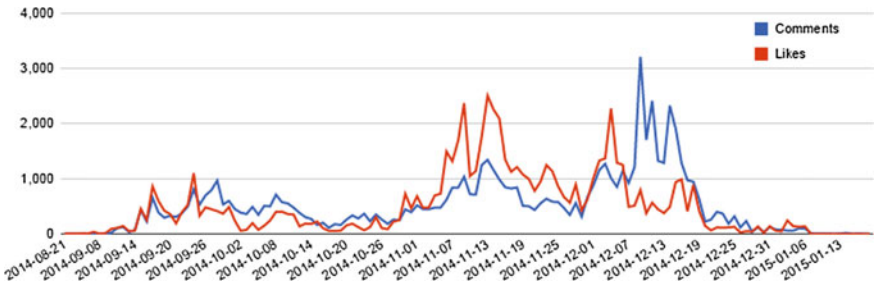

Fig. 24.4 Number of comments and likes from September 2014 to January 2015

well as at the end of the course (25 December 2014–13 January 2015). This is summarized in Fig. 24.4.

24.3.2 Students' Perception in Terms of Attitude, Self-efficacy, and Anxiety

For attitude, four questions were assessed, as shown in Table 24.1. A1 assessed whether students preferred to use MOOC for learning, while A2 assessed whether MOOCs increased their motivation in learning. A3 inquired on whether MOOCs make learning more interesting and A4 inquired on whether MOOCs made learning easier. Encouraging results were obtained for all for three of the items, A2, A3, and A4 while A1 achieved a mixed score. A3 achieved the highest (75.5 %) indicating that students perceived that MOOCs makes learning interesting. A1 received the least, indicating that only 58.3 % of the 1055 students preferred using MOOCs for learning while the remaining did not.

With regards to self-efficacy, three items were assessed. SE1 inquired about whether students could completed their tasks without instructions from the course instructors or peers. SE2 assessed on whether students were able to complete their tasks if they had assistance when facing difficulties while SE3 inquired on whether the students could complete tasks by using built-in facilities of the MOOC. For SE1, only less than half of the students (49.1 %) agreed that could complete their tasks if there was no instructing them to act. For SE2 and SE3, more than half of the students agreed that they could complete tasks if that could seek assistance (59.3 %) and 56.3 % agreed that they could complete their tasks by using built-in facilities in the MOOC.

In terms of anxiety, students were assessed with three questions. AX1 assessed whether students were anxious in using MOOCs for learning while AX2 inquired whether students felt anxious about losing data if the wrong button was clicked. AX3 assessed whether as students was afraid to use MOOCs for learning. The results for all three items were negative, where only 32.6 % agreed that they felt

Table 24.1 Students' perception in terms of attitude, self-efficacy and anxiety

Factors	Questionnaire item	Strongly disagree	Disagree	Agree	Strongly agree	Mean
Attitude (A)	A1: I prefer to use MOOCs for learning	89 (8.4 %)	351 (33.3 %)	443 (42.0 %)	172 (16.3 %)	2.66
	A2: Using MOOCs increased my motivation during learning	73 (6.9 %)	311 (29.5 %)	480 (45.5 %)	191 (18.1 %)	2.75
	A3: MOOCs makes learning more interesting	54 (5.1 %)	205 (19.4 %)	489 (46.4 %)	307 (29.1 %)	2.99
	A4: It was easier for me to learn by using MOOCs	71 (6.7 %)	292 (27.7 %)	482 (45.7 %)	210 (19.9 %)	2.79
Self-efficacy (SE)	SE1: I could complete my tasks by using MOOCs if there is no one instructing me to act	137 (13.0 %)	400 (37.9 %)	409 (38.8 %)	109 (10.3 %)	2.46
	SE2: I could complete my tasks by using MOOCs if I can seek of assistance when facing difficulties in learning	81 (7.7 %)	348 (33.0 %)	498 47.2 %)	128 (12.1 %)	2.64
	SE3: I could complete my tasks by using MOOCs by using the built-in facilities available in the MOOC	86 (8.2 %)	375 (35.5 %)	458 (43.4 %)	136 (12.9 %)	2.61
Anxiety (AX)	AX1: I felt anxious to use MOOCs for learning	287 (27.2 %)	424 (40.2 %)	265 (25.1 %)	79 (7.5 %)	2.13
	AX2: I felt anxious that I will lose a lot of data if I click the wrong button	215 (20.4 %)	392 (37.2 %)	327 (31.0 %)	121 (11.5 %)	2.34
	AX3: I feel afraid to use MOOCs for learning	391 (37.1 %)	385 (36.5 %)	214 (20.3 %)	65 (6.2 %)	1.96

anxious using MOOCs, 42.5 % felt anxious in losing data due to clicking the wrong button, and 26.5 % agreed that they felt afraid to use MOOCs. In sum, this indicates that students did not feel anxious or afraid in using MOOCs for learning.

24.4 Discussion

The results are discussed in two sections, which are: (i) overall analytics of the MOOC; and (ii) students' perception in terms of attitude, self-efficacy, and anxiety. The discussion is as follows.

24.4.1 Discussion on Overall Analytics of the MOOC

The findings indicated that the highest number of daily active students was in the first month, which was around 2000 students. The number then decreased to 500 daily active students in the subsequent months. The cause could probably be attributed to the "novelty effect", where the technology could have affected the students using the technology for the first time (Griesbaum 2014). In other words, novelty effects could have caused the increase of daily active students due to their tendency in paying more attention to technology which is new to them (Sim and Hew 2010).

With regards to the total number of comments, the highest number of comments was from 7 to 19 December 2014 (near the end of the course period). The high number of comments was probably due to fact that the learning tasks deadlines was due near the end of the course period. Another factor that could have contributed is that the time range was near to the examination period causing students to increase their interaction and discussion among each other. This can be linked to the work of Nawrot and Doucet (2014), where they found out that implementation of submission times for MOOC learning tasks could increase task submission and also enhance student engagement.

24.4.2 Discussion of Students' Perception in Terms of Attitude, Self-efficacy, and Anxiety

For attitude, the results for the A3 item showed that 75.5 % of the students perceived that MOOCs makes learning interesting. This could be linked to works of Adams et al. (2014) and Guo et al. (2014). Adams et al. (2014) discovered that the use of talking-heads in MOOC created an intimate pedagogical space where lecturers in videos were perceived to be speaking directly to the students. This in turn made learning in MOOCs more interesting for the students. In a related study, Guo et al. (2014) found out that the use of talk-heads in MOOC videos increased students' engagement as compared to powerpoint slides. As we also used talking heads in some of the MOOC videos, this could have become one of the reasons behind students' perception. Apart from that, another possibility could be attributed to the integration of local culture aspects in the MOOC's learning content.

For example, for live action videos, we utilized local universities settings for the video shooting and local students as actors in the video. Previous studies have discovered that by increasing "familiarity" of the people (i.e. location and actors in the video), it can help keep learner attention towards the learning content (Veletsianos 2009; Chen et al. 2010). Nevertheless, the use of talking-heads and integration of local culture in MOOC learning content should be examined further, as excessive use of talking-head (e.g. long lectures) make decrease learner attention while integration of local culture could be suitable for certain regions, hence reduce the appeal of MOOC learning content.

With regards to self-efficacy, only less than half of the students (49.1 %) agreed that could complete their tasks if there was no instructing them to act (item SE1). This could have been caused by the high level of student autonomy required to learn using MOOCs. Mackness et al. (2013) identified that MOOCs can cause students to feel "lost" or disoriented in learning due to high level of self-directed learning required in using MOOCs for learning. As MOOCs have massive number of students, a probable solution could be to integrate the concept of "community of practice" using mentors. Here, the mentors would be the "old-timers" or members who have been a part of a community (i.e. MOOC course) for a longer period in which they would have developed a "shared knowledge bank" of learning experiences (Wenger et al. 2009; Aadal et al. 2014). The "old-timers" would then serve as "mentors" who would give feedback to students who face difficulties in learning or require a higher level of guidance and assistance in learning (Ryberg and Christiansen 2008). However, it would be interesting to investigate whether this strategy would be applicable and would enhance or disrupt learning.

In terms of anxiety, findings indicated that students did not feel anxious (67.4 %) or afraid (73.5 %) of using the MOOC a for learning. Results also showed that they were not afraid of losing data due to clicking the wrong button (57.5 %). This could be related to a study by Shariman et al. (2012) where they discovered that Malaysian students prefer digital content that is presented in a variety of multimodal forms and also have a short attention span. Referring back to the MOOC that was developed, two types of MOOC learning content was developed, which were live actions videos and 2D animated videos (Nordin et al. 2016). This could have caused students to be attracted as the video was not focused on one-form (e.g. only lectures with talking-heads). In addition, the videos in the MOOCs were mainly short, hence was beneficial to students who had short attention spans.

24.4.3 Conclusions, Implications and Future Directions

The paper has presented the iterative ADDIE instructional design framework that was used in the development of a Malaysia MOOC. This framework could be used in future development of MOOCs locally or globally. The paper also presented findings related to the MOOC overall analytics as well as students' perception of the developed MOOC in terms of attitude, self-efficacy, and anxiety. Implications of the

findings suggest that that the MOOC can be improved in terms of increasing the self-efficacy or reducing the learner autonomy in the MOOC. With regards to future directions, it would be interesting to investigate the implementation of the "community of practice" concept in MOOCs (e.g. mentorship in MOOC learning) and assess whether such measure could enhance or disrupt learning.

Although the paper has presented some interesting findings regarding MOOCs, some limitations should be kept in mind. First, the MOOC was developed using the iterative ADDIE instructional design framework. Using other approaches for MOOC development could have produce different results. Second, the learning content developed was mainly focused on two types of videos, which were live action and 2D animated videos. Using other types of learning content such as 3D animations or integration of other technologies, such as mobile blogs (Norman et al. 2014) or mobile pedagogical agents (Embi and Nordin 2013) could have yielded different findings. Finally, the MOOC was developed for an Ethnic Relations course. Applying the iterative ADDIE instructional design framework in a different domain such as engineering or medicine could have an effect on the results. In sum, it is hoped that papers' findings as well as the framework presented (i.e. the iterative ADDIE instructional design framework) could be utilised by researchers and educators interested in development of MOOCs for the Asian region as well as the international community.

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Chapter 25
Google Forms for Students' and Teachers' Self Reflection Practices

Norshima Zainal Shah, Dian Darina Indah Daruis and Amnah Saayah Ismail

Abstract The paper looks at how Google docs (forms) were used to collect feedbacks from students in Sociolinguistics classes. Feedbacks collected are on lessons conducted in the classroom. During the set induction and closure of each lesson, students were taught moral values directly through short stories delivered or videos carefully chosen by the lecturer to suit the *Kemahiran Insaniah* items in Learning Outcomes *Kemahiran Insaniah* (LOKI) by Ministry of Higher Education (MOHE). Sociolinguistics lessons were conducted as usual. Thirty minutes before classes end, students go to a given link (http://goo.gl/forms/z23Z36YWvZ) using either their laptops or smart phones to answer six (6) questions; one which rates their understanding of the lesson taught, and two questions allow students to reflect on what they have learnt, found most interesting or uninteresting, and they are free to write down their thoughts. Students found typing their responses into Google forms using their smart phones to be easier; and with Google forms, their responses were directly sent to a spreadsheet for easy analysis; and were automatically saved and stored on lecturer's Google drive. The lecturer gets to monitor students' understanding and read the summary of responses and reflect on his teaching practices in the classroom. Many decisions can be made from the reflections done by both students and lecturer; for example students reinforced what has been taught to them and lecturer gets to improvise teaching methodology and be aware of students' differences and accommodate them. After five (5) lessons, it was found

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that students do remember the moral values inculcated directly to them as most of them wrote about the values in their responses. Additionally, Google forms proved to be a very convenient tool for reflective practices (as compared to students writing their reflections on pieces of paper or diary) in gathering information on what happens in the classroom from the students, as well as it is fast, plus it is free and easy to use web-based application.

Keywords Google forms · *Kemahiran insaniah* · Reflective practice · Online teaching and learning

25.1 Introduction

For decades, there has always been complains of graduates lacking in soft skills and this became the main reason why they are unable to secure employment (Schulz 2008; Singh and Singh 2008; Ismail et al. 2011). Many researches have conducted studies on soft skills (Aida et al. 2015; Tan and Tang 2015; Tang 2011), and listed down soft skills needed in today's workplace, for example Robles (2012) identified top 10 soft skills perceived as most important by business executives in the USA as integrity, communication, courtesy, responsibility, social skills, positive attitude, professionalism, flexibility, teamwork and work ethic. On the other hand, work skills that were found to be pertinent in small and medium enterprises are grouped into five core abilities: personal values, interpersonal skills, initiative and enterprise skills, and learning and workplace skills in a study conducted by McLeish (2002). In Malaysia, employers were found to prefer graduates with high ICT skills, ability to work as a team, interpersonal skills and proficient in English (Singh and Singh 2008; Maros 2000; Nair-Venugopal 2000). Recognising the importance of soft skills in the workplace, in 2006, the Ministry of Higher Education (MOHE) has announced that all public universities must introduce soft skills elements and incorporate them in the undergraduate syllabus; through the Learning Outcomes and *Kemahiran Insaniah* (LOKI).

The teaching of *Kemahiran Insaniah* or soft skills as prescribed in LOKI of MOHE directly in the classroom emerged from the interest to investigate whether soft skills can be taught as it has been widely claimed that graduates do not possess these skills. All this while, soft skills are integrated into classroom activities, for example by making classroom activities more student-centred, it is hoped that students are more vocal, more proactive, more socially, politically, environmentally, and economically aware, more ethical, and more a team player. In other words, the soft skills of students would have been improved by doing Student Centred Learning (SCL) (Sung 2010). He continued saying that this has failed as "lecturers are not committed and are not trained enough in SCL; students are uncomfortable with it and lack the motivation and skills to self-do and self-learn; and authorities do not know how to scientifically evaluate the success or failure of LOKI". The Ministry of Higher Education's 'LOKI' or domains of soft skills

learning outcomes are Communication Skills, Leadership Skills, Teamwork Skills, Entrepreneurial Skills, Values, Ethics & Professionalism, Lifelong Learning & Information Management Skills and Critical Thinking & Problem Solving Skills. This study carefully plans and selects stories or videos that highlight and teach soft skills directly during lessons' set inductions and closures. It offers a platform for both lecturers and students to reflect and act upon the teaching and learning process that has happened in the classroom.

Self-reflection is certainly a pragmatic way to consider classroom changes (Gubbins 2003). It is a generic term for the intellectual and affective activities in which individuals engage to explore their experiences in order to lead to new understandings and appreciation (Boud et al. 1985). Tice (2004) posited that, "Reflective teaching means looking at what you do in the classroom, thinking about why you do it, and thinking about if it works—a process of self-observation and self-evaluation". By collecting information about what goes on in our classroom, and by analysing and evaluating this information, we identify and explore our own practices and underlying beliefs. It enhances learning and motivation and ownership in one's learning (Cimer 2011). Furthermore, Moon (2005) stated that reflection improves teachers' classroom practice as it is an intense process of self-examination as well as an in-depth, honest confrontation of longstanding perceptions and attitudes toward students' achievement. When lecturers and students become reflective about teaching and learning process, they are strengthening their own capacity to learn.

Consequently, there are many ways in which one can do reflective practice. Some of the ways are through writing diaries, portfolios, journals or even discussions with peers. Reflective fieldwork diaries offer an innovative and flexible approach to teaching and learning. This assessment method implicitly supports learning through assessment and helps enhance critical self-reflection and communication skills, as well as encouraging deep learning (Dummer et al. 2008). Cimer (2011) used portfolios to write self reflections and found that it encouraged students to study regularly, increased retention and made learning more enjoyable. Data collection in this study involved written journals and documents (e.g. lesson and unit plans). Tsnagaridou and Polemitou (2015) encouraged reflective journal keeping as this is recognised as a useful data collection strategy to help clarify the meaning given by the participants to their experiences. On the other hand, this study deviates from the traditional pen and paper way of jotting down reflections and turns to using Web 2.0 tools (Google forms) to gather information from reflective practices.

The objectives of this study are:

1. To investigate students' understanding of what has been taught in the classroom.
2. To assess students' reflection on whether they have learned the soft skills taught directly to them in the classroom.
3. To help lecturers reflect on own teaching from students' views on the activities conducted in the classrooms.

4. To identify whether lecturers act upon their reflections.
5. To investigate students and lecturers' views on using Google forms in getting feedback on teaching and learning activities in their classrooms.

25.2 Method

25.2.1 Teaching Soft Skills Directly

The seven elements of soft skills that are propagated by the MOHE are: 1. Communicative Skills, 2. Leadership Skills, 3. Teamwork Force Skills, 4. Entrepreneurial Skills, 5. Ethics, Moral & Professionalism, 6. Lifelong Learning & Information Management Skills and 7. Critical Thinking & Problem Solving Skills. In this study, the two soft skills emphasised are skills no 1. Communicative skills and no 5. Ethics, Moral & Professionalism. These two skills are taught using short stories with moral values; during lessons' set inductions and closures. Titles of short stories and videos are given in Table 25.1.

25.2.2 Self Reflection Practice

Students: Fifteen minutes before classes end, students click on a given link (http://goo.gl/forms/z23Z36YWvZ) using either their laptops or smart phones to answer six (6) questions. Apart from rating their understanding of the lesson taught, the other questions will allow students to reflect on what they have learnt, found most interesting/uninteresting, and how they think lessons could be made better.

Lecturer: After all students have posted their responses, the lecturer reads and reflects upon them. He then reflects on his teaching, and later plans and prepares the next lesson to accommodate the responses.

25.3 Results and Discussion

Results are presented and discussed according to the objectives of the study.

Table 25.1 Stories and videos to teach soft skills

Lesson	Story
1	Nails in the fence
2	Dealing with adversity
3	Videos about father's love
4	A bird in the hand
5	Man selling balloons

25.3.1 Students' Understanding of What Has Been Taught in the Classroom

Students rated their understanding on a scale of 0–10. A high understanding is set at a rating above 5 and a low understanding is at a rating below 5.

It can be seen that 64.3 % have high understanding of what had been taught in the five lessons and 35.8 % rated their understanding on a scale of 5 and lower (Fig. 25.1).

Responses from students

When students reflect, it is hoped that they are reinforcing themselves on what was being taught to them in the classroom. Students' reflections showed that they can adequately summarise the lesson. Examples of the summary of lessons are:

> I learned about multilingualism during my friend's presentation. Besides, Maam Shima also taught us the meaning of regional dialect, patois, dialect continuum and social dialects.
>
> Today I've learnt about social background that will influence our language. For example our age. The way teenagers speak sometimes can't be understood by an old lady. The word such as 'Balak' refers to boyfriend just can be understood by teenagers. I did my quiz and it also helped me to understand better.
>
> I have learnt about jargon, sociolect, and register; where register is when you hear a sentence you can recognised who said that based on their occupation or position. I need to find out on the difference between jargon and register. I also learnt the Sapir Whorf hypothesis. The hypothesis states that what we can assume or predict on some things.

Responses from students that showed high understanding

> Today I studied about multilingualism from my friends' presentation which is made up of individual and societal multilingualism. Then, I studied about regional dialect, social dialect, styles, and registers. Lastly, I learned about Manglish.
>
> The examples made me understand more about the lesson.
>
> Today we are learnt about language and variation. Its contains socialect, dialect, jargon, register and so on. Besides, we are studying about language and culture. Second language as a second soul. They relate cognitive, language and culture. There are some culture that really care about time. Like in Hebrew, they write it like Jawi words. In Mandarin,they write from up to down. There are two theories which are Linguistic Determinism and Linguistic Relativism.

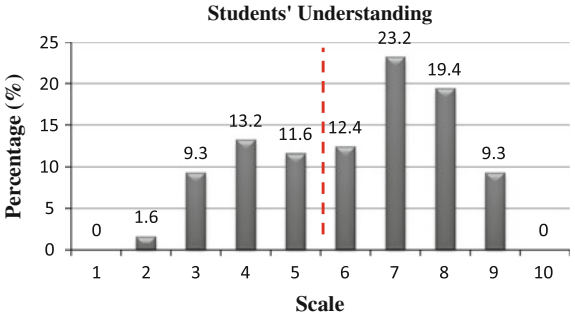

Fig. 25.1 Percentage of students' understanding for five lessons

Responses from students that showed low understanding

There are some of the things that I don't understand…

In class, I have understood only half of the topic taught… I am still confuse and I can't understand the topic very well…

25.3.2 Soft Skills Taught Directly

A manual frequency count for responses that mentioned of the soft skills taught was carried out. There are 68 out of 129 responses (53 %) from five lessons which mentioned or reflected on the soft skills taught. This can be seen in responses:

Even though we are forgiven, people will not forget as arguments will leave permanent scars, just like holes in the fence. Must think before we do something.

The class was very interesting.. doing tasks in groups made me understand more about I have learnt..the video that was shown by my lecturer made me sad because I can't hug my father anymore.. we must appreciate other people when there is still time.

I have learnt about the meanings and examples of society, language, sociolinguistics, dialect, variety, standardisation, vitality, historicity, autonomy, reduction, mixture,de facto norm, accent, social dialect,regional dialect and patois. I also learnt about the need to respect our parents is so important through the video that has been shown to us.

Today's lesson have established my understanding of the definitions of sociolinguistics terms. Also, the story that Maam had told made us realise that we have to choose friends wisely.

25.3.3 Lecturer's Reflection

From the students' responses, the lecturer can reflect on his own teaching. The lecturer can detect students' understanding or whether they have achieved the objectives set for his class on that day. The example below exposes to the lecturer that the student needs reinforcement on the topic taught.

I don't have any reflection. Everything is perfect. I learnt many new things today. But I have one curious question. Is it true when we switch our language, we also switch our way of thinking? I see many of my Indian friends who are always talking two languages: Tamil and English. But still, I feel that they still think the same way. What is your opinion Maam?

There are times when students' reflections tell the lecturer whether students are ready for his class. Students are also found to be sleepy and hungry, hence will disrupt understanding of what is being taught in classrooms. They also suggested how the classes can be made better in future.

I feel sleepy.. very sleepy.

Shamimie likes to eat Mee Tarik at Sungai Besi. And she is so hungry during the lessons. We want to go CIMB bank tomorrow in the morning.

Lesson is quite interesting but I am a little bit tired.
I need more examples during the presentation in today's lesson.

Positive reflections from students motivate the lecturer to teach better. The lecturer's self esteem is heightened and he looks forward to teaching the class.

I love the idea of Maam Shima, starting or ending the class with a story full of moral values. Like a 9GAG. I need better explanation from Maam Shima while teaching and easy explanation. Sometimes the explanations are so hard to understand. But it's okay, if I do not understand I will ask her to explain it again. Mostly, I love the way Maam Shima teaches in the class. No stress. Thank you Maam.

Thanks Maam Shima for sharing the moral videos. Everybody was crying. Today's class is the best.

I love this class because the lecturer is so energetic and she tries her best to make us understand. And sometimes she pampered us and makes us touched.

25.3.4 Action Taken by Lecturer

After two lessons using short stories, a response from one student stated:

The lecture is quite boring because the slides have so many words like an essay. It will be interesting if Maam can attach a video or anything with sound effects to prevent us from being sleepy.

In reaction to that, the lecturer brought into the next class, two short videos to impart the soft skill for that day. Positive feedbacks were captured in students' responses:

I love watching all the videos. It really touches my heart. I was crying. Aina Aqilah was crying too.

Thanks Maam Shima because sharing the moral videos. Everybody was crying. Class for today is the best. It is important that we respect the elderly especially our own parents.

25.3.5 Using Google Forms Versus Pen and Paper

From verbal discussions with students on the use of Google forms in replacement of writing on paper, students expressed that answering the questions using their smart phones are:

1. much easier as they do not need to use pen and paper,
2. very personal, for one, their responses using Google forms could not be seen by others,
3. enlightening as bad handwriting is eliminated, and there is also auto spell check,
4. quite trendy as students are used to writing messages on their mobiles, and this motivates them answer the questions, and

5. flexible. Sometimes, students are given time after class to response to the questions, they find this very convenient as they can even answer the questions when they are in between classes, at any time and anywhere they want.

Another thing that should be mentioned is on lecturer's reaction upon reading students' reflections. Reflections that are negative proved to be a challenge especially when the lecturer thinks that he has done his best. The lecturer should always stay positive and look as reflections as an opportunity to improve and enhance the teaching and learning activities in his classroom.

25.4 Conclusion

Lecturers must embrace technology in the classroom in keeping up with the trend and life styles of the current student population. Feedbacks from students serve as priceless indicators in determining students' interest, understanding and expectation of what is being delivered by lecturers in classrooms. Firstly, using Google forms has proven to be simple but efficient in collecting students' feedbacks. Secondly, there is a promising 53 % mention of soft skills in students' responses, which proves a move in the correct direction in teaching soft skills directly through short story telling and videos with moral values.

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Chapter 26
Visual Thinking Courseware (VTC): Enhancing Critical Thinking Skills Among Spatial Learners

Harrinni Md Noor

Abstract Spatial ability is the concept that generally refers to skill in representing, transforming, generating, and recalling symbolic, non-linguistic information. Therefore, visual imageries play an important role for the Spatial learners. In the 21st century, teaching and learning with technology have diversified to complement the age of digital era where technology is made available to cater for all learning styles. In this study, a Visual Thinking Courseware (VTC) was designed and developed to help solve the problem of teaching Art Criticism by introducing systematic strategies particularly on visuals to enhance students' critical thinking skills. Built on Gestalt Theory, the objective of this research was to determine the difference in students' performance in critical thinking skills between High Spatial Learners (HSL) and Low Spatial Learners (LSL). The methodology used in this research was quantitative and qualitative in nature. A quasi-experimental design was applied to collect the necessary data. A pretest and posttest for the two treatment groups was implemented. Four research instruments were used in the research to obtain the data namely, Index for learning Styles Questionnaire (ILSQ), Spatial Ability Test, Pretest and Posttest, and Critical Thinking Rubrics. Sixty-three post degree education diploma students participated in this study. Results showed that both HSL and LSL groups showed ability to critically think better. VTC had a greater impact on LSL critical thinking skills as compared to HSL. Therefore, it can be concluded that the use of VTC enabled spatial students to critically think better.

Keywords Visual thinking · Spatial ability · Art criticism · Art education

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26.1 Introduction

Art Education is a discipline-based education where art is taught as an academic subject and focuses on the teaching and learning of art in the schools. In UiTM, the Art and Design Education program is an undergraduate degree program focusing on pre-service art teachers. The program aims to provide the knowledge and training for undergraduate students in four areas namely Art Aesthetics, Art History, Art Production, and Art Criticism that hopefully will contribute to the creation, understanding, and appreciation of art.

According to Hamblem (1984), art education should not to remain confined to artistic performance. Therefore, discovery learning, critical thinking and problem solving (Nilson et al. 2013) are to remain as general goals in art education and there should be an emphasis in Art Criticism in art education program. Inevitably, critical knowledge (Culp 2015; Caroll 2002) is a necessary part of the practical investigation into the work of others and at the same time, help to foster inquiry learning.

As we all know, critical thinking skills is one of the qualities to developed among students as stated in the National Philosophy of Education. Through Art Criticism in Art Education, critical thinking can be further enhanced when used in the teaching and learning of art. Therefore, in order to teach Art Criticism, there must be a framework that can accommodate the details and sequences of the practice of skills. It should comprise of different levels of thinking (Atherton 2011) and also a teaching methodology within the stages of art criticism (Barret 2010).

As an art undergraduate, possessing higher order thinking skills could ensure the active involvement of students beyond the memorization of facts and predefined conclusions (Barret 2010; Hamblem 1984). Therefore, in order to practice higher order thinking skills in an art classroom, Art Criticism should be taught accordingly.

Therefore, Visual Thinking Courseware (VTC) designed and developed in this research can help in the teaching and learning of Art Criticism. VTC was designed to assist in the instruction by incorporating a more systematic approach to the teaching and learning of Art Criticism. The courseware comprises of different levels of thinking and also a teaching methodology within the art critical format. Carefully selected visuals are used to ensure that critical thinking occurs.

There are two modes of VTC. The first is Sequenced Visual Selection (SVS) that uses visual materials that are sequenced from the simpler to more complex visuals in terms of subject-matter and composition. For example, in this research, students go through the art criticism stages by answering questions from the simpler visuals first and later moved on to more complex visuals. The second mode is Random Visual Selection (RVS) that uses visual materials that are randomly arranged. For example, in this research, visuals used for the art criticism purposes are not arranged in any order of complexity. At every stage of the tasks, visuals are randomly put with a mix of simple and complex visuals.

The visual selections applied in the courseware could help undergraduates of Art and Design Education to grasp the skills before they go out to teach in schools.

Short (1993), also stressed that it is critical for pre-service teachers to understand the subject matter that they will later teach in education in order to facilitate understanding in their students.

Therefore, the objectives of this research were:

(1) To find out the difference in students' performance in critical thinking skills between High Spatial Learners (HSL) and Low Spatial Learners (LSL) using two different visual selection modes—Random Visual Selection (RVS) and Sequenced Visual Selection (SVS).
(2) To find out the difference in students' performance in critical thinking skills among High Spatial Learners (HSL) and Low Spatial Learners (LSL) using the same visual selection modes (RVS and SVS).

The research questions in this study were:

1. Does students' performance in critical thinking skills differ among High Spatial Learners (HSL) in using RVS and SVS modes?
2. Does students' performance in critical thinking skills differ among Low Spatial Learners (LSL) in using RVS and SVS modes?
3. Does students' performance in critical thinking skills differ among High Spatial Learners (HSL) and Low Spatial Learners (LSL) who uses RVS mode?
4. Does the students' performance in critical thinking skills differ among High Spatial Learners (HSL) and Low Spatial Learners (LSL) who uses SVS mode?
5. Do the two different visual modes allow students to critically think better?

26.2 Method

In this study, Yenawine's (2003) selection of images and Housen's Visual Thinking Strategies (VTS) (Housen 2002) were used to aid the selection of visuals that was used in the courseware for Art Criticism activities. These image selections guidelines were derived from Housen's research into the viewing process and Stages of Aesthetic Development (Housen and Yenawine 2000-02). Three subject matter experts (SME) in the field or Art and Design Education were identified to help in the design and the selection of these materials. The SMEs had more than 20 years of experience each in the teaching and learning of art in education. They are currently active in research in the areas of Art Education including Art Criticism and aesthetics. Their expertise helped verify the contents and materials used for this courseware that best suit the Malaysian undergraduate students.

A web-based courseware was designed and developed using the design based on the model for design and development developed by Alessi and Trollip (2001). A pilot test was carried out on a first draft or prototype of the courseware for purpose of formative evaluation before the actual research was conducted. This courseware was pilot tested by 10 students and three experts. They evaluated the

courseware in terms of its technical, curriculum and cosmetic adequacies and inadequacies. Improvements and upgrading was made based on the formative evaluation. The final version was verified by experts before it was used in the actual research.

The students, who were the post degree education diploma students, viewed the courseware and followed the activities and assignments provided during a specified period of time. A pretest was administered before they were allowed to go through the treatment process. A posttest was administered at the end of the treatment. Students' pre and post test scores were taken as an indicator of their achievements in using the two modes of courseware.

The quantitative data was collected in the pretest and posttest as the summative evaluation. Students' written scripts from the tests were analyzed to gain insight on the effects of the visual strategies on their Art Criticism and critical thinking skills.

26.3 Population and Samples

Samples were drawn from students of Art and Design Education at the Faculty of Education, UiTM, Shah Alam. This was because the samples selected had undergone the basic training in art and design which is the prerequisite to follow through the Art Criticism courseware. At this level, they have undergone basic training to understand the Elements and Principles of Art that will enable them to carry out a critical analysis of an art work. Furthermore, considering the mode of instructions in the courseware is in English, the UiTM students were selected for this study.

The samples consisted of 63 students undergoing the post degree education diploma in Art and Design Education at UiTM. All the students had an entry qualification of Malaysian University English Test (MUET) with Band 2 or 3. The sample was divided into two groups, high spatial learners (HSL) and low spatial learners (LSL) that are determined by the Spatial Ability Test and the Index for Learning Styles Questionnaire (ILSQ). They are then divided into two groups that represented the two modes that were used in the research—Random Visual Selection (RVS) and Sequenced Visual Selection (SVS). The names of the students were randomly selected based on the alphabetical name listing provided by the faculty.

26.4 Research Design

In order to determine the effectiveness of the visual strategies used in the courseware, this research aimed to find out if there is any significant difference in students' achievements between students who use Random Visual Selection (RVS) and those using Sequence Visual Selection (SVC) courseware. It is also aimed to find out if there was any significant difference in students' achievements with different learning styles in using the two different visual selection modes. The research was

carried out to find out the effectiveness of the visual strategies in the Art Criticism courseware.

Therefore, the methodology that was used in this research was quantitative and qualitative in nature. The quantitative data shed some light on the research questions. The qualitative data provided the research with an in-depth view of the strength and weaknesses of the courseware. Students' opinion and suggestions were also obtained from the qualitative data.

A quasi-experimental design was applied. A pretest and posttest for the two treatment groups was implemented. Pretest was administered to the two groups in the form of a sixty-minute written test. Treatment was then given to all experimental groups within the duration of three weeks in which the viewing time for the courseware would be completed. The posttest took place at the end of the treatment in the form of a sixty-minute written test.

26.5 Research Instruements

The following research instruments were used in the research to obtain the data.

26.5.1 Index of Learning Style Questionnaire (ILSQ)

The Index of learning Style Questionnaire (ILSQ) that was used in this study was formulated by Richard M. Felder and Linda K. Silverman in 1991 (Felder 1993). It is an instrument used to measure the four dimensions of learning style model that includes the verbal/visual learning styles. This questionnaire was used in this study to determine the students learning style, whether they were visual or verbal learners. The questionnaire was administered at the start of the study.

26.5.2 Spatial Ability Test

The Spatial Ability Test by Newton and Bristol in 2009 was used in this study to determine students' spatial ability. Based on the score, the students were divided into two groups, the High Visual Learners (HVL) and the Low Visual learners (LVL) based on their scores. There were 45 items in this test and students were required to complete them in 20 min.

Questions in the test contain series of pictorial figures rather than words or numbers. It does not involve analysis and reasoning. It is purely a test of mental manipulation. Students had to look for the logical relationship between figures. They had to try and form mental images and visualize movement or change

between them. It contained numerous types of question students are likely to encounter—including shape matching, group rotation, combining shapes, cube views in three dimensions, other solids in 2 and 3 dimensions, and maps and plans.

The spatial ability questions in the test involved the visual assembly and the disassembly of objects that have been rotated, which are viewed from different angles or objects that have different markings on their surfaces. Students were challenged to answer them all in the time allocated. This test looked at students' ability to think visually and solve spatial problems in two and three dimensions.

26.5.3 Pretest and Posttest

A set of sixty-minute written test was administered to assess students' critical thinking skills during the pretest and posttest. Questions were set according to standard examination format for the Art and Design Education Program at the Faculty of Education, UiTM. There were two questions in each test. The first question required students to write a critical analysis of the work of art seen in the picture. They were required to describe, analyze, interpret and then make a final judgment of the work. The second question required the students to discuss the similarities and differences of the two artworks in the picture. They were needed to also describe at least three elements of designs used by the two artists to communicate their purpose.

Both the pretest and posttest questions were of the same level of difficulty with similar visual themes. The content validity of the tests was judged by a panel of SMEs who are knowledgeable about the materials, the format and the wording of the instrument, and the content validity of each item.

The Holistic Critical Thinking Rubrics for Art Criticism were used to assess students' performance in the tests. The score were then used to indicate their performance.

26.5.4 Critical Thinking Rubrics

The Critical Thinking Rubrics by Facione and Facione in 1994 was used in this study to assess the critical thinking skills of the students. This rubric was designed to rate the students' critical thinking skill demonstrated by students in essays, projects presentations, and such. Therefore, this rubric was suitable to grade the students score in the tests as they gave answers in essay form. However, an adaptation on the original four-level scoring was done. It was spread out in sixteen levels as suggested by SMEs.

26.6 Data Analysis

All the experimental groups completed both the pretest and posttest within the six-week duration. Both the tests, in the form of one-hour written test was analyzed and graded by the researcher. The scores were moderated by another lecturer. The t-test for paired samples was used to compare the single group's performance on the pretest and posttest between which the treatment was given. This is also to determine any significant differences in the scores among the two groups (HVL and LVL) on the two instructional modes used in the research (RVS and SVS).

SPSS was used to process the descriptive statistical data of mean score in students' performance. The t-test was used to examine the effects between the two modes of instructional strategies and the learning styles.

26.7 Results and Findings

Students were divided into two groups—the High Spatial Learners (HSL) and the Low Spatial Learners (LSL). There were 22 students in the HSL group (50.8 %) and 21 (49.2 %) students in the LSL group. The students were further divided into two groups using two different visual selection modes (RVS and SVS). Therefore, there were four different treatment groups.

Table 26.1 shows there were 17 (27 %) students in HSL group who used Random Visual Selection (RVS) mode and 15 (23.8 %) students in HSL group who used Sequenced Visual Selection (SVS) mode. Sixteen (25.4 %) students in the LSL group were given the RVS mode and the remainder 15 (23.8 %) students in the LSL group were given the SVS mode.

The results in Table 26.2 indicate that there is a difference in mean before and after using the courseware. Mean for pretest was m = 6.23 and after using the courseware their mean score increased to m = 16.38. There is an increase of 10.15 marks before and after using the courseware. It is also found that there is a significant difference between pre and posttest scores with t-value at t = 13.976, df = 16 and significant value of p = 0.00.

This would indicate that the courseware helped improved HSL group's critical thinking skills as seen by the increase of mean score and t-test among the students

Table 26.1 The four treatment groups

		Frequency	Percent	Valid percent	Cumulative percent
Valid	HSL/RVS	17	27.0	27.0	27.0
	HSL/SVS	15	23.8	23.8	50.8
	LSL/RVS	16	25.4	25.4	76.2
	LSL/SVS	15	23.8	23.8	100.0
	Total	63	100.0	100.0	

Table 26.2 Results of HSL performance in using the RVS mode

		Mean	N	t	df	Sig. (2-tailed)
Pair 1	Critical thinking pretest	6.2353	17	−13.976	16	0.000
	Critical thinking posttest	16.3824	17			

Significant level at $p \leq 0.05$

Table 26.3 Results of HSL performance in using the SVS mode

		Mean	N	t	df	Sig. (2-tailed)
Pair 1	Critical thinking pretest	7.0667	15	−8.863	14	0.000
	Critical thinking posttest	16.9333	15			

Significant level at $p \leq 0.05$

when using the RVS mode. Therefore, given the significant value of $p \leq 0.05$ it can be concluded that there is a significant difference in students' performance in Critical Thinking skills among High Spatial Learners in using RVS mode.

The results in Table 26.3 show that mean score prior to using the courseware was mean = 7.06 and after using the courseware was mean = 16.93. This indicates that there is a difference in mean before and after using the courseware. There is an increase of 9.87 marks before and after using the courseware.

It is also found that there is a significant difference between pre and posttest scores with t value at 8.863, df = 14 and significant value of p = 0.00. This would indicate that the courseware helped improved HSL group's critical thinking skills as seen by the increase of mean score among the students when using the SVS mode. Therefore, at the significant value of $p \leq 0.05$ there is a significant difference in students' performance among the High Spatial Learners in using SVS mode.

The results in Table 26.4 show an increase of mean score among the students when using the RVS mode. Their mean score prior to using the courseware was mean = 10.25 and after using the courseware their test score increased to mean = 19.78. There is an increase of 9.53 marks before and after using the courseware. This would indicate that the courseware helped improved LSL group's critical thinking skills as seen by the increase of mean score and t-test among the students when using the RVS mode.

The results also indicate that the difference between pre and posttest scores was significant with t value at 7.812 with df = 15 and significant value of p = 0.00. Therefore, at the significant value of $p \leq 0.05$ there is a significant difference in students' performance among the Low Spatial Learners in using RVS mode.

Table 26.4 Results of LSL performance in using the RVS mode

		Mean	N	t	df	Sig. (2-tailed)
Pair 1	Critical thinking pretest	10.2500	16	−7.812	15	0.000
	Critical thinking posttest	19.7813	16			

Significant level at $p \leq 0.05$

Table 26.5 Results of LSL performance in using the SVS mode

		Mean	N	t	df	Sig. (2-tailed)
Pair 1	Critical thinking pretest	5.8000	15	−9.768	14	0.000
	Critical thinking posttest	17.3667	15			

Significant level at $p \leq 0.05$

The results in Table 26.5 indicate there is a difference in mean before and after using the courseware. Their mean score prior to using the courseware was Mean = 5.8 and after using the courseware their test score increased to Mean = 7.4. There is an increase of 11.6 points before and after using the courseware. It is also found that there is a significant difference between pre and posttest scores with t-value at 9.76 with df = 14 and significant value of p = 0.00. This would indicate that the courseware helped improved LSL group's critical thinking skills as seen by the increase of mean score and t-test among the students when using the SVS mode.

Therefore, given the significant value of $p \leq 0.05$ it can be concluded that there is a significant difference in students' performance in critical thinking skills among Low Spatial Learners (LSL) in using SVS mode.

The results in Table 26.6 show that HSL group of students have lower mean score with mean = 6.23 as compared to the LSL group with mean = 10.25 in the pretest score using RVS mode. There is a difference of 4.02 marks. It is found that there is a significant difference between HSL and LSL pretest scores with t-value at 3.9 with df = 31 and significant value of p = 0.00. This would indicate that the Art Criticism skills among the two groups before using the courseware are not the same. HSL group has a lower critical thinking score in the pretest as compared to LSL.

Therefore, given the significant value of $p \leq 0.05$ it can be concluded that there is no significant difference in students' pretest performance in Art Criticism skills among High Spatial Learners (HSL) and Low Spatial Learners (LSL) in using SVS mode.

The results in Table 26.7 show that HSL group of students have lower mean score with mean = 16.38 as compared to the LSL group with mean = 19.78 in the

Table 26.6 Results of HSL and LSL pretest performance in using the RVS mode

	Group	N	Mean	t	df	Sig. (2-tailed)
Critical thinking pretest	HSL/RVS	17	6.2353	−3.979	31	0.000
	LSL/RVS	16	10.2500			

Significant level at $p \leq 0.05$

Table 26.7 Results of HSL and LSL posttest performance in using the RVS mode

	Group	N	Mean	t	df	Sig. (2-tailed)
Critical thinking posttest	HSL/RVS	17	16.3824	−2.950	31	0.006
	LSL/RVS	16	19.7813			

Significant level at $p \leq 0.05$

Table 26.8 Results of HSL and LSL Pretest performance in using the SVS mode

	Group	N	Mean	t	df	Sig. (2-tailed)
Critical thinking pretest	HSL/SVS	15	7.0667	2.271	28	0.031
	LSL/SVS	15	5.8000			

Significant level at $p \leq 0.05$

posttest score using RVS mode. There is a difference of 3.4 marks. However, it is found that there is no significant difference between HSL and LSL posttest scores with t-value at 12.95 with df = 31 and significant value of p = 006. This would indicate that the Art Criticism skills among the two groups after using the courseware are not similar.

Therefore, given the significant value of $p \leq 0.05$ it can be concluded that there is no significant difference in students' pretest and posttest performance in critical thinking skills among High Spatial Learners (HSL) and Low Spatial Learners (LSL) in using SVS mode.

The results in Table 26.8 show that there is a difference in mean score prior to using SVS courseware in the pretest among HSL and LSL. HSL group of students have higher means at mean = 7.06 compared to the LSL group with mean = 5.8. There is a difference of 1.26 marks. It is also found that there is a significant difference between HSL and LSL pretest scores with t-value at 2.27 with df = 28 and significant value of p = 0.031. This would indicate that HSL group significantly has higher level of critical thinking skills compared to the LSL group before using SVS mode.

Therefore, given the significant value of $p \leq 0.05$ it can be concluded that there is a significant difference in students' pretest performance in Art Criticism skills among High Spatial Learners (HSL) and Low Spatial Learners (LSL) prior to using SVS mode.

On the other hand, the results in Table 26.9 show that HSL group of students have slightly lower mean score with mean = 16.9 as compared to the LSL group with mean = 17.3 in the posttest score after using RVS mode. There is a difference of 0.4 marks. However, it is found that there is no significant difference between HSL and LSL posttest scores with t-value at 0.23 with df = 28 and significant value of p = 0.81. This would indicate that the Art Criticism skills among the two groups after using the courseware are not similar.

Therefore, given the significant value of $p \leq 0.05$ it can be concluded that there is a difference in students' pretest performance in using the SVS mode but there is no significant difference in the posttest performance in critical thinking skills among

Table 26.9 Results of HSL and LSL Posttest performance in using the SVS mode

	Group	N	Mean	t	df	Sig. (2-tailed)
Critical thinking posttest	HSL/SVS	15	16.9333	−0.238	28	0.814
	LSL/SVS	15	17.3667			

Significant level at $p \leq 0.05$

High Spatial Learners (HSL) and Low Spatial Learners (LSL) in using SVS mode. This means that after using the courseware, both HSL and LSL groups showed improvement in the score but the results show no significant difference in their Art Criticism skills between the two groups after using the courseware.

26.8 Discussion

The main aim of the research was to find out the significant difference in students' performance in critical thinking skills among High Spatial Learner (HSL) and Low Spatial Learner (LSL) when using two modes of Visual Thinking Courseware, Random Visual Selection (RVS) and Sequenced Visual Selection (SVS).

Data analysis shows that there is a difference in mean before and after using the two modes of courseware. This would indicate that the courseware helped improved HSL group's critical thinking skills as seen by the increase of mean score and t-test among the students when using RVS and SVS modes. However, HSL group has a higher increase in their score after using RVS mode as compared to using SVS mode.

This could be due to the fact that HSL group has high spatial ability that they are able to view visuals in various complexity levels. Their thoughts were provoked when the visuals were at random as they were constantly shifting their thoughts from high to low and high again in various complexity levels. These high and low patterns in their thinking mode could perhaps give positive impact on their critical thinking.

Nevertheless, the two modes RVS and SVS gave positive impact on HSL critical thinking skills. The used of questioning techniques by Hamblem (1984) could have played a major role not just in the teaching and learning of Art Criticism but also critical thinking skills. Open-ended questions were designed to stimulate thorough examination of images as well as rigorous discussion about the visual's many possible interpretations (Barret 2003). It helped develop student's positive self-concept and personal artistic development, thus, promote students thinking in the classroom (Rowland 2001). Therefore, the questioning technique used in the courseware could have contributed to the increase in score among the HSL group of students.

Data analysis showed that there is a significant difference in the LSL score after using both RVS and SVS mode. However, LSL scored higher when using the SVS mode as compared to RVS. This indicates that regardless of any modes, LSL group showed improvement in their critical thinking skills. However, when using SVS, LSL group showed better improvement than using RVS.

This also indicates that arrangement of the visuals played important roles in allowing students to critically think during Art Criticism session. In SVS, visuals were arranged from the simpler to more complex visuals in terms of subject-matter and composition. The arrangement of visuals in that manner allowed students to improve their critical thinking skills as they progress from the simpler to more complex visuals (Peterson 2006). Therefore, they were able to overcome the

difficulties of looking at the artwork as they get practice from looking at the simpler visuals and move beyond the basics to a more difficult one.

Based on the data analyzed in this research HSL scored lower in critical thinking skill as compared to LSL before and after using RVS courseware. Although there was a difference in their performance before and after, the analysis showed that HSL have lower critical thinking skills than LSL. This indicates that having high spatial ability does not mean that the students are also good in critical thinking. The results showed that LSL is better at critical thinking than HSL when using the RVS.

The results in the research could be due to the fact that students with low spatial ability were more articulate. They look for more details and ask many questions to find answers for their thoughts. Perhaps, questioning technique by Hamblem (1984) provoked students to critically think about the visuals observed as they describe, analyze, judge and interpret.

The analysis from this research showed that LSL had a better improvement in their critical thinking skills as compared to HSL. Although the performance score was slightly the same before using the courseware, the score after using SVS showed that LSL scored higher than HSL. In other words, HSL did show an improvement but their score was lower than LSL.

Therefore, it can be concluded that regardless of the visual selections, either RVS or SVS, the two visual modes allowed students to critically think and criticize better. The questioning technique used in the courseware promotes students thinking when using the courseware that have contributed to the increase in score among the HSL and LSL group of students.

26.9 Conclusion

Results of the research show that the two modes of visual selection—Random Visual Selection and Sequenced Visual Selection do have an impact on students' performance in Art Criticism and critical thinking.

It is timely that a courseware like Visual Thinking Courseware (VTC) is included in Art Education. Art educators should find time to practice Art Criticism as it not only improve students' skills in criticizing and artwork but also enhances their critical thinking skills.

Therefore, higher learning institutions that offer courses in art related areas should consider using the courseware to help their students in Art Criticism and critical thinking. Art Criticism is an area that involves higher levels of thinking and utilizes several areas of Bloom's Taxonomy. This is applied in the courseware. Therefore, this courseware allows viewers to respond, interpret and make critical judgments on specific works of art either in verbal or written form. The web-based courseware would also enable students to use it at any point of time and could fit into the course schedule at any time within the semester.

Teacher training institutions could also use this courseware to help provide the knowledge and training for undergraduate students in Art Criticism to contribute to

the creation, understanding, and appreciation of art. The systematic framework in this courseware could also help to accommodate the details and sequences of the practice of skills.

The use of this courseware could also support UNESCO's project in Asia and the Pacific region. The use of this courseware can be included in the Arts in Education (AiE) approach. It can be introduced as an addition to conventional teaching methods. Teachers and students will have easy access to it as it is web-based. It is also time and cost effective. Therefore, in line with UNESCO declarations that art is used in education, using this courseware in art education would not only improve on children and adolescents' art criticism and critical thinking skills but also have an impact on their intellectual and personal development.

The courseware can also help in UNESCO's Education for All (EFA) programme. According to EFA, education should allow children to reach their fullest potential in terms of cognitive, emotional and creative capacities. According to Wagner (2005) art is needed as a subject as well as a tool and methodology. Therefore, the courseware is relevant indeed as it has an art approach that could help promote Art Criticism and critical thinking skills among students, along with cognitive development and academic achievement. This attempt would be good for Malaysia who has actively supported UNESCO's initiatives and all geared towards making Art Education part of the 21st century agenda.

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Chapter 27
Investigating the Usefulness of Blended Learning: A Case of UiTM Negeri Sembilan

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Abstract Blended Learning (BL) has been implemented in many universities to provide various learning experiences to fulfill the needs of the new generation of students who live in the borderless world. Universiti Teknologi MARA (UiTM) also encourages lecturers in applying BL as one of the delivery methods in teaching and learning processes using its official Learning Management System (LMS) called i-Learn which it was launched in December 2005. Although the BL mode offers various advantages to lecturers, negative perceptions on the usefulness of BL may affect its implementation. Hence, this paper investigated the lecturer's perception on the usefulness of BL. An online questionnaire was distributed to the lecturers of UiTM Negeri Sembilan from various faculties via their staff email. 84 lecturers responded to the questionnaire, and the data then were analyzed using descriptive data analysis. Based on the findings from the analyzed data, the results indicated that the lecturers agreed BL gave benefits such as flexibility, reducing the problem of insufficient classrooms and lecturers, and providing a platform for ideas, experiences, and teaching materials among lecturers and students. However, the results also showed that BL did not reduce lecturers' time in preparing teaching materials.

Keywords Blended learning · LMS · Perception · Usefulness

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27.1 Introduction

Traditional learning environment or called as face to face learning is being practiced since the early education generation until now. Through technology development, it has changed the technique of teaching and learning processes. One of the teaching methods introduced is online learning or e-Learning with the presence of web-based learning system. e-Learning refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance (Jethro et al. 2012). e-Learning is also called web-based learning, online learning, distributed learning, computer-assisted instruction, or Internet-based learning. It has been used effectively in university for enhancing the traditional forms of teaching and learning (Joi et al. 2011).

According to Ssekakubo et al. (2011), LMS is a collection of e-Learning tools available through a shared administrative interface. It can be thought of as the platform in which online courses or online components of courses were assembled and used from. Blended learning (BL) is a fairly new term in education but the idea is familiar to almost academicians. BL is one of the delivery methods in teaching and learning in UiTM. BL is a phrase introduced by the distance learning community in recognizing the value of synchronous learning activities, like face-to-face interactions with instructors and collaborative work with peers, as complements to activities performed asynchronously by individual students (Howard et al. 2006).

Universiti Teknologi MARA (UiTM) Malaysia launched Learning Management System (LMS) or known as i-Learn portal in December 2005 as their web-based learning system. i-Learn Center (i-LeC), UiTM introduced BL concept to students and lecturers in 2009. The face-to-face lecture has been integrated or blended with the online session as part of afford to overcome the issues of space constraints. At the beginning, selected courses were given the permission to officially used the BL mode. Thereafter, i-LeC has opened registration for lecturers to select the BL mode began in 2013. Today, BL mode has been synonymous among lecturers and students. However, there are still many issues that need to be studied and solved.

Previous studies stated that BL have many advantages, such as flexibility (time and place), wider facilitating of searching information and needs oriented learning (Lim et al. 2014). However, some limitations of BL have also been identified such as lack of peer contact and interaction, failed to define the content quality and high cost to initiate in preparing the content of learning materials and to maintain and update (Hamburg et al. 2003).

27.2 Literature Review

There are several definitions of BL that have almost similar meaning or understanding. According to Brew (2008), BL is an integration of the online and face-to-face formats to create a more effective learning experience. Furthermore, BL

is a flexible approach that combines face-to-face learning activities with online learning practices that allow students to exchange collective and individual feedback and responses in four specific area, namely, student feedback, student strategies and alternative assessment synchronously or asynchronously (Cavanagh 2011; Draffan and Raingerb 2013). Besides, Gikandi et al. (2011) stated that BL emphasizes on optimizing the attainment of learning goals by using the suitable learning technologies that fit with the learning styles to transfer the right skills to the right person at the right time.

There are several of precise definitions of BL given by the previous researchers as follow:

i. BL is learning outside the traditional classroom using information technology for the delivery of the learning materials.
ii. Combination of two kinds of learning environment, physical classroom learning and online learning to enhance the learning outcomes (Kudrik et al. 2009).
iii. Combination of multiple delivery media designed to complement each other and promote learning and application learned behaviour (Singh 2003).

Both face to face and online methods have their advantages. There are several reasons why BL has been chosen: (1) improved pedagogy, (2) increased access or flexibility, and (3) increased cost-effectiveness (Azizan 2010; Poon 2012). Lim et al. (2014) indicate that mixing teaching and learning methods will be the most efficient way to help student learning since all the essential learning activities such as discussion, interaction, adaptation and reflection can be conducted. However, the benefits of BL are related to the degree of students' expectations, satisfaction, opinions or views on courses that are important in evaluating the effectiveness of the learning processes (Yilmaz-Soylu 2008). Furthermore, when students perceive their experience as enjoyable, satisfying, and personally fulfilling, they tend to interact more, which results in enhanced learning (Esani 2010; Karimi et al. 2013).

BL is an original concept of learning approach from self-paced, instructor-led, distance and classroom delivery in achieving the flexible, efficient and cost effective learning. The benefits offered to the instructor and students in terms of the teaching and learning activities are (Azizan 2010):

i. Enhancessocial interaction, communication and collaboration.
ii. Offers flexibility and efficiency.
iii. Extends the reach and mobility.
iv. Optimizes development cost and time.

Heba (2012) stated that a blended course can lie anywhere between the continuum anchored at the opposite ends by fully face-to-face and fully online learning environments. The face-to-face component can be either on the main university campus or the professor can travel to a remote site in order to meet students (McCarthy and Murphy 2010). For example, blended courses at the University of Central Florida replaced face-to-face class time with online learning so that a three-hour course occupied only one hour of actual face-to-face classroom time.

Such courses allowed the weekly operation of multiple classes in a classroom previously occupied by only one course, thus making more efficient use of existing university infrastructure. (Morgan 2002; Dziuban and Moskal 2011).

27.3 Methodology

The purpose of this study was to investigate the lecturers' perception towards the usefulness of the BL approach. This quantitative study involved lecturers from several faculties in Universiti Teknologi MARA Negeri Sembilan. An online questionnaire was distributed to all lecturers via their staff email and 84 lecturers responded to the survey.

The questionnaire was designed into 10 sections. Section A consisted of questionnaire items that contain the demographic profile of the lecturers. Section B was on the computer and Internet facilities. Section C was on the how i-Learn portal is accessed. Section D was on the BL registration. Section E was on the BL training. Section F was on the perception on usefulness of BL to lecturers. Section G was on the lecturers' workload. Section H was on the i-Learn support. Section I was on the applications on i-Learn. Lastly, section J for the recommendations.

The measurement were structured using 4 likert scales: 4 is for strongly agree, 3 is for agree, 2 for disagree and 1 for strongly disagree. Respondents were also allowed to give their views and recommendations in the open-ended questions. The data obtained from the questionnaire were analyzed using Statistical Package for Social Sciences (SPSS) version 22. Statistical analysis used is descriptive statistics such as percentage and mean analysis.

27.4 Analysis and Results

Table 27.1 represents the descriptive statistics of the lecturers' demographic information. This study indicates that 20 (23.81 %) male and 64 (76.19 %) female lecturers completed the questionnaire. Most of the respondents were identified as lecturers from the FSG (29, 34.52 %) and the fewest from FSR (3, 3.57 %). 30 respondents (35.71 %) were lecturers who had 2 to 5 years teaching experience.

82.14 % of the lecturers claimed that they had Internet at home, 78.57 % of them revealed that the university provided them a personal computer, and 94.05 % of them stated that the university provided a computer laboratory. These results show that the lecturers could easily access the Internet that could help them in implementing the BL approach.

Table 27.2 shows the computer and Internet facilities. The findings indicate that 96.4 % of the lecturers agreed that they frequently accessed the Internet at the workplace (mean = 3.23) since their computer was always connected to the Internet (mean = 2.86). The results also reveal that majority of the lecturers agreed that the

Table 27.1 Descriptive statistics of lecturers' demographic

Variable	Category	N	%
Gender	Male	20	23.81
	Female	64	76.19
Faculty	FSKM	25	29.57
	FSR	3	3.57
	FSG	29	34.52
	FBM	4	4.76
	Other	23	27.38
Years of teaching	Less than 2 years	12	14.29
	2–5 years	30	35.71
	5–10 years	24	28.57
	More than 10 years	18	21.43
Have internet access at home	Yes	69	82.14
	No	15	17.86
University provide a personal computer or laptop for lecturers	Yes	66	78.57
	No	18	21.43
University provide computer laboratories	Yes	79	94.05
	No	5	5.95

Table 27.2 Computer and internet facilities

Item	Percentage (%)				Mean
	Strongly disagree	Disagree	Agree	Strongly agree	
1. The quality of the hardware is sufficient	1.2	17.9	78.6	2.4	2.82
2. The types of software provided are sufficient	1.2	20.2	75.0	3.6	2.81
3. The computer/laptop is always connected to the internet	1.2	20.2	70.2	8.3	2.86
4. The quality of the internet connection at my workplace is sufficient	9.5	36.9	52.4	1.2	2.45
5. I frequently access the internet at my workplace	0.0	3.6	70.2	26.2	**3.23**
6. I frequently access the internet at home	6.0	27.4	46.4	20.2	2.81

quality of hardware (81 %, mean = 2.82) and types of software (78.6 %, mean = 2.81) provided were sufficient. Furthermore, they claimed that they frequently accessed the Internet at home (mean = 2.81) and the quality of the Internet connection at the workplace was sufficient (mean = 2.45). It shows that the university has provided good facilities and equipment to support the BL approach.

Table 27.3 Blended learning registration

Item	Percentage (%)				Mean
	Strongly disagree	Disagree	Agree	Strongly agree	
1. I do not register any courses that I teach in the BL mode	23.8	36.9	32.1	7.1	2.23
2. I register some courses that I teach in the BL mode	10.7	38.1	40.5	10.7	**2.51**
3. I register all courses that I teach in the BL mode	15.5	50.0	17.9	16.7	2.36

Table 27.3 indicates the registration of BL courses among UiTM Negeri Sembilan lecturers. Only 51.2 % of the lecturers registered their courses in the BL mode and 48.8 % of them did not register their courses in the BL mode. The difference is slightly small resulting in the total of mean 2.51 only. This is because once a course is registered, the lecturer who teaches the course is officially considered using BL mode. Even though the lecturers could use the BL approach in any courses, they are not enforced to register the course in the BL mode. This is because only courses that have been gazetted as BL courses are compulsory to be registered. However, other courses that use BL as the additional method in supporting the teaching and learning process still can be considered as active BL courses.

Table 27.4 shows that 90.5 % of the lecturers have attended BL training provided by i-Learn (mean = 3.15). Furthermore, the trainings provided by i-LeC were sufficient for the lecturers in their preparation of using BL in their teaching (mean = 3.04). The type of training provided are the hands on practice using the LMS, online pedagogy, applying web 2.0 tools and some other software that can be used to support BL.

Table 27.5 shows the perception on usefulness of BL to lecturers. It shows that 92.8 % of the lecturers (mean = 3.15) agreed that BL provided flexibility to lecturers in conducting their courses from anywhere and at any time. 92.9 % of the lecturers (mean = 3.08) agreed that BL supported the sharing of teaching materials among lecturers, and 92.9 % of the lecturers (mean = 3.07) agreed that BL supported the sharing of ideas amongst lecturers. The lecturer can refer to other lecturers' style of online teaching by looking at the materials uploaded and how they use the LMS. Currently, many e-contents are developed under the university project to produce the standard learning materials that follow the syllabus content. The teaching materials can be shared amongst lecturers even though they are from different branches.

Other findings indicate that 83.4 % of the lecturers (mean = 3.01) agreed that BL offered great potential in solving the problem of insufficient classrooms. This problem has been solved because some of the lectures or tutorial sessions can be done virtually using LMS. For example, the discussion of face-to-face tutorial session can be done by using a forum in the LMS. Lecturers can also upload a case

Table 27.4 Blended learning training

Item	Percentage (%)				Mean
	Strongly disagree	Disagree	Agree	Strongly agree	
1. I have attended BL trainings provided by i-Learn	2.4	7.1	63.1	27.4	**3.15**
2. BL trainings provided by i-LeC are sufficient to prepare me in using BL in my teaching	2.4	11.9	65.5	20.2	**3.04**
3. BL trainings are conducted at suitable time	2.4	17.9	66.7	13.1	2.90

Table 27.5 Perception on usefulness of blended learning to lecturers

Item	Percentage (%)				Mean
	Strongly disagree	Disagree	Agree	Strongly agree	
1. BL provides flexibility to lecturers in conducting their courses from anywhere and at any time	0	7.1	70.2	22.6	**3.15**
2. BL offers great potential in solving the problem of insufficient lecturers	3.6	21.4	65.5	9.5	2.81
3. BL offers great potential in solving the problem of insufficient classrooms	0.0	16.7	65.5	17.9	**3.01**
4. BL supports the sharing of ideas amongst lecturers	1.2	6.0	77.4	15.5	**3.07**
5. BL supports the sharing of experience among lecturers	2.4	8.3	78.6	10.7	2.98
6. BL supports the sharing of teaching materials amongst lecturers	1.2	6.0	76.2	16.7	**3.08**
7. BL helps lecturers to teach better	2.4	13.1	64.3	20.2	**3.02**

study or any materials to initiate students' discussions. Thus, the tutorial session does not require a physical class. Furthermore, students from many groups can participate in the forum conducted by a lecturer. Hence, the lecturer can manage many students just in one forum. Furthermore, 84.5 % of the lecturers (mean = 3.02) agreed that BL helped lecturers to teach better.

Table 27.6 indicates that majority of the lecturers believed that BL supported cooperative learning amongst students (83.3 %, mean = 2.93), BL supported the sharing of ideas (82.1 %, mean = 2.94) and experience (79.7 %, mean = 2.90) amongst students. Forum is one the i-Learn features (Nurmaisara et al. 2012) that permits discussions to be carried out virtually. The lecturer has to set up the class

Table 27.6 Lecturers' view on how BL can help students in learning

Item	Percentage (%)				Mean
	Strongly disagree	Disagree	Agree	Strongly agree	
1. BL supports cooperative learning amongst students	1.2	15.5	72.6	10.7	2.93
2. BL supports the sharing of ideas amongst students	0.0	17.9	70.2	11.9	2.94
3. BL supports the sharing of experience amongst students	0.0	20.2	69.0	10.7	2.90
4. BL increases interaction amongst students	1.2	19.0	70.2	9.5	2.88
5. BL helps students to learn better	2.4	11.9	67.9	17.9	**3.01**

forum first on i-Learn so that students can interact virtually with their classmates, and the lecturer usually acts a moderator. Students can exchange ideas and share information by typing in the forum entries or attaching files. They can participate in forums conveniently without meeting their classmates physically and it can be done at anytime and from anywhere which provide flexibility in learning outside the classroom. Compared to traditional discussions in the classroom, online discussions allow students to participate equally that enable them to explore course topics and provide them additional communication time to interact amongst them (Weed et al. 2014). A study conducted by Noriah et al. (2013) proved that structured online discussion activities enabled students to learn academic writing autonomously that enhanced their ability and interest in academic writing.

Another finding shows that 85.8 % of the lecturers believed that BL helped students to learn better. According to Al Zumor et al. (2013), BL can enhance students' confidence in learning as students can express themselves in online forums, use learning material repeatedly, and make mistakes in the personalized learning environment. BL actually extends the learning time outside the classroom that supports, complements and enriches face-to-face instruction (Adora et al. 2012).

Results on lecturers' workload towards the implementation of the BL that are tabulated in Table 27.7. 59.1 % of the lecturers (mean = 2.77) agreed that BL reduced the hours spent to marks student assessment and 57.1 % of the lecturers (mean = 2.57) felt that BL reduced their teaching hours. However, the result shows that only 32.1 % of the lecturers (mean = 2.27) agreed that BL reduced time for lecturers to prepare teaching materials. This probably because most of the lecturers are still new to the implementation of BL. They need to prepare the interactive and interesting e-content as well as other online teaching materials that require knowledge and skills in certain software to support BL activities.

As shown in Fig. 27.1, it is confirmed that the BL mode is very useful. This is because 69 (82.14 %) lecturers preferred the current BL approach with the

Table 27.7 Lecturers' workload

Item	Percentage (%)				Mean
	Strongly disagree	Disagree	Agree	Strongly agree	
1. BL reduces teaching hours	7.1	35.7	50.0	7.1	**2.57**
2. BL reduces time for lecturer to prepare teaching materials	13.1	54.8	23.8	8.3	2.27
3. BL reduces the hours spent to marks student assessment	4.8	26.2	56.0	13.1	**2.77**

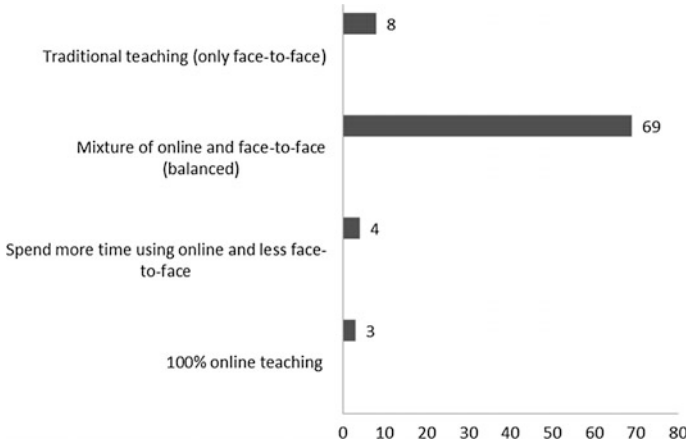

Fig. 27.1 Lecturers' recommendation for teaching and learning approach

integration of online learning and face-to-face lecture time (balanced) while 8 (9.5 %) preferred face-to-face lecture. 4 (4.76 %) lecturers preferred to spend more time in using online and had less face-to-face sessions, and only 3 (3.57 %) preferred 100 % online for the learning and teaching process. It shows that BL approach is relevant and useful to the current teaching and learning process.

27.5 Recommendation

The result of this study have a number of implications for lecturers and the university particularly related to implementing the useful BL approach. The university needs to improve the quality of the internet connection and the computer equipment in order to support the BL mode. The motivation of the lecturers will increase if all the facilities required are sufficient to support them in implementing BL. Lecturers also need to be well trained on how to conduct BL. Online learning could not just be limited to uploading notes and assignments, but it could be more than that.

Lecturers need to be creative in producing interesting and challenging BL activities to ensure students are interested to participate in online activities. This will increase the student engagement in the BL.

Another drawback found from the survey that the existing LMS is not good enough to support BL for certain courses that require special characters and notation such as Mathematics and Programming. Online assessments are also crucial to the implementation of BL. Therefore, the features need to be improved to provide various types of questions that can be used for all courses. Currently, the i-Learn portal version 3.0 has been developed and ready to be used but still in the beta mode. It is hoped that all the drawbacks identified in the existing LMS (i-Learn portal version 2.2) will be solved and improved.

In addition, every course has different styles of teaching methods that depend on the content to be delivered. It is good to implement BL, but there are many more things that should be considered other than facilities and readiness of lecturers. Such things include students' perception, students' result/output in comparison with traditional teaching, time spent for traditional method compared with BL mode for one topic taught, the relationship between student-lecturer; the face-to-face—'humanly' relationship, which topics or courses that are better or worse to be taught online and many more.

27.6 Conclusion

BL has the proven potential to enhance meaningful teaching and learning experiences based on its usefulness such as flexibility, reducing the problem of insufficient classrooms and lecturers, and providing a platform for ideas, experiences, and teaching materials among lecturers and students. Even though lecturers feel that BL did not reduced lecturers' time in preparing teaching materials, they still recommended the BL mode to be implemented in the teaching and learning process.

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Chapter 28
Mobile Learning, Effective Integration of New Technologies into Existing Models

Rajani Balakrishnan, Dahlila Putri Binti Dahnil and Mohammed Awadh Ahmed Ben Mubarak

Abstract Mobile learning is seen as another leap in education system as it complements the traditional classroom teaching due to the advancement in mobile technology. Despite this advancement, the elements that will define the acceptance of mobile technology in education have yet to be explored. This paper emphasizes on mobile technology as a key component in the acceptance of mobile learning. In the existing acceptance model, the user perception is taken as the most important factor for the real use of the system. Whereas in Information System model, the factor that drives users satisfaction is based on quality of service and information. However in mobile learning the strong successful factor must integrate mobile technology as one component in the model. This paper proposes mobile learning technology model that includes mobile technology as an important components besides user acceptance and information success model to ensure successful implementation of m-learning in higher learning institutions (HLI). The results showed that there are three main elements which constitute m-learning environment namely academicians, students and mobile technology. Mobile technology, infrastructure and technical system quality have been added in the technology acceptance model and information system success model.

Keywords Mobile learning · E-learning · Mobile technology · Mobile devices

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28.1 Introduction

Traditional way of learning process involves students and lecturers to be confined in the same room with the teaching materials. However the current advancement of technology have taken over every area of global education. It has become one of the most important topics for discussion and to be researched among academicians and scholars in education and training field. Technology have a high impact on teaching and learning and it plays an important role in distance learning (d-learning). Distance learning is defined as the learning process which takes place outside the classroom environment in a non-traditional way. The teachers and students who are geographically separated are connected via technology (Johari and Ismail 2011). The course materials usually in the form of documents are delivered to students through postal delivery (North 2014).

Technologies are becoming very important for the delivery of content as distance education is growing rapidly worldwide. D-learning evolved into electronic learning (e-learning) as the e-revolution took place. It makes the learning process much easier, flexible and feasible for universities to cater to students. Delivery of the teaching material are sent via internet, in which the student's access the information from desktop or laptop computers. E-learning includes more than the communication devices related to internet, it is based on a learning management system (LMS) such as Moodle (Hadjiathanasiou 2009). E-learning is any educational program which is delivered to the students with the use of information and communications technology (ICT) (Koch 2014). According to researcher (Cook et al. 2008), one of the advantages by using e-learning lies in its asynchronous and decentralized nature, because this offers flexibility in learning regardless of time and location. It allows the students to learn at their convenient time and place, therefore it increases students motivation and independence. E-learning plays a significant role in HLI. Universities adopt e-learning in various areas of study to enhance the existing teaching and learning process as it is well established and widely accepted. (Kim et al. 2006).

Researchers (Viberg and Gronlung 2013) and Kukulska-Hume (2007) indicated m-learning requires additional further studies on the factors driving its adoption in Higher learning institutions as it is still in the early stages of implementation globally. There are previous studies which have used information technology theories such as the Technology Acceptance Model (TAM) in their research. Wang et al. (2009) stated with the unique abilities and characteristics of m-learning that may have not be fully addressed by the traditional TAM models. Consequently additional research is necessary on the technology acceptance model (TAM) to explore m-learning users' behavioural patterns. There are several studies been done to address the issues such as, the drivers of m-learning adoption to examine the user acceptance and intentions to adopt m-learning to reap educational benefits which it provides (e.g., Nassuora 2012; Cheon et al. 2012; Viberg and Gronlung 2013). This paper describes the conceptual model, which shows the elements constitute the

m-learning. Then a mobile learning technology model is proposed which integrate mobile technology with user acceptance and Information Success (IS) success model.

28.2 Mobile Learning

Mobile Learning (m-learning) appears to be a non-traditional way of teaching and learning which uses latest information technology in the learning process. It is part of e-learning and therefore part of the d-learning, Georgieva et al. (2004) as seen in Fig. 28.1.

M-learning uses wireless technology as a tool for supplementing learning. Researchers have defined m-learning in various ways. Hashemi and Ghasemi (2011) stated that m-learning could be used to enhance, as a provision to extend the teaching and learning process. Traxler (2007) summarized m-learning as mobility of learning which occurs while travelling, driving, walking or sitting; it means hands-free learning or eye-free learning. Cheon et al. (2012), have defined m-learning as a learning model using mobile technology utilizing the unique capabilities of mobile devices. It supports unremitting learning through mobile digital tools and environments. It also offers an extensive variety of learning activities that support the learning process by means of motivation, control, ownership, fun and communication (Jones et al. 2006).

Innovation in wireless technology have high impact on education since smart phones, wireless technology and communication is used in m-learning. It allows students to access the learning materials at anyplace, anytime using mobile technologies and internet (Ktoridou et al. 2007). The mobile devices and wireless technologies have enabled students and academicians to utilize mobile devices in HLI as an enhanced tool (Mostakhdemin-Hosseini 2009).

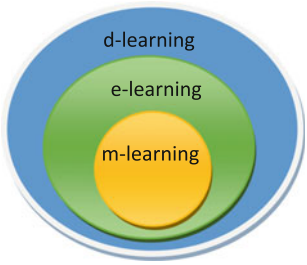

Fig. 28.1 M-learning, e-learning and d-learning

28.2.1 Mobile Learning in Higher Learning Institution (HLI)

Mobile learning is explained as "the use of mobile devices that can link to the Internet for educational perspectives" (Kinash et al. 2012). Students in HLI are mostly equipped with mobile devices and may be ready to adopt m-learning system (Cheon et al. 2012). In one of the research conducted by researchers Clarke et al. (2008), 84 % of learners found the usefulness of SMS in teaching and learning. Hlodan (2010) stated that mobile devices engage the learners more in learning activities and their attitudes towards the usefulness of m-learning improved (Cavus and Uzunboylu 2009). Technology has converted the way of teaching and learning in HLI. It may progress, expand, and modify the existing method the academicians currently adopt to teach. The usage of mobile devices for learning inside the classroom environment is efficient for students and teachers (Ooms et al. 2008). Using technology such as audio, video, multimedia, Computer-based Learning (CBL), Learning Management System (LMS), Mobile Phones and PDAs may alter tutoring from a normal situation of instructor transfer of information to impassive students into one of inspired students working with the tutor to progress knowledge and information on their own (Chuntao 2010). Kulkulsa-Hulme (2005) has identified three main reasons for HLI to embrace m-learning: (a) to improve access to learners; (b) to improve access to learning through additional potential for teaching and learning and (c) alignment with institutional policies. However, according to Park (2011) m-learning is still in the early stages of development in HLI. It is also identified that mobile devices are only not for m-learning but also for administrative activicties such as taking attendance and monitoring students learning progress which is done in Washington and Stanford Universitites (Keller 2011).

28.2.2 Mobile Devices

Transmission and exchange of data takes place with portable mobile devices. M-learning is being supported by a wider range of mobile devices. All of the tools has diverse abilities, purposes and the significant is the capability of the apparatus to upkeep wireless applications (Rahman 2011). The characteristics of mobile devices are three fold, portability, e-devices (easy to be taken around), (b) instant connectivity: can access information anytime and anywhere, and (c) context sensitivity: it can be used to gather data (Churchill and Churchill 2008). Mobile devices are useful to carry out education substance and tutoring and it may likewise work as audio players, media-players and digital cameras. Application Protocol (WAP) and Wireless Fidelity (Wi-Fi) capabilities are equipped as an advanced technology in mobile devices so that the user may link to internet via his/her PDA (Trinder 2005). There are many mobile devices that support m-learning some of them are listed and defined in Table 28.1.

Table 28.1 List of mobile devices used in m-learning

Device	Definition
PDA (personal data assistants)	PDA works as an individual digital secondary device which is generally small in size and able to play wide range of multimedia files
Cellular phone	It permits operators to converse with one another at anyplace and at any time. Access to the internet via WAP or GPRS technology may also be done through cellular phones
Smart phone	This device integrate mobile phone capabilities with the more common features of a handheld computer or PDA. It is furnished with internet usage and the capability to support multimedia files
3G phone	3rd generation of mobile phone that has the capability to transmit four times better than the normal cellular phones
4G phone	4G is the original and enhanced version of 3G. Internet speeds are five times faster, and the internet linking are and solid
Tablet Pc	Tablet Pc is the utmost common computer of our time which is a transportable personal computer classically smaller than a notepad
Notebooks	Notebook computers normally thinner design and weigh less than the laptop
Netbook	Is a device that may perform the most of the purposes of a desktop or laptop, It looks like tiny laptops, with screens infrequently beyond 10 or 12 inches
Laptop	The laptop is small and light sufficient to be used sitting in your lap
MP3 player	Is a digital audio player which plays music and audio files
iPod	A transportable media player that allows an operator to download materials such as: audio books, music, podcasts, and other video

28.2.3 The Proposed Conceptual Model

In the following section the conceptual model is proposed which shows the elements which constitute the m-learning environment in HLI. The diagram below shows the integration between the three elements, academicians, students and mobile technology. Both the Academicians and students are very important as they are the users for the system in HLI. The users need to be basic ICT literate. In order for them to use the m-learning they need to be digitally literate. As m-learning is a subset of e-learning, all the factors influence the acceptance of e-learning is replicated in m-learning. According to researchers Hamat et al. (2012), they identified that e-learning and mobile learning are from the same foundations; therefore, e-learning acceptance factors can be reproduced to mobile learning design.

The factors which influence the acceptance of e-learning are:-

- Human aspect:- Student and Academicians
- System/Application
- Infrastructures
- Organization
- Quality of Service

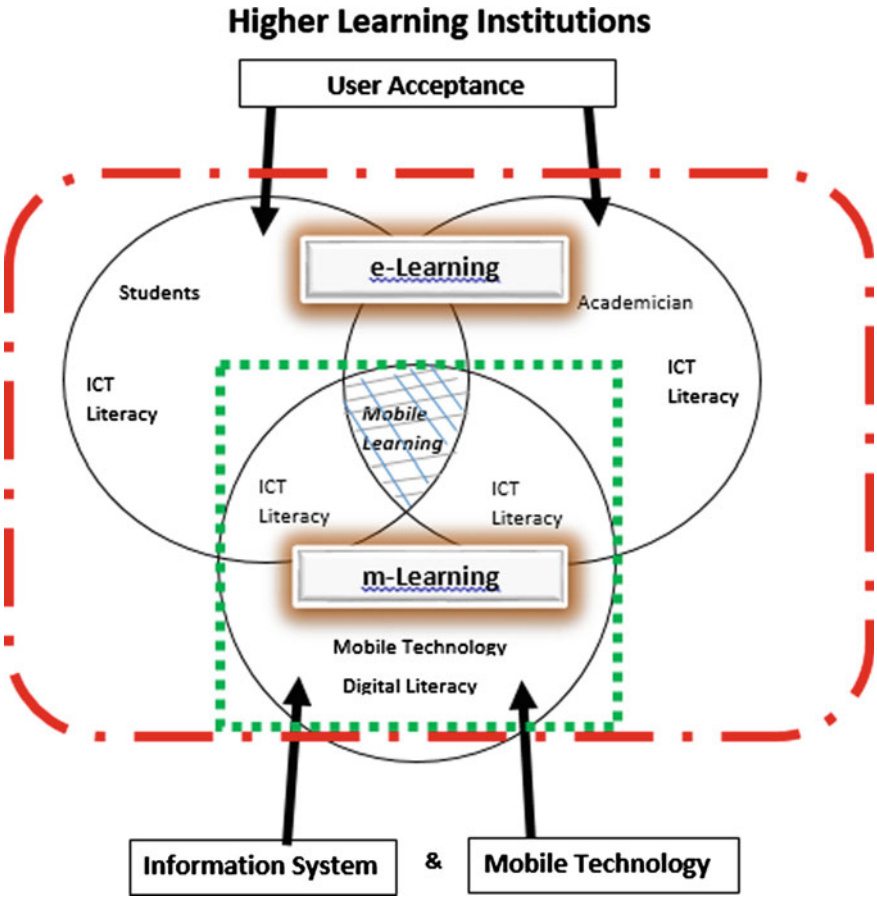

Fig. 28.2 Conceptual model that shows the elements in Mobile learning

- Program or faculty
- Technology
- Demographic factor

In Fig. 28.2, the intersection among academicians, students and mobile technology is the m-learning system. The users of the system are: academicians and students. They must be digitally literate to gain maximum benefit from the m-learning system used in HLI.

Academicians plays the utmost significant part in shaping the accomplishment or disaster of the systems. If they choose to carry out all or portion of their teaching actions via learning system, students have no option but to practice the system (Trinder 2005). The thinking, arrangement, and decision making of a faculty associate makes up a chief portion of the perspective of teaching. A teacher's

behavior, comprising of planning and technology-use choices, is considerably subjective to their thought and teaching procedure (Wang and Wang 2009).

Students treats smartphones as a fashionable gadgets for their social activities regardless of education (Economides and Grousppoulou 2009). According to Rocca (2009), these students from age group from 13 to 17 years old are categorized as idealistic students born in the 1990s. That was the time when technology was booming. McAlister (2009), agrees that these students are contented and assertive in dealing with computers and are contented with the variety media used in their learning.

Information and Communication Technology (ICT) Literacy or knowledge is the degree of a person's capability to utilize digital technology, communication tools, and/or systems to admit, achieve and assimilate digital resources (Markauskaite 2007). Consequently the degree of a person's fluency with technology emphases on their comparative proficiency using a range of technologies (Madigan et al. 2007). Basic ICT literacy are the simple calculating tasks, such as using word processing software, examining and emailing on the internet and carrying out simple mobile activities, such as texting and calling. Advanced ICT literacy is where the users have the advance capabilities, such as altering pictures and sounds and using progressive software.

Digital literacy is the ability of a student to understand, analyze, evaluate, organize and assess information or facts using digital technologies. Being digitally literate means knowing about various technologies and understand how to use them effectively, as well as having an awareness of their impact on individuals and societies. It also allows individuals to communicate with others, work more effectively, and increase one's productivity, particularly with those who have the same skills and proficiency levels (Ng 2012).

28.2.4 The Proposed Mobile Learning Technology Model

This section describes the proposed mobile learning technology model. This model is an integration between Technology Acceptance Model (TAM) which is developed by Davis (1989), and Information success (IS) model developed by DeLone and McLean (2003). Although Liu et al. (2010) and Wang and Wang (2009) have studies on the factors influence the HLI students to accept the m-learning, their focus is solely using intention to use as dependent variable. The new proposed model integrates mobile technology as an important component where factors such as infrastructure and technical system quality are being part of mobile technology, which gives satisfaction to users to actually use m-learning in HLI. The model includes educational quality as a motivation for intention to use which also result in user's satisfaction, which was suggested by Hassanzadeh et al. (2012), This model is constructed based on the literature review of the past studies. It has the combination of user acceptance factors and information system success factors.

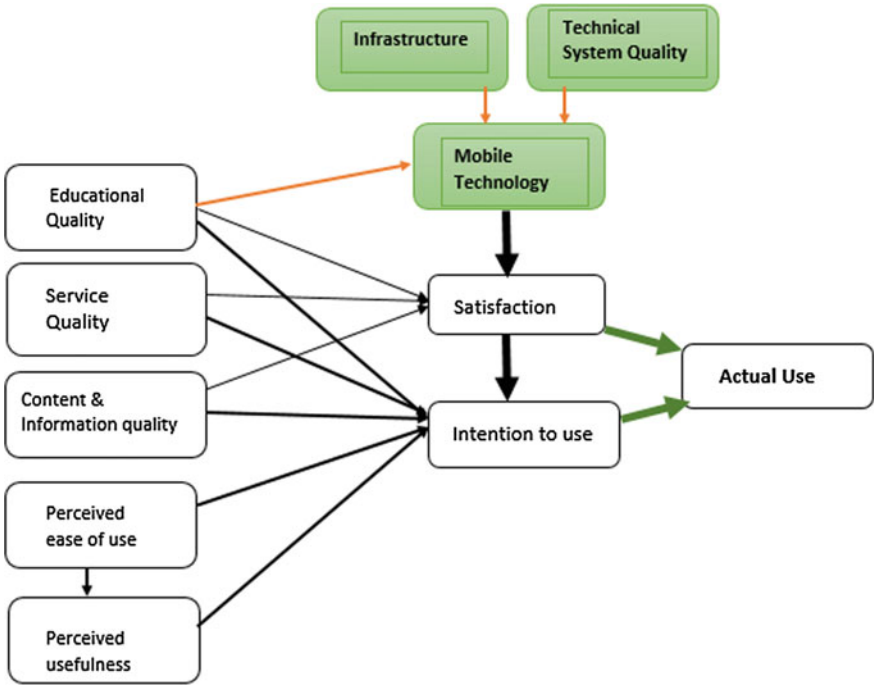

Fig. 28.3 Proposed mobile learning technology model

Mobile phones constitute as a technology that has become part of our everyday usage (Fig. 28.3).

Mobile technology may offer the comprehensive tools and services for retrieving any video and audio constituents that are obtainable on the public province (Madigan et al. 2007). DeLone and McLean (2003), technical system quality refers to technical success and the accuracy and efficiency of the communication system that produces information. Performance of the IS in terms of reliability, convenience, ease of use, functionality, and other system metrics such as; Usability, availability, reliability, adaptability, and response time (e.g., download time) (DeLone and McLean 1992). Organisation superiority has an important effect on use and consumer satisfaction (DeLone and McLean 2003). Currently, the use of latest communication technology and information in learning and teaching environment will be a useful tool to enhance educational methodology. To achieve good learning outcomes the students can choose and utilize the best technology available to them (Abachi and Muhammad 2013). To maximize and effectively use the mobile technologies students must reveal the digital literacy skills such as being able to access, manage and evaluate digital possessions (Drenoyianni et al. 2008).

Researchers Khaddage and Lattemann (2013), pointed out that mobile technologies and applications offer benefits such as portability, simplicity, and availability. Another researcher Hlodan (2010) found in his study, by using smartphone

technologies, it has promoted learning and indicated an improvement in student's performance. Cavus and Ibrahim (2009), concluded in their studies that students embrace the technology used in m-learning as it brought better flexibility to their learning. Students also found the system is effective and enjoyable. Davenport and Linder (1994), are supposed to be among the initial assistants investigating the role of long-term investment in IT infrastructure services in gaining competitive advantage. The researcher found IT infrastructure facilities to be one of the important component of mobile technology in the model for the success of m-learning systems. According to Soong et al. (2001) their studies confirmed that the critical factors of IT infrastructure services in online courses focused on the software used in implementing the online courses. Another study was conducted by Selim (2007) and Ahmed (2010) they concluded that IT infrastructure was a significant factor affecting acceptance of e-learning system courses by learners. The technologies available for mobile devices are listed and defined in Table 28.2.

Table 28.2 List of mobile technologies used in m-learning

Technologies	Definition
Bluetooth	A short range wireless connection
CAMs	Video cameras currently embedded into mobile phone and PDAs
GPS	The global positioning system is a space based satelite which provides locations and time information
GPRS	An permanently on internet link for mobile devices that offers better swiftness of connection (171 kb/s)
GSM	Global system for mobile. It is a mobile communication technology developed basely on GSM 2 g technology which means global system for mobile communication
MP3s	Audio file arrangement that proficiently compresses files and permits them to be shared
MMS	Multimedia messaging service assists the same objective as SMS but permits the presence of graphics
SMS	Short Message Service permits operators to send/receive messages
WAP	Wireless application protocol (WAP) is a technical average for reading information over a mobile wireless network via their WAP empowered mobile phones
WiMAX	(Worldwide interoperability for microwave access) is a wireless communications standard designed to provide 30–40 megabit-per-second data rates
WiFi	A wireless or WiFi network utilizes a radio incidence signal in its place of wires to link your devices—such as computers, printers and smartphones—to the Internet and each other

28.2.4.1 Technical System Quality

DeLone and McLean (2003), technical system quality refers to technical success and the accuracy and efficiency of the communication system that produces information. Performance of the IS in terms of reliability, convenience, ease of use, functionality, and other system metrics such as; Usability, availability, reliability, adaptability, and response time (e.g., download time). DeLone and McLean (1992). Organisation superiority has an important effect on use and consumer gratification DeLone and McLean (2003) and Holsapple and Lee-Post (2006).

28.2.4.2 Infrastructure

The key aim of expending IT arrangement amenities is to kind a connection between the HLI, students, academicians and administrations of the institution. Davenport and Linder (1994), are supposed to be among the initial assistants investigating the role of long-term investment in IT infrastructure services in gaining competitive advantage. The researcher found IT infrastructure facilities to be one of the important component of mobile technology in the model for the success of m-learning systems. According to Soong et al. (2001) they studies confirmed that the critical factors of IT infrastructure services in online courses focused on the software used in implementing the online courses. Another study was conducted by Selim (2007) and Ahmed (2010) they concluded that IT infrastructure was a significant factor affecting acceptance of e-learning system courses by learners.

28.2.4.3 Education Quality

Researchers Hassanzadeh et al. (2012), has added a new variable Educational quality to the IS success model. This researchers also determined in their studies that educational quality has a constructive effect on user gratification and it is also agreed by Kim et al. (2012). Educational quality, therefore, is supposed to have a positive effect on individuals' satification; however, it is expected to have a positive effect on intention to use as well.

28.2.5 Information System Success Model

The Delone and McLean information systems success model (IS success model) is an information systems (IS) model which pursues to offer a wide-ranging understanding of information system accomplishment by recognizing, describing, and

clarifying the associations among six of the greatest vital magnitudes of accomplishment beside which information systems are usually assessed. Preliminary growth of the concept was carried out by DeLone and McLean (1992). DeLone and McLean's (1992), information system recognizes and defines the associations between six acute proportions of IS accomplishment: information quality, system quality, service quality, system use/usage purposes, user satisfaction, and net structural benefits.

28.2.5.1 Satisfaction

According to DeLone and McLean (2003) user satisfaction is often been associated to information system (IS) success and is considered as one of the most important measures of IS success. It is the feelings and attitudes that a user acquires from all the benefits in information system (IS). This user satisfaction has received extensive attention in the IS literature (Aggelidis and Chatzoglou 2012). In this study, satisfaction is assumed to have positive affect on both intention to use and actual use of m-learning system.

28.2.5.2 Content and Information Quality

Petter and McLean (2009), quoted that content and information quality specifies the needed characteristics of an information systems's result. It focus on the quality of the information generated by the system and its usefulness for the user. Information quality is often seen as a predecessor for user satisfaction (Hassanzadeh et al. 2012) and (Kim et al. 2012). It is also the characteristics of the output offered by the IS, such as exactness, correctness, and fullness (Martin 2008). Researcher, Lin (2007) used D&M IS Model (2003) concentrating on issues that affect popular use of web-based arrangement ('online learning system'). Lin examined how structure superiority, information quality and service quality affect use through user gratification and intent to use. DeLone and McLean (1992) and Lin (2007) also confirmed that information excellence has a substantial influence on use and user satisfaction.

28.2.5.3 Service Quality

Support of employers by the IS division, frequently measured by the reliability, reaction, and understanding of the sustenance organization (DeLone and McLean 1992). Service quality is tremendously significant since due to bad service consumers may be lost (DeLone and McLean 1992).

28.2.6 Technology Acceptance Model

Fred Davis has developed Technology Acceptance Model (TAM) in 1989. It is a theoretical foundation to explain and predict the individual's acceptance, consent and utilize of the information technology (Kim et al. 2006). The model denotes that there are numerous contributing elements that will effect an operator on how they use a different type of technology. Perceived usefulness (PU) and perceived ease of use (PEOU) are theorized to be the important factors of operator receiving. This model is extensively utilized by academicians and practitioners to forecast and clarify operator acceptance of information technologies and is a significant instrument in information technology studies (Yuanquan et al. 2008).

Perceived usefulness (PU) is explained as the amount to which an individual considers that using a specific structure might improve his or her job effectiveness (Davis 1989). According to Liu et al. (2010), perceived usefulness have a significant positive effect on usage intention towards the acceptance of m-learning system

Perceived ease of use (PEOU) is explained as the amount to which an individual trusts that using a specific system may be free from hassle (Davis 1989). The effect of perceived ease of use on intention towards use of m-learning is used by researchers Liu et al. (2010) in their studies.

Intention to use, is the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior (Davis 1989). According to researchers Mac Callum et al. (2014), apparent ease of use and perceived usefulness plays a significant role on the acceptance of mobile learning. These two aspects were shown to have a optimistic consequence on the behavioral intention to use mobile learning, and TAM offers a valued tool for modelling teachers acceptance of mobile learning.

28.3 Conclusion

In this study, the factors influencing users' acceptance of m-learning in HLI were investigated. The conceptual model explained in this paper has three main elements which constitute in the m-learning environment. The elements are academicians, students and mobile technology as explained. A mobile learning technology model is proposed in this study. In this model, mobile technology is incorporated as an important element, which includes infrastructure and technical system quality. Both the elements are important to mobile technology, which is supported by literatures. This model integrates TAM's user acceptance and IS success model quality features which affects users' intentions and satisfaction towards the use of m-learning. The proposed model will be used as a framework for further research.

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Chapter 29
Technology Factors That Drive Students' Knowledge Sharing Ability in Online Discussion Interface: The Conceptual Model

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Abstract Online discussion interface is a tool that is embedded in an e-learning portal. It provides a user interface with functionality of knowledge and content sharing ability. The students are able to discuss tutorial and subject related questions at anytime and anywhere. Efforts have already been taken by higher educational institutions to encourage student participation for knowledge sharing in the online discussion interface. But still the students were unable to participate fully in the online discussion interface. Students were more likely to have learning-related discussions in social networking sites. But the sharing of knowledge among students in social networking sites are difficult to be tracked by educators for monitoring purposes. Therefore, the online discussion interface should be designed to attract students to use it for knowledge sharing. Many studies previously has focused on the evaluation of the overall e-learning system interface, but only few studies are related to the online discussion interface. The online discussion interface most of the time are assessed together with e-learning system interface and is less specific towards evaluation related to online discussion interface for educational purposes. Recent years studies are focused towards understanding the knowledge sharing behavior. It was identified that there are three factors that affect knowledge sharing behavior. These consist of personal, social, technology and organizational factors. Many existing studies focused more towards personal and social enablers for knowledge sharing.

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But accessing technology factors have become very important, owing to the limited study on technology enablers for knowledge sharing in online discussion interface. Thus this paper proposes a conceptual model for measuring students' knowledge sharing ability in online discussion interface. Four main technology enablers that drives students' knowledge sharing ability in online discussion interface were identified through literature. There are the usability, sociability, visual aesthetics, and social motivation of the online discussion interface.

Keywords Conceptual model · Interface · Knowledge sharing · Online discussion

29.1 Introduction

Knowledge sharing refers to a process in which knowledge is given by one party and received by another (Sharratt and Usoro 2003). In traditional learning method, knowledge sharing is limited to face-to-face discussion in classroom. But with the advancement of technology now sharing of knowledge can take place regardless of time and place in an online learning environment. This online learning environment contains a number of features that enable learning and communication. Among them are the learning modules, communications, test, assignments submission and so on. Although there are many modules, the use of online discussion interface for communication reported the highest usage in online learning environment (Moore et al. 2011). The online discussion interface is used as a communication medium in online learning envinroment by both students and educators for the purpose of sharing knowledge (Kearsley 2000). This interface provides a medium for the students to continue their classroom discussions online. Besides that, the online discussion interface can provide a platform for the students to share and gain knowledge (Ardichvili 2008), interact (Whittaker et al. 2003), increase discussion and cooperation among other students (Stodel et al. 2006), prepare for cognitive learning and better exploration (Haggerty et al. 2001) and improve critical thinking skills (Collison et al. 2000).

Some higher education institutions in Malaysia are now using online discussion interface for tutorial discussions. Efforts have been taken by higher education institutions to encourage students to share their knowledge in online discussion interface, but the students participation is still not very encouraging. It was identified that the current online discussion interface design need to be further improved to increase the students intention to use it (Jaafar and Ramakrisnan 2015). Therefore it is important to review the interface design for online discussion related to education (Harman and Koohang 2005) because use of online discussion interface has great potential to enhance the learning experience and learning outcomes (Khoo 2010). But there are some issues identified in online discussion interface. Among them are the quality of the online discussion is more of a statement than a

discussion, conversation is limited to the use of text, unable to identify emotions in discussion and face-to-face interaction was not able to be performed (Shin and Lee 2014; Stodel et al. 2006). Many of studies related to online discussion was previously associated with collaborative learning (Dixon et al. 2008); improving student learning in the classroom (Luppicini 2007); student involvement in the construction of knowledge (Lucas and Moreira 2010; Roschelle et al. 2000); fostering critical thinking (Borsoto 2004; Thomas 2002); increasing student interaction (Carswell et al. 2002); collaboration (Lucas and Moreira 2010; Murphy 2004; Sethi and Gil 2011; Zilouchian Moghaddam et al. 2011); quality of messages in discussion (Kay 2006; Weinberger et al. 2007) and study of user experiences (Raitman et al. 2005; Sullivan et al. 2011). Many of previous studies focused on identifying how and what drives online sharing knowledge (Analoui et al. 2014; Bishop 2007; Bock et al. 2005; Chen et al. 2012; Cheung and Lee 2007). It was found that there were less researches on the interface to enable the sharing of knowledge among students.

Generally all of the studies conducted to investigate the behavior of online knowledge sharing have been inspected by four main factors; personal (Chang and Chuang 2011; Chiu et al. 2006; Jadin et al. 2013; Wasko and Faraj 2005), social (Amayah 2013; Hau et al. 2013; Lai and Hsieh 2013), technology (Huysman and Wulf 2005; Hwang et al. 2011; Lu et al. 2011; Ma and Agarwal 2007; Phang et al. 2009) and organizational (Chen and Hew 2015). Although there are four factors in the study of online knowledge sharing, this study focueses on the importance of technology to support online knowledge sharing. In fact, several studies investigating the technology support in knowledge sharing focuses on experimental studies (Begoña and Carmen 2011; Eppler 2006; Huysman and Wulf 2005) or on usability and sociability factors only in empirical studies (Lu et al. 2011; Phang et al. 2009). But other factors such as social motivation (Hau et al. 2013; Liao et al. 2013; Pi et al. 2013) and visual esthetics (Sánchez-Franco et al. 2013) of online interface affects student behavior. Therefore, this study will look at the influence of social motivation and visual aesthetics of online discussion interface on students' knowledge sharing behavior. The main goal of the online discussion interface is to enable students to share their knowledge for the purpose of learning. Therefore the design of the interface should enable students to share knowledge with minimum effort to interact with the interface (Ardito et al. 2006). Thus this study will propose a conceptual model to evaluate students knowledge sharing ability in online discussion interface.

29.2 Conceptual Model for Knowledge Sharing in Online Discussion Interface

Interface for knowledge sharing is concerned with the ability of the students to use interface for knowledge sharing discussions. The challenge is to determine the criteria of online discussion interface that enables the sharing of knowledge among

students'. Various criteria has be taken into account to assess the online discussion interface. Among the evaluation criteria that often been discussed are usability (Ardito et al. 2004, 2006; Costabile et al. 2005; Georgiakakis et al. 2005; Granic et al. 2004; Lin et al. 2011; Miller 2005; Moore et al. 2008; Muhammad et al. 2011), visual aesthetics (Altaboli and Lin 2011; Glore and David 2012; Moshagen and Thielsch 2010; Mõttus et al. 2013; Stenalt and Godsk 2006; Tractinsky 2006; Wu et al. 2011) sociability (Gao et al. 2010; Phang et al. 2009; Preece and Maloney-Krichmar 2003; Preece 2001) and social motivation (Deterding 2011, 2012; Fitz-Walter et al. 2011; Hamari and Koivisto 2013; Hendriks 1999; Hernandez et al. 2011; Reiners et al. 2012; Shi et al. 2014).

The interface design plays an important role in providing an online space for interaction among students. Thus the interface design should be made interesting and to make students feel interested in using it for knowledge sharing. This study shows that the interface design should be given attention to support for knowledge sharing. Issues such as usability, visual aesthetics, sociability and social motivation are the most important factors to be assessed. Earlier studies looked at usability and visual aesthetics as one single factor, but they are accually two different factors and it is important to investigate both the factors seperately to understand users' behavior (Mahlke 2005). Usability traditionally was defined as "people who use the product can do so quickly and easily to accomplish their task" (Dumas and Redish 1999). But the traditional usability evaluation is insufficient for e-learning (Zaharias and Poylymenakou 2009). Thus the user, task and context that taken into account in traditional usability is extended to learning in formal and informal environments (Mehlenbacher et al. 2005). Learning occurs in online discussion interface through the students interaction in an informal environment. In this context, usability is concerned with how intuitive and easy it is for students to learn to use and interact with the online discussion interface. The online discussion interface should be designed in a way in which students can interact easily for knowledge sharing activities.

Apart from usability factor, the visual aesthetics factor plays an important role in the evaluation of interface and relatively limited research in other contexts such as online discussion interface (Tractinsky 2006). In addition, it also was found that the visual aesthetics of the interface can define user satisfaction and pleasure by using measurement constructs (Lavie and Tractinsky 2004). Therefore, this study makes extension to measure empirically the visual aesthetics of the online discussion interface for knowledge sharing. So looking at the usability and visual aesthetics of the interface alone is not enough. Researchers must also pay attention to the technology that enables social interaction in online discussion interface (Preece 2001). Hence, sociability concept was introduced to examine support of social interaction in the online interface. Sociability is concerned with developing the software, policies and practices to support social interaction online. Though practical sociability and usability are closely related, both of these factors have significant differences. Usability is very dependent on how users interact with technology while sociability is related with how users interact with the support of

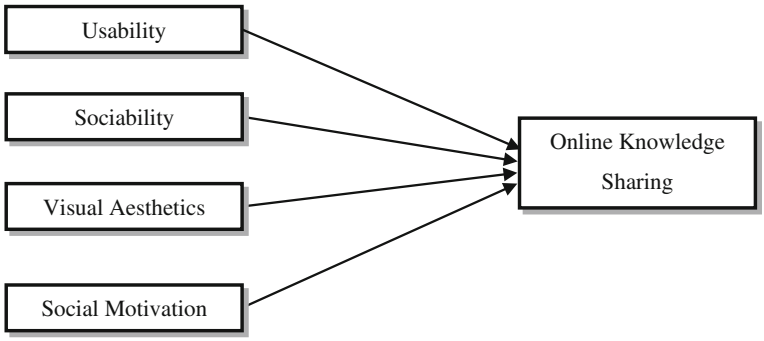

Fig. 29.1 Conceptual model for online knowledge sharing

technology. Therefore the online discussion interface need to be evaluted to see how the interface support students interaction online.

As the interface combines social motivational factor in online discussion interface, social motivation factor need to be considered for inclusion in the online discussion interface evaluation. It was found the game elements can motivate the user in the online interface (Hamari et al. 2014). But the use of game elements in the context of non-game is known as gamification (Deterding 2011). This gamification was used in social motivation to predict students' attitudes toward the use of game elements and the intention to continue using it (Hamari and Koivisto 2013). The implementation of game elements in online interface can engage users while encouraging their activities for learning (Raymer and Design 2011). Thus social motivation factor will be assessed using a set of gamification specifications to enhance students' motivation for engaging them in knowledge sharing activities.

From the result of literature review, a conceptual model as in Fig. 29.1 was developed. This conceptual model is designed to investigate students knowledge sharing ability in online discussion interface using four important factors; usability, sociability, visual aesthetics and social motivation.

29.3 Research Methodology

This study will discuss the initial development of the conceptual model. Where by an instrument will be development in this phase. The initial development of the instrument was performed through three steps, namely, (1) content domain determination, (2) sampling from content (item generation) and (3) instrument construction (Carmines and Zeller 1979; Nunnally et al. 1967; Zamanzadeh et al. 2014).

29.3.1 Content Domain Determination

The first step is to determine the content domain of the construct that is being measured in this study. Content domain covers the concepts, theories and frameworks in the area of study (Page and Mukherjee 2014). It can be identified through literature review or interviews with actual respondents and focus groups. There by the qualitative data for this stage was obtained from extensive literature review.

The advancement in technology has led to software development for qualitative data analysis. Examples of software for qualitative data analysis are as ATLAS.ti, Dedoose, MAXQDA, and Nvivo. By using these software, data obtained through literature review and interviews can be arranged based on related features related; divided and categorized by theme using codes; and represented visually in order to facilitate search and retrieval of codes.

Thus usage of software for qualitative data analysis is recommend for content analysis because it is designed to facilitate clear and in-depth understanding about the analyzed text in research studies (Passonneau and Erickson 2014). These software provides a way to quantify the qualitative data. In this study, ATLAS.ti was used to help in identifying text code to represent the characteristics of the interface needed by the students to enable online knowledge sharing. The qualitative data analyzed using ATLAS.ti software provides the categories associated with the online discussion interface characteristics. The categories such as usability, sociability, visual aesthetics and social motivation were identified and it was used for the instrument construction.

29.3.2 Sampling from Content (Item Generation)

The next step in the development of the instrument is sampling from content where by the items for this study was developed. The items were resulted from an extensive literature review. Existing instruments for online sharing knowledge was investigated and new items that need to be added are identified. Table 29.1 shows the items for the initial conceptual model for online knowledge sharing.

29.3.3 Instrument Construction

The items were later refined and prepared in a suitable format so that it can be used for this study. This is the instrument construction phase, the final phase of instrument development. After this stage, this instrument will go through an instrument validation process to assess the quality of item in this research.

Table 29.1 Initial items

Construct	Sub-construct	Items	References
Usability	Dialogue support	1. Learn knowledge sharing activities fast 2. Support knowledge sharing activities 3. Contribute knowledge easily 4. New user support 5. Remember knowledge sharing activities 6. Knowledge sharing activities error	Self developed based on Lu et al. (2011), Preece and Shneiderman (2009), Preece (2000)
	Information design	1. Read information easily 2. Find information fast 3. Error in finding information 4. Organized information	
	Navigation	1. Learn navigating easily 2. Clear navigation path 3. Know current location 4. Easy return 5. Fast movement between discussion topics	
Sociability	Social interaction	1. Learning material sharing 2. Learning material access 3. Discussion contribution 4. Discussion reading	Self-develop based on Preece (2000)
	Contribution quality	1. Contribution evaluation	
	Contribution reliability	1. View reliability of contribution	
Visual aesthetics	Simplicity	1. Clear layout 2. Easy to understand layout 3. Everything goes together 4. Smooth layout 5. Well structured layout	Adapted from Moshagen and Thielsch (2010)

(continued)

Table 29.1 (continued)

Construct	Sub-construct	Items	References
	Diversity	1. Layout pleasantly varied 2. Layout is inventive 3. Design appears inspired 4. Layout appears dynamic 5. Design is interesting	
	Colorfulness	1. Attractive color composition 2. Colors matches 3. Proper choice of colors 4. Colors are appealing	
	Craftmanship	1. Layout professionally designed 2. Layout is up-to-date 3. Interface designed with care 4. Interface designed with a concept	
Social motivation	Competence	1. Unpredicted response 2. Direct response 3. Positive feedback 4. Interesting challenges 5. Unintended behaviors	Self developed based on Self-determination theory (Deci and Ryan 2002 and Shi et al. 2014)
	Autonomy	1. Variety interaction tool 2. Fast feedback 3. Share media	
	Relatedness	1. Connect user goals 2. Connect users interest 3. Visualize 4. Appreciate	
Knowledge Sharing		1. Spend time to share 2. Active sharing 3. Involve in variety of discussion 4. Response to comment	Self developed

29.4 Conclusion

In review of online knowledge sharing literature, it was identified that not many studies comprehensively evaluate the online discussion interface for knowledge sharing. Based upon the previous studies and Self-determination Theory, a conceptual model for measuring students' knowledge sharing ability in online discussion interface is proposed. Furthermore a research methodology is presented for the initial development of the conceptual model. The proposed conceptual model is merely based on literature review. Thus, the conceptual model needs further validation before it can be applied in practice. Future research will focus on empirically validating the conceptual model and on applying it in practice.

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Chapter 30
Measuring User's Usage Intentions on e-Learning Portal

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Abstract The development of information technology has contributed to the growth in e-learning as an additional educational method. e-Learning provides the opportunities for the academician to share their knowledge, resources and expertise in a diverse way. e-Learning supports learners with some special capabilities such as interactivity, strong search, immediacy, physical mobility and situating of educational activities, self-organized and self-directed learning, corporate training, personalized learning and effective technique of delivering lesson and gaining knowledge. This paper proposes to explore the effect of educational, service, technical system and information quality features on user's usage intentions. To explain the influence educational, service, technical system and information quality features on user's usage intentions, the researchers test the framework using survey data from the students whom uses the i-Learn Portal in Universiti Teknologi MARA (UiTM) Kelantan. The findings from the survey data collected will be correlate and will explain about the user's intentions, whether to continuously uses i-Learn Portal or vice versa.

Keywords Users · Usage · Intentions · e-Learning portal · Educational quality · Service quality · Technical system quality · Information quality

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30.1 Introduction

Coping with the latest development of Internet technologies, universities are investing considerable resources in implementing e-Learning system to support teaching and learning activities. e-Learning system implemented features the distribution of knowledge sharing and online collaboration between academician and students all over the Internet. e-Learning system facilitates educator-students communication, tracking student's progress and secure sharing of course content online (Islam, 2013). The implementation of e-Learning system by the universities has promised better quality and learning-centered education because Internet makes the teaching and learning available anytime and anywhere with no boundaries.

However, despite all the benefits of using e-Learning system to support teaching and learning, the effectiveness of e-Learning depends on the level of individual and social support available when it is adopted (Cho et al. 2009; Liu et al. 2010). The ability to collaborate with remotely-located peers may address learner's social needs and make them more satisfied with online learning and motivated to use it (Salas et al., 2002). Learners may also be more satisfied and keen to continue their learning if they have able to control and customize their learning, as their learning experiences will then be a better fit with their preferences (Derouin et al., 2005). Therefore, it can be concluded that e-Learning usage depend on the role of individual attitudes towards technology. If the e-Learning system fit the user's learning style or preferences, they will using the system and experiences more enjoyable on their e-Learning activities as compared to those who find it difficult to adopt the e-Learning systems (Ahmed, 2010).

To address this problem, this paper proposes to access e-Learning systems success adopted from the study conducted by Hassanzaneh et al. (2012). They have identified four dimension that can be used to measure the user's intention to use the e-Learning system adopted. Those dimension are as follow; educational quality, service quality, technical system quality and content and information quality. The adopted model will explain the influence educational, service, technical system and information quality features on user's usage intentions, using survey data from the students whom uses the i-Learn Portal in Universiti Teknologi MARA (UiTM) Kelantan.

30.2 Literature Reviews

30.2.1 e-Learning

e-Learning system is a web-based communication platform that allows learners, without limitations on place and time, to access diverse learning tools such as discussion boards, assessments, content repositiories and document sharing systems (Martins and Kellermanns, 2004; Ngai et al., 2007). e-Learning makes learning

more accessible because not only can individual study when it is convenient for them, but they also have access to coaching and support potentially round-the-clock (Soheila and Singh, 2015). Nowadays, e-Learning quickly becoming a vital part of the learning and teaching process (Pituch and Lee, 2006) because it makes communication among learners and between learner and instructor/teachers more efficient (Martins and Kellermanns, 2004).

30.2.2 Educational Quality

Educational quality is the extend to which an information system managed to provide an conductive learning enviroment for learners in collaborative learning (Hassanzadeh et al., 2012; Kim et al., 2012). It also helps to facilitates users learning and training by rendering the information system's charateristics and features (Hassanzadeh et al., 2012). Educational quality helps influences user's satisasfaction in using the information system. Previous studies conducted by Hassanzadeh et al., (2012) and Kim et al., (2012) confirmed that educational quality have a significant positive effect on user's satisfaction.

30.2.3 Service Quality

Service quality is the extend to which the support that the user receive while using the information system (Wang and Wang, 2009). Service quality helps influences the user's satisfaction in using the information system. Previous studies confirmed that the quality of support the user receive while using the information system have a significant positive effect on user's satisfaction in e-Learning context (Poulova and Simonova, 2014; Roca et al., 2006; Tajuddin et al., 2013; Wang and Chiu, 2011) and on intention to use e-Learning system (Cheng, 2012; Hassanzadeh et al., 2012; Ramayah et al., 2010; Wang and Chiu, 2011).

30.2.4 Technical System Quality

Technical system quality refers to the technical success and the accuracy and efficiency of the communication system that produce information (DeLone and McLean, 2003). Technical system quality is a part of desirable characteristics and measures of an information system and relates to the presence and absence of a bug in a system (Rabaa'i, 2009). Technical system quality have a significant positive effect on satisfaction in e-Learning context (Hassanzadeh et al., 2012; Kim et al., 2012; Tajuddin et al., 2013; Wang and Chiu, 2011; Wu et al., 2010), and

on intention to use e-Learning system (Cheng, 2012; Islam, 2012; Li et al., 2012; Ramayah et al., 2010; Wang and Chiu, 2011).

30.2.5 Content and Information Quality

Content and information quality refers to the quality of the information that the system generates and its usefulness for the user. It is also one of the desirable characteristic that the information system's success factor and often seen as key antecedent for user satisfaction (Hassanzadeh et al., 2012; Kim et al., 2012; Roca et al., 2006; Wang and Chiu, 2011) and for intention to use e-Learning system (Cheng, 2012; Ramayah et al., 2010; Wang and Chiu, 2011).

30.2.6 Intention to Use

Intention to use is defined as the likelihood that an individual will use an information system (Schierz et al., 2010). Intention to use plays a critical role in the actual use of a new technology and can also be considered as an attitude towards the information system adopted (DeLone and McLean, 2003). Thus, it is important to understand the role of individual attitudes toward technology, since e-Learning usage depends on it. As new generations of e-Learning technology, such as podcasts, wikis and blogs, enter workplaces, being able to quickly adopt and use them for one's training becomes a valuable skill because it means greater control over one's learning environment-individuals can try different tools, and pick and choose which ones fit their needs and preferences best. Individuals who, on the other hand, are less able to adopt new tools may be stuck with e-Learning from the previous generations which may be less customizable, less portable, and difficult to query, making their e-Learning experience less enjoyable. Individuals who are better able to adopt new tools may start using them if the new tools fit their learning styles or preferences better, while those who find it difficult to adopt new systems may be trapped into using systems that they do not like (Ahmed, 2010).

30.2.7 Conceptual Framework

The independent variables for this study are the dimensions of e-Learning success model success adopted from the study conducted by Hassanzaneh et al. (2012). Meanwhile, as for the dependent variable in this study is the variable that reflects

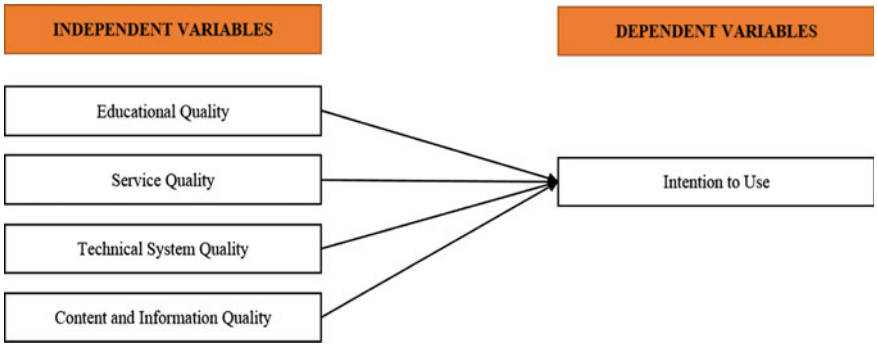

Fig. 30.1 Research model for measuring user's usage intentions on e-Learning portal

the outcome of a research study which is intention to use. There are four (4) dimentions served as independent variables e-Learning success model which consist of educational quality, service quality, technical system quality and content and information quality. Those dimension will be correlate to assist the study in investigating the relationship between educational, service, technical system and information quality features on user's usage intentions on i-Learn Portal in Universiti Teknologi MARA (UiTM) Kelantan (Fig. 30.1).

30.2.8 Hypotheses

Based on the review of the related literature, the following research hypotheses are developed:

H_1 Educational quality significantly influence intention to use.
H_2 Service quality significantly influence intention to use.
H_3 Technical system quality significantly influence intention to use.
H_4 Content and Information quality significantly influence intention to use.

30.3 Methodology

30.3.1 Research Design

This research is non-experimental research. It is a correlational study which answers questions about the relationship among variables or events (Salkind, 2006). The researcher seeks to investigate the relationship between educational, service, technical system and information quality features on user's usage intentions i-Learn Portal in Universiti Teknologi MARA (UiTM) Kelantan. Correlational research

does provide some indication as to show how two or more things are related to one another or, in effect, what they share or have in common, or how well a specific outcome might be predicted by one or more pieces of information (Salkind, 2006).

30.3.2 Sampling Frame

The sampling frame for this research is the students whom uses the i-Learn Portal in Universiti Teknologi MARA (UiTM) Kelantan. Sampling frame is important because it will determine the list of respondents' involvement in this research.

30.3.3 Population

There a bit of similarities of the definition of population between Sekaran and Salkind in term of the entirety of the group. According to Sekaran (2003), population refers to entire group of people, event of things of interest that the researcher wishes to investigate. Whereas Salkind (2006) said, population is entirety of some group. The students in Universiti Teknologi MARA (UiTM) Kelantan, is the population for this research. The total students in Universiti Teknologi MARA (UiTM) Kelantan is 7018 students.

30.3.4 Sampling Technique

The purposive sampling will be used as the sampling technique for this study. The sampling here is confined to specific types of people who can provide the desired information, either because they are the only one who have it, or to conform to some criteria set by the researcher (Sekaran and Bougie, 2010). Here, only the information from students at Universiti Teknologi MARA (UiTM) Kelantan will collected and investigated because they who uses the i-Learn Portal adopted.

30.3.5 Sample Size

According to Sekaran (2003), sample size is the actual number of subjects chosen as a sample to represent the population characteristics. Larger sample are usually more representative but it also more expensive and less efficient. The total population of the students in Universiti Teknologi MARA (UiTM) Kelantan is 7018 students. Krejcie and Morgan (1970) greatly simplified the size decision by providing a table that ensures a good decision model. They indicate that as the

population size is 3500, the sample size should be 364 (N = 7000, S = 364). In addition, Roscoe (1975) concluded that sample size larger than 30 and less than 500 are appropriate for most research. Therefore, as for this research, the researcher decided to consider only 370 students in Universiti Teknologi MARA (UiTM) Kelantan as a sample for this research.

30.3.6 Unit of Analysis

In this research, the unit of analysis refers to the individual students in Universiti Teknologi MARA (UiTM) Kelantan that are currently using the i-Learn Portal implemented by Universiti Teknologi MARA (UiTM) Kelantan.

30.3.7 Data Collection Procedures

Data will be collect from variety of ways, in different settings and from different sources. For the purpose of data collection, questionnaires will be prepare and distribute to all respondents in Universiti Teknologi MARA (UiTM) Kelantan.

30.3.8 Instrument

The main instrument used in this research will be questionnaire. The items in the questionnaire will obtain from the literature reviews of past researchers and for the purpose of this research, the researcher has decides to amend and did some modifications to suit the nature of this research. The questionnaire comprises three (3) sections. For this study, the appropriate questions will be developed by the researcher.

Section A contains demographic information of the respondents and Section B focused on the e-Learning success model adopted from the study conducted by Hassanzaneh et al. (2012), where the researchers has identified the four dimension of e-Learning success model. Meanwhile Section C focus on the user's usage intention towards the i-Learn Portal uses by in Universiti Teknologi MARA (UiTM) Kelantan. The questionnaires contained closed ended questions using a 5 point Likert scale as suggested in Sekaran (2003). The following scales are:

5 = Strongly Agree
4 = Agree
3 = Neutral
2 = Disagree
1 = Strongly Disagree.

In this research, all items will be value using the Likert scale. Likert scale is lists a set of statements (not questions) and provides a 5-point or 6-point scale for which the participant can rate his or her level of satisfaction or dissatisfaction with the statement. Supporting statements of the Likert scale help to make sure the questionnaire that will be use could be understand by both the researcher and the respondents. Moreover, the coding as well as interpretation of Likert Scale is also easier and takes less time to explain.

Section A: Respondent Backgrounds

Section A will contains demographic information about the respondents such as gender, age, marital status, highest education level and the frequencies of e-Learning portal visited will be asked. To answer the questions, the researcher had already classified the answer and respondents will be require to choose or fill up the ones that is most appropriate and applicable to their responses.

Section B: e-Learning Success Model

Section B will focus on the e-Learning success model uses by Universiti Teknologi MARA (UiTM) Kelantan, where the researcher had identified four (4) four dimension of e-Learning success model. There are 24 questions in the four dimension of e-Learning success model:

1	Educational Quality	6 questions
2	Service Quality	6 questions
3	Technical System Quality	6 questions
4	Content and Information Quality	6 questions

Therefore, a 5-point Likert scale basis will be use in this section with the following values of 1—Strongly Disagree, 2—Disagree, 3—Neutral, 4—Agree and 5—Strongly Agree.

Section C: User's Usage Intention

Section C will focus on the user's usage intention on the i-Learn Portal uses by in Universiti Teknologi MARA (UiTM) Kelantan. The purpose of this section is to investigate the relationship between e-Learning success model and user's usage intention. There are three (3) questions and a 5-point Likert scale used in this section with the following values of 1—Strongly Disagree, 2—Disagree, 3—Neutral, 4—Agree and 5—Strongly Agree.

30.3.9 Data Analysis

Each result of the questionnaire response will be examines for completeness before being entered into the data analysis systems. The data from the questionnaire of this

research will be analyze using Statistical Package for Social Sciences (SPSS), version 20.1. SPSS will be use as the analysis tool because this research used a structured questionnaire. The SPSS also purposely use to provide a broad range of capabilities for the entire analytical process.

30.4 Conclusion

Although e-Learning is being used more intensively in recent years, the range of possibilities offered by e-Learning has not been fully exploited (Hsbollah and Idris, 2009). The effectiveness of e-Learning depends on the level of individual and social support available when it is adopted (Cho et al., 2009; Liu et al., 2010). Hence, providing an application which is aesthetically satisfying, user-friendly, structurally designed, flexible, environmentally attractive, reliable, and secure which optimizes response time and provides interactive features are recommended (Hossien, 2015). Appropriate arrangement of time and application environment, possibility of content printing and transferring by the way of application without being detached, possibility of controlling all aspects of the system while working, the presence of a fixed available menu for users, supporting content and information with images, videos, and sounds, evolving e-Learning communication towards voice communication and video conference, and expanding requisite IT infrastructure are some alternatives in this regard (Hossein, 2015). In other words, it should be designed in a way that evokes the users' interests.

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Chapter 31
Providing a Mobile Service for Academics and Professionals: Need Analysis for the Development of Mobile App Glossary of Terms in Islamic Banking and Finance

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Abstract Newer development in mobile technology allows the use of hand phone which can be extended not only to communication but also to other personal life styles such as digital references in a form of dictionary or encyclopedia, to the users for *just in time, just enough, and just for me* access of information. One of the areas that received vast attention nowadays by educationists and learners alike is the area of Islamic banking and finance. The expansion of Islamic banking practices through various local financial institutions leads to the need in understanding the terminologies used in the industry in "just-in-time" manner due to the dynamism of the field itself. In view of this scenario, the present research seeks to shed some light

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using a workable model (George in Rapid instructional design: Learning ID fast and right. San Francsico, 2000) for developing a purposeful mobile Islamic banking terminology glossary app in a more convenient way and made it operational via devices such as iPhone, iPad or any Android-based smart gadgets. It further explored the prototype development and its implementations for mobile accessibility by providing multilingual glossary of Islamic banking and finance terminologies (Malay-Arabic-English). The translation of specific terms from any academic field needs collaboration between experts both from the language and subject domains. This paper reports the findings of the need analysis stage, inclusive of mapping users' device type, Internet accessibility, reasons for owning mobile devices, delivery and user interface, and preferred features to be embedded in the mobile app.

Keywords Mobile app · Mobile learning · Islamic banking · Islamic finance · Instructional design model

31.1 Introduction

Islamic finance has grown tremendously since its emergence in the 1970s. Current global Islamic banking assets and assets under management have reached more than USD1 trillion. There are over 300 Islamic financial institutions worldwide across 75 countries. The Islamic Banking Act 1983 enabled the country's first Islamic Bank to be established and thereafter, with the liberalisation of the Islamic financial system, more Islamic financial institutions have been established. Malaysia's long track record of building a successful domestic Islamic financial industry of over 30 years gives the country a solid foundation and stability that adds to the richness, diversity and maturity of the financial system (McKinsey 2008).

Today, Malaysia's Islamic finance continues to grow rapidly with assets reached USD65.6 billion with an average growth rate of 18–20 % annually. The present ecosystem is supported by a conducive environment that is renowned for continuous product innovation, a diversity of financial institutions from across the world, a broad range of innovative Islamic investment instruments, a comprehensive financial infrastructure and adopting global regulatory and legal best practices. Malaysia has also placed a strong emphasis on human capital development alongside the development of the Islamic financial industry to ensure the availability of Islamic finance talent. All of these value propositions have transformed Malaysia into one of the most developed Islamic banking markets in the world (McKinsey 2008). Moreover, policies and regulations that guarded the practices of Islamic banking and finance are equally important. These policies and regulation will ensure that the practices are complied with and endorsed accordingly by the Shariah advisory board of the related financial institutions.

The concept of Islamic banking includes many terms that originated from the study of Muamalat or transactions in Islam. Those terms are originated from Arabic

language and have evolved in the field inducing a very particular definition and meaning. In relation to works on glossary terms in this field, there are very limited if not comprehensive in nature. Some may focus on bilingual terms used in Islamic banking, such as Kamus Kewangan Islam (Ismail et al. 2011). Others may choose areas rather border in spectrum and scope. Nevertheless, a reference focusing on the trilingual version of the terms is none to be found. Thus, this is what intended to be endeavored in the current study. Let alone a specific mobile app to cater in offering this service in "just-in-time" manner to the end users. This subject is also considered to be a matter of concern in the field of language teaching and learning especially for students acquiring languages such as, Arabic or English for specific purposes (Islamic banking and finance).

The notion of mobile learning as similar to other technology-based learning facilities can be tracked back theoretically to various learning frameworks include behaviourist (Skinner 1968), constructivist (Bruner 1966), situated (Brown et al. 1989), collaborative (Vygotsky 1978), informal and lifelong (Eraut 2000), and the use of it for providing teaching and learning support. The term mobile learning can be defined as any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies (MLearning and December 2010). Hwang and Tsai (2011) state the similar when implying the definition of mobile learning to the facilitating and promoting of learning anywhere and at any time via mobile technologies. Ally (2009), on the other hand, defines mobile learning as the delivery of learning content to mobile devices. The essential understanding of this definition might be rooted back to Wexler et al. (2007) where it was denoted to "any activity that allow individuals to be more productive when consuming, interacting with, or creating information, mediated through a compact digital portable device that the individual carries on a regular basis, has reliable connectivity, and fits in a pocket or purse". In a nutshell, the aforementioned interpretations of mobile learning highlight one way or the other the crucial role of mobile learning in promoting learning anywhere and at any time. Additionally, there are many evidences supporting the effectiveness of mobile technology in a wide range of activities for learners of all levels of education (Thornton and Houser 2004; Proctor and Burton 2003; Colley and Stead 2003).

31.2 Problem Statement

The expansion of Islamic banking practices through various local financial institutions leads to the need in understanding the terms in "just-in-time" manner due to the dynamism of the field itself. Technology, on the other hand, is ubiquitous nowadays in our houses, dominating school children, and expanding across our professional lives. Mobile phones, iPads, tablets, laptops and many other technology devices have a great impact on educating the community. These devices can be used as an alternative to traditional reading references, such as, guidebook or

dictionary that could promote learning and reading comprehension strategies with full features of mobility and flexibility. The motivating factor behind this project is the need to have a mobile access to Islamic banking terminologies in supporting learning environment. At the moment, the utilisation of mobile gadgets among the educators, students, and even professionals at various sectors is exponentially increasing and certainly aggregating the years to come. Mobile accessibility, in this respect, is a must or else the potential use of technology could not be made beneficial especially when it comes to academic and education—the two areas which are always being neglected by the modernity and technology (Carroll 1991). With the increasing rapid use of mobile devices (iPhone, iPad, iPod, and Android-based smartphones), the journey to venture in this area is favourable and very much promising. Viewing this scenario, this study attempts to develop a prototype of a mobile app for glossary of terms in Islamic banking and finance to serve the needs of academics and professionals.

At the moment, mobile glossary of terms in Islamic banking and finance is not yet available in the mobile market (Apple and Android apps stores). Some of the mobile applications available in the market (iTunes and Google Play) with the similar intended functionality unfortunately cater for English-only based dictionary, such as *Financial Glossary* app (USD3.99) and *Financial Terms* (USD2.99).

31.3 Research Objective

The main objective of this study is to embark on developing a mobile application for glossary term of Islamic banking and finance for the target community of academics and professionals using the step-by-step George's instructional design model (2000). This endeavor entails executing the objectives in stages as stated below:

- Access needs and content—analysing the needs of the development and what is the nature of the content in details
- Set objectives—detailing out the objectives from the development and how teach of the objectives can be achieved in this research
- Design—constructing a prototype through programming, debugging, sketching storyboards and designing accurate user interface.
- Research—utilising the prototype and performing continuous evaluation.
- System installation and maintenance—installing the prototype through proper channel, in this respect would be putting the application into the Apple store and Google Play store for commercial purposes.

The model (as illustrated in Fig. 31.1) allows a better communication between the designer and users right from the beginning. The feedbacks given by the users can be implemented at the earlier stage of the development of any prototypes. This non-linear approach gives more flexibility as well in detecting any drawbacks and

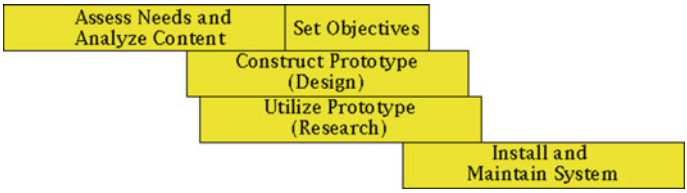

Fig. 31.1 Rapid prototype ID model

defects existed in the development stages. It is, however, cautioned that this model is to be applied only in situations where time and costs are crucial factors (Rapid prototyping 2014).

31.3.1 Need Analysis

The quantitative data collection procedures were conducted during the period of this research. A sample of 225 learned respondents where majority of them coming from the field of Education and Social Sciences (95.1 %) followed by Sciences and Health Sciences (2.7 %) and ICT and Engineering (1.8 %) participated. The breakdown of their educational backgrounds is as follow: Diploma (3.1 %), Bachelor (89.4 %), Master (4.9 %), and Ph.D. (2.7 %).

31.3.1.1 Device Ownership

The survey results (see Table 31.1) indicated that 159 out of 225 respondents (70.4 %) had Android based device for their mobile phones followed by others (19 %), Apple iPhone (11.1 %), and Windows Phone (2.2 %). The least was Blackberry mobile phone with a percentage of (1.3 %) only. The factors that led to the high ownership rate of Android based mobile phones can be attributed to the cheap and competitive price of these devices in the market. However, in lieu of this finding, the simplicity, reliability and functionality may be best attributed to others, such as, Apple iPhone or Windows Phone.

Table 31.1 Device type

Device ownership	(%)
Android	70.4
Others	19.0
Apple iOS	11.1
Windows phone	2.2
Blackberry	1.3

Table 31.2 Internet accessibility

Internet accessibility	(%)
University Wifi	84.5
Broadband (3G/LTE)	37.6
Free hotspots	18.1
High-speed broadband	11.1
Streamyx	8.8
Others	8.4

31.3.1.2 Internet Accessibility

Findings as stated in Table 31.2 on the most popular method to have an access to the Internet was through University Wifi facility (84.5 %). The rest of the breakdown of percentages for Internet accessibility is as follows: Broadband 3G/LTE (37.6 %), Free Hotspots (18.1 %), High-speed Broadband (11.1 %), Streamyx (8.8 %) and Others (8.4 %). Since most of the respondents were from the field of Education and Social Sciences, this is the possible explanation why University Wifi was chosen to be as the main preferred facility. This is balanced by Broadband 3G/LTE services with almost 40 % of the respondents subscribed to them indicating that the Internet can be reached more than just the campus limited area.

31.3.1.3 Reasons for Having Mobile Devices

The respondents were asked on the reasons for having a mobile device. Table 31.3 tabulates the results with the majority of them (92.9 %) stated Communication as the main reason. This was followed by Education (85.4 %) and Entertainment (71.7 %). Collaboration and Business reasons received lower adoption with only 23.5 % and 16.4 % respectively. Since the selection of the respondents vastly came from the field of Education and Social Sciences as stated earlier, the findings disclose some insights of academic community in the study. It is noticeably clear from the findings that not only academic related matters (Education = 85.4 %) entice them to own a mobile device but some joyful activities might do as well (Entertainment = 71.7 %). However, surprisingly collaboration as the core activity in teaching and learning received less than normal with (23.5 %) only.

Table 31.3 Reasons for having mobile devices

Reasons for having mobile devices	(%)
Communication	92.9
Education	85.4
Entertainment	71.7
Collaboration	23.5
Business	16.4
Others	0.9

31.3.1.4 Delivery and User Interface

The respondents were also asked to select their preferences on elements used for the delivery of the app and its user interface design. These include the form of the app, the navigation of content, the main menu design, the delivery platform, and the language interface. Table 31.4 illustrates the findings on these aspects in details. Apparently, the combination of non web-based and web-based app (hybrid) was preferable by the respondents. This might refer to the fact that non web-based app is comparably faster in execution while at the same time any update if exist can be made seamlessly through limited online button click. As for the navigation, scrolling up and down using finger touch was rated highest which again might refer to the speed factor and the factor of responsiveness.

The main menu was preferable to be in a combination of both icons and their descriptions. Though the limitation of the mobile screen size may have hindered this preference, an app with fewer items may be considered for the development. Furthermore, the delivery was opted to be on both phone and tablet platforms. Although having on both platforms may give advantages to users, the limitation of resources would obstruct it from becoming a reality. As for the current study, the development of the app is for mobile phone platform rather than tablet. Finally, the language interface of preference was English. Giving the fact that English interface is familiar to the users in almost the majority of apps available nowadays, the phenomenon is also true in this finding.

Table 31.4 Delivery and user interface preferences

Delivery and user interface		(%)
I prefer to have the app in a form of	Hybrid (combination of both)	63.3
	Non web-based app	9.7
	Web-based app	27.0
I prefer the navigation of the content app using	Page flipping	27.9
	Previous and next buttons	11.5
	Scroll up and down	60.6
I prefer the main menu in a form of	Both	69.9
	List of icons only	24.8
	List of words only	5.3
I prefer to have the app designed for	Both	67.3
	Mobile phone	29.6
	Tablet	3.1
I prefer the language interface in	Arabic	18.1
	English	76.5
	Malay	5.3

Table 31.5 Preferable features of the app

Preferable features	(%)
Search functionality	99.1
Literal meaning of the term	97.8
Settings section for changing the app appearance	97.3
Trilingual form (English-Arabic- Malay)	96.9
Terms arranged alphabetically	96.9
Arabic transliteration of the term	96.0
Word properties of the term (noun, adjective, verb, etc.)	96.0
List of related terms	96.0
Arabic script of the term	95.2
View search history	95.1
Add bookmarks	94.7
Audio pronunciation of the term	92.9
Custom list of terms	92.5
Extended meaning of the term	92.0
Terms arranged topically	91.1
Share term definition via social networks (Twitter, Facebook, etc.)	88.1
Share term definition via email	83.7

31.3.1.5 Preferable Features

Table 31.5 shows the features rated by the respondents in descending order. The highest requested feature was search functionality due to this is the core function in any apps with dictionary like category. Next, the features received above 95 % rating from the respondents were literal meaning of the term (97.8 %) followed by settings Sect. (97.3 %). Features of trilingual form (English-Arabic-Malay) (96.9 %) and terms arranged alphabetically received similar percentage of rating with (96.9 %) each. This was tailed by Arabic transliteration of the term, word properties of the term, and list of related terms with (96 %) each. Later followed by Arabic script of the term and view search history with (95.2 %) and (95.1 %) respectively. Noticeably in these selected features that the respondents need flexibility in using the app by being able to customise several settings incorporated in it. This message is obvious as settings section rated in third position from the list with 97.3 %.

31.4 Discussion

The need to build a bridge between technological innovations and users' satisfaction is important to ensure the use of the tool could trigger learning attainment, engagement, and motivation (Shahrir and Alias 2011; Kinzie et al. 2002; Lee 2012). In the present study the learners shared their information on device type, Internet

accessibility, and reasons for owning a mobile device. They also conveyed their preferences on the delivery platform, user interface, and requested features of the intended app, glossary of terms in Islamic banking and finance. The study suggests that the app can be later developed taking into account these findings to enhance its practicality and embrace by the academics and professionals at large.

The step-by-step development of mobile glossary of terms in Islamic banking and finance will employ the findings of the current study. Elements in aspects stated earlier which received higher rating from the respondents will be emphasised and put into consideration during the development. This includes the app of a hybrid type, navigation using scroll up and down, use of icons for the main menu, and the English interface. Although mobile web apps can be advantageous to the user compared to normal mobile app (Jenson 2011), the findings in this study suggest the combination of both as an opted preference. This is not only for the preference per se, but well supported by the results in the Internet accessibility where users may face difficulties to get the connection outside of the university territory as the number of subscribers to Broadband 3G/LTE is less than 40 %. It is anticipated that the designated mobile app will not only be characterised as a user-friendly but can also provide a spectrum of experiences to the users particularly those interested in Arabic representations of the terms.

Prior to the mobile app features, it is also wise to note here that the developed app will be supported on both platforms; iPhone and Android. It will serve on Android platform due to its popularity and be made available on iPhone device for its reputation in the field of education (Chen 2009) and executive professionalism (Edwards 2014). The content of the mobile app is multilingual in nature where it is supposed to cater the display of both Latin and non-Latin characters especially Arabic. Elements of the content include literal meaning of the terms in trilingual form (English-Arabic-Malay), Arabic transliteration, word properties, and Arabic script of the term. On top of that, the capability of customising the app display is a feature that received higher request from the respondents. Other customisations like disclosing and closing some information of the term during the navigation, changing the language user interface, font type and size, and reading mode can be considered to be integrated during the development.

31.5 Conclusion

The workable mobile app for glossary of terms on Islamic banking and finance is pertinent to academics and professionals alike. The lack of such tool used in mobile oriented environment justifies its development. In fact, users' needs and preferences are being taken account during the development of the mobile app. The app could be utilised to engage users in improving their knowledge on Islamic banking and finance. This is because not only the integrated features are those preferred and suggested by them but the overall interface itself that makes it likely unique from any other mobile apps available in the field. Hopefully it would contribute to a

significant input in disseminating the intended information not only in an efficient and effective way but also engaging and enjoyable to the users.

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Chapter 32
Smoking Cessation: Learning Through App Development

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Abstract Learning through direct experience, through action and reflection, is often difficult within the confines of a classroom. Mobile learning (m-learning) environments open a wide range of new and exciting learning opportunities, and envision students to learn across space and time through constant interaction with technology. **Objectives**: To integrate and utilise m-learning technologies in carrying out dental curricula by allowing students to interact with new knowledge, as opposed to passively learning it. In this context, the students will develop an evidence based smoking cessation app for the Malaysian population. **Materials and Methods**: Phase 1 (content development) will involve the review of literature to identify ideal properties and features of an app for behaviour modification specifically, smoking cessation. This phase involves the review of existing clinical guidelines to identify the evidence-based content to be included in the app. Phase 2 (technical development)—will focus on the technical development of the smoking cessation app where it will be developed based on the ideal properties and evidence based content collated in phase 1. Phase 3 (testing and evaluation)—the app will be launched, tested and evaluated for its usage, content, and effectiveness. **Expected outcomes**: The development of an evidence based smoking cessation app which supports self-determination theory that is crucial for stimulating autonomous motivation for long-term smoking cessation. By developing the app, students will

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explore meaningful learning experiences and shift the mode of teaching to themselves as user- (or student-) led, collaborative, and flexible, and address the needs of Generation C.

Keywords Content development · Generation C · m-Learning · Smoking cessation

32.1 Introduction

Nearly six million deaths each year related to tobacco consumption makes it a leading preventable cause of death and disease worldwide. As reported by the Malaysian Ministry of Health, in Malaysia, tobacco use accounts for 35 % of in-hospital deaths, principally from cancer, heart disease and stroke. Annually, a staggering 10,000 Malaysians die from smoking-related illnesses. In 2012, Malaysia joined other countries in completing The Global Adult Tobacco Survey organised by the World Health Organization (WHO) and the Institute of Public Health. Results of this survey shows that almost half (48.6 %) of adult smokers (current smokers plus former smokers who had been abstinent for less than 12 months) had tried to quit smoking in the past 12 months. Four out of five smokers who had attempted to quit smoking in the past 12 months had tried to do so without any assistance. Among those who have smoked on a daily basis, only 9.5 % have successfully quit. Thus, effective interventions to support smoking cessation are urgently needed (Free et al. 2011).

In today's day and age where the mobile phone technology is considered as a necessity or 'must have' item, it would be amiss to overlook the potential it holds to provide personalised smoking cessation support. Traditional ways of delivering motivational messages or conventional behaviour-change methods that have long been practiced in face-to-face smoking cessation support can be modified for delivery via mobile phones with the content tailored to the age, sex, and ethnic group of the quitter (Abroms et al. 2011). Mobile phones have shown some promise in helping people quit smoking and modifying other health behaviours (Rodgers et al. 2005; Riley et al. 2008; Free et al. 2009; Fjeldsoe et al. 2009). Most of these phone-based interventions have relied on the text-messaging feature of mobile phones and consisted of a series of short, and sometimes interactive set of text messages that guide a person through the process of behaviour change. However, with the proliferation of smart phones it would be a waste to just stop at the text messaging feature as there are new possibilities for using mobile phones as tools for health promotion. The ability of smart phones which have powerful operating systems that can run computer programs or applications (apps), in addition to the standard features of mobile phones (Beal 2008; Patrick et al. 2008) makes it a great platform for not only disseminating information but also interactive motivation to support behaviour modification.

More than 100,000 iPhone apps have been released by the Apple iTunes store, these apps in turn have been downloaded by consumers more than 3 billion times

(Apple 2009, 2010). Out of the 10000 apps, 200 are smoking cessation apps (NTCC 2008). However despite the encouraging numbers of apps available in the market, recent content analysis of these apps found that these apps did not typically adhere to evidence-based principles for smoking cessation or may not sufficiently stimulate autonomous motivation as explained by the self determination theory (Ryan and Deci 2000).

The Self-determination theory is a theory of human motivation that focuses on the degree to which an individual's behavior is self-motivated and self-determined. The Self—determination theory proposes that the gratification of three basic psychological needs—autonomy, competence, and relatedness—is essential to the development of intrinsic or autonomous motivation and the maintenance of behavioral change (Ryan and Deci 2000).

On the other hand, while mobile learning, or m-learning is not a new concept, it has been defined and redefined multiple times over the past few years (Laouris and Eteokleous 2005; Rajasingham 2011; Ozdamlie and Cavus 2011; Solvberg and Rismark 2012). While no concensus has been reached on it's definition as it continues to be clarified and evolves within different communities, its concept is simplistic: any sort of learning that occurs with a mobile device, where the learner is not tethered or fixed to a predetermined location. The objective of m-learning is to allow for ubiquitous learning, where educational content can be delivered and consumed at any time or in any location that the learner chooses hence the criterion for success of m-learning is that programs that utilise m-learning will need to be more motivational, attractive, accessible (Wilson and Bolliger 2013) and most importantly inspire better compliance than traditional activities.

M-learning environments can provide new and exciting learning opportunities when key features are appreciated before implementation. However, whether mobile devices are used as an investigative tool, a communication tool, a simulator, or even a gaming tool, instructors should be aware of the potential drawbacks that learning on mobile devices can present, to avoid negative learning experiences (Wilson and Bolliger 2013). As younger generations continue to grow and mature with mobile devices weaved into their lives, an expectation has formed to include these in as many ways as possible into all their activities. The so-called Generation C' (for 'content', in the first place), the successor to 'digital' or 'net-related' generational descriptions (Prensky 2001a, b; Oblinger and Oblinger 2005) is the generation responsible for open source software development, music filesharing, *YouTube*, *Flickr*, and the *Wikipedia* (Kaplan-Leiserson 2005). The mobile and wireless devices allow for a further extension of the Web 2.0 phenomenon, enabling it to reach beyond the confines of the wired network and connect directly to users and devices in changing and remote locations. It is no surprise, therefore, that a number of theorists and developers are now working to establish the terms 'Mobile 2.0' or 'Mobile Web 2.0' to highlight such advances (De Waele 2006; Jaokar 2006a, b; Appelquist 2006).

This paper has taken a further step forward in m-learning with a reverse approach. Instead of using apps in mobile devices as learning tools, we propose to let the learners learn the self-determination theory (for smoking cessation)

themselves by developing an evidence-based smoking cessation app. They will experience beyond the syllabus as they will need to do preliminary research and even evaluating the developed app with real patient at the end of the study. Therefore, the objective of this study is to propose the integration and utilisation of m-learning technologies in carrying out dental curricula by allowing students to interact with new knowledge, as opposed to passively learning it. In this context, the students will develop an evidence-based smoking cessation app for the Malaysian population. Moreover, in the Malaysian scenario, there is no bilingual (Malay/English) app available to fulfill the needs of non-English speaking population. Thus, this present study is also therefore designed to develop a bilingual (Malay/English) evidence-based smoking cessation app which incorporates self-determination theory features for the Malaysian population. At the end of this study, a preliminary evaluation of the smoking cessation app developed will be conducted by the learners.

32.2 Methodology

This study will be conducted in three phases:

Phase 1: Content development. This phase will involve the review of literature to identify the ideal properties and features of an app for behaviour modification specifically smoking cessation. This phase will also involve the review of existing clinical guidelines for smoking cessation to identify the evidence-based content to be included in the app. This phase will also focus on incorporating the self-determination theory (SDT) features into the content.

Phase 2: Technical development. This phase will focus on the technical development of the smoking cessation app. In this phase, the smoking cessation app will be developed based on the ideal properties and evidence based content collated in phase 1. For this study, the app will be developed using the Android SDK (Software Development Kit) version r24.1.2 with Android Studio as shown in Fig. 32.1.

Phase 3: Testing and evaluation. In this phase the app will be launched, tested and evaluated. The testing and evaluation will be focused on three separate components:

i. Usage evaluation: This would include an evaluation of how many times the app has been downloaded and also an evaluation of extent of engagement which will be measured based on how many times a user opens the app.
ii. Content evaluation: This would include an evaluation of availability of features that satisfy the basic needs identified in SDT, which in

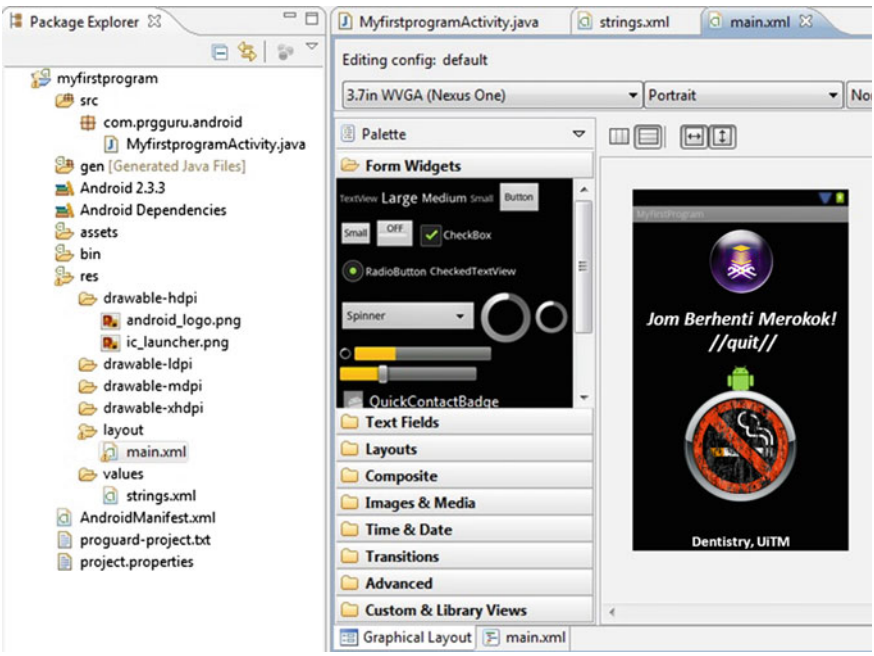

Fig. 32.1 Tentative layout of the smoking cessation app to be developed using Android Studio

turn stimulate autonomous motivation and also an evaluation of adherence to evidence based clinical guidelines.

iii. Effectiveness evaluation: This would include an evaluation of self-reported 30-day prevalence quit rates amongst app users against unaided cessation.

32.3 Anticipated Research Outcomes

This is a concept paper with the ultimate goal for the development of an evidence-based smoking cessation app which supports self determination theory which is crucial for stimulating autonomous motivation for long-term smoking cessation. This app will also be the first bi-lingual smoking cessation app (to incorporate both bahasa Malaysia and English) to enable a wider demographic of the Malaysian population to benefit from this app. By developing the app, students will also explore meaningful learning experiences and shift the mode of teaching to themselves as user- (or student-) led, collaborative, and flexible, and address the needs of Generation C.

32.4 Conclusion

In short, it has become apparent that an evolution or at least a paradigm shift is occurring in education. By integrating and utilising m-learning technologies properly, educators may have an opportunity to bring engagement and active learning to a new and profound height. Based on the fundamental concepts that Dewey (1997) professed a hundred years ago: "Learning needs to be driven by application.", we propose this reverse approach in m-learning. Knowledge—its transfer and therefore transcendence—comes most appropriately when it can be used, not merely read.

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Chapter 33
A Comparative Study of Single Maker Based and Multiple Touch Functions for Visualizing Engineering Contents

Manjit Singh Sidhu, Jee Geak Ying and Waleed Maqableh

Abstract Augmented reality (AR) is a technology that enables the users to visualize and interact with 3D virtual objects, which are digitally processed and augmented in real time environments. The use of AR in education has a wide potential of providing learners with a new experience and challenges in learning, especially in the learning of kinesthetic and dynamics subjects such as Mechanical Engineering. AR uses a "marker" which is a tangible mechanism to interact with the digital contents. However the problem for visualizing becomes limited as the user needs to focus more on the marker rather than the digital contents. To improve this problem, we designed a dynamic simulation software tool that allows the user to interact using multiple interactive functions on a single paper for a four-bar linkage mechanisms (4BL) problem. A preliminary test of the new user interface found that users could focus more on the contents rather than the interaction mechanism. The results and a discussion on the comparative of marker based and multiple touch functions are provided in this paper.

Keywords Augmented reality · Engineering · Education · Learning · Vizualization

33.1 Introduction

Learning some special topics in mechanical engineering such as (kinesthetic and dynamics problems) is not an easy task, especially when the understanding of these topics requires some skills that cannot be provided by the conventional learning methods. Occasionally, there is lack of modern educational tools for this purpose, or we still do not have the proper and suitable learning tools which have the ability to address these problems that appear when studying the kinesthetic and

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dynamics theory. The reasons behind these problems are the use of conventional methods such as the white board/marker/power point slides do not fully support two important factors when studying kinesthetic and dynamics problems. The first factor is the visualization of the 3D kinesthetic and dynamics models; the second factor is the imagination of these 3D models. Ballou (1995) defines visualization as the practice of seeking to affect the outer world by changing the thoughts and the expectations, and also it can be defined as the basic technique underlying positive thinking and is frequently used by athletes to enhance their performance (Tony et al. 2005; Maizam et al. 2002).

In engineering, learning is required and accepted as being important to problem-solving and learning. As such engineering educators need to place more emphasis on the development of the above mentioned skills in their engineering students (Manjit et al. 2003). In general visualization can affect and improve the imagination; it has the ability to use the learner's imagination. Therefore visualization and imagination are needed in studying kinesthetic and dynamics models. It is important when studying the characteristic of dynamitic of the models where some part affects the motions of the other parts. In addition when solving a particular equation, if the mechanisms needed to define many input parameters and/or interprets many output results, this could lead to the complexity of understanding the concepts of engineering problems Ballou (1995). As such, many interactive simulation systems have been enhanced as an alternative teaching tool in engineering learning i.e. those systems that support realistic object motion within the geometric constraints of a layout which allow users to experiment with and practice strategies for assembling and disassembling equipment and mechanisms (Manjit and Maqableh 2012; Manjit et al. 2015). However, most of this interactive systems do not take into account on the user interface which hampers the user from concentrating on its contents. At present many technologies exists such as multimedia, virtual reality and augmented reality (AR) technology which can be used to improve the interactivity/user interface between learners and interactive system by providing a better human computer interface (HCI).

The objectives of this research was to help students to solve the visualization and imagination problems of the subject matter. As such two new AR based simulation packages were developed to assist in the teaching and learning of 4BL problems. Two different user interfaces were designed i.e. a single marker and multiple touch functions to see which design could help users to focus more on the learning contents.

33.2 Motivation

We choose this problem because there are many engineering students facing difficulties when studying the engineering mechanics subjects, especially by employing traditional approaches (Auguestine 2005; Froyd et al. 2012; National Science Board 2007; Prados 1998; Wince-Smith 2005). These difficulties

occationally rise because of the wrong imagination of the 4BL models. For example when using some simulation software created using MATLAB that can simulate 2D models of the mechanism. This could lead to the visualization problem because the simulation is not linked with the actual equations and user is unable to input parameter values. Therefore this work can be considered as a further extension of our previous work which was done to understand the motion of the 4BL mechanism and see how it could be simulated (Manjit and Maqableh 2012). In this extended work, we developed an AR application that can simulate any type of the 4BL mechanism. The next section will describe the four-bar linkage mechanism problem.

33.2.1 Concepts of the Four Linkage Bar Mechanism (4BL)

Mechanical linkages can be defined as a series of rigid links connected with joints to form a closed chain, or a series of closed chains. Each link has two or more joints, and the joints have various degrees of freedom (DOF) to allow motion between the links as shown in Fig. 33.1.

A linkage is called a mechanism if two or more links are movable with respect to a fixed link. Mechanical linkages are usually designed to take an input and produce a different output. In the Four-Bar Linkage, this input changes the behaviour of the mechanism. According to Grashof's Law at (Wikipedia). We can determine whether there is a link that can rotate 360° or not. See Fig. 33.2. In general Grashof's Law is defined as "If the sum of the lengths of the longest and shortest links is less than the sum of the lengths of the other two links, there must be a link that can rotate 360°".

When Grashofs' law is applied then four types of linkages as shown in Fig. 33.3 can satisfy Grashofs (Drag-Link, Crank-Rocker, Double-Rocker, and Parallelogram-Linkage) which they defined as Four Bar Linkages (Oleg 2000).

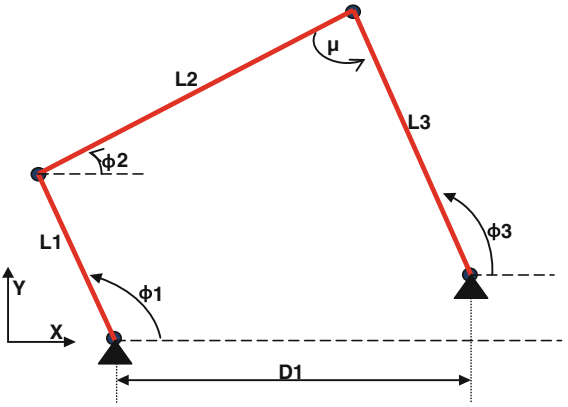

Fig. 33.1 Scemantic diagram of a four linkage bar (4BL)

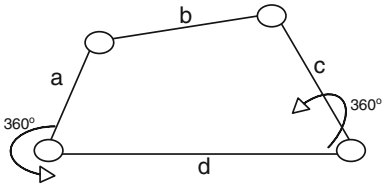

Fig. 33.2 Graphical representation of grashof's law

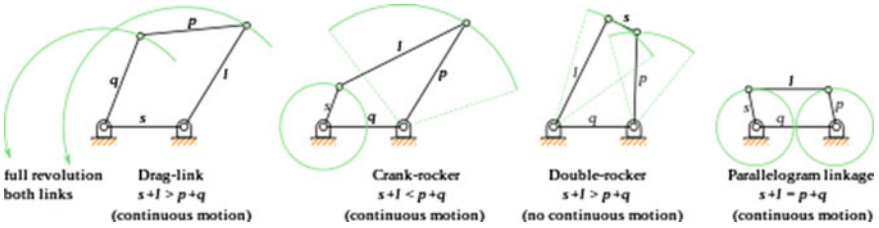

Fig. 33.3 Types of mechanisms according to grashof's law s = shortest link, l = longest link

33.3 Design and Simulation Requirements of the 4BL Mechanism

The design of the four-bar mechanism requires creating two joints and three link components if we assume that the ground link is not counted as shown in Fig. 33.4a, or the design requires four joints and four link components when the ground link is counted as shown in Fig. 33.4b. Creation of the link components are executed first, and then the joints are defined to connect the created links together (Wikipedia; Oleg 2000).

The design for such a kind of mechanisms should take into account some important aspects; which might be used to determine which type of the 4BL we are dealing with; the (shortest and longest) links, the (Direction and Speed) of the

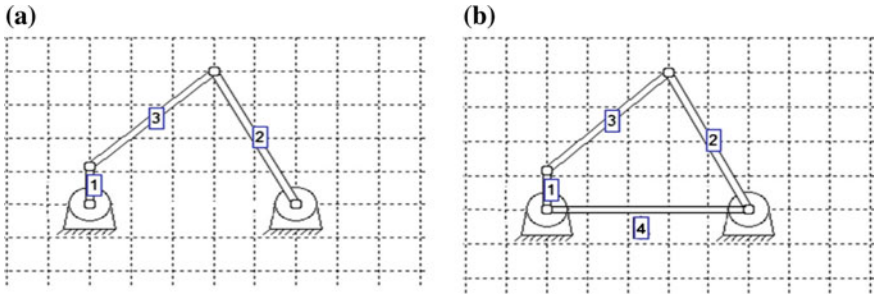

Fig. 33.4 **a** 4BL ground link is not counted. **b** 4BL ground link is counted

motion and finally, the angle of crank (Wikipedia). In The next section, discusses how to 4BL mechanism problem was developed using augmented reality.

33.4 Methodology

This study was initiated to evaluate engineering students on their interaction of the newly implemented 3D AR application. The 3D application for visualizing engineering concepts allows the student to relate the real object (in this study four bar linkage mechanism) with the technical information. Next the AR application implemented for this study is described. The objective of this work was to study and understand the motion of the 4BL mechanism and see how it could be simulated [8]. The purpose of this mechanism is to transmit motion and force from one location to another. The theory of this mechanism can be understood by the 4BL (which consists of four rigid bodies each attached to two others by single joints or pivots to form a closed loop) (Kempe 2013). Four-Bar-linkage mechanism can be found in many applications such as (Human body, Automatic Windows and Doors, Crane movements system in heavy vehicles etc.). In our point of view and in general we can say any mechanical device can have a 4BL mechanism connected with other mechanisms. In theory students could be posed with some typical questions such as 1. How many links are there in the mechanism, 2. How many joints are there in the mechanism and their types, 3. What are the relations between the links and joints, 4. What are the fundamental dimensions of the links to achieve the desired motion? 5. What are the actual shapes of the mechanism which can provide enough strength and stiffness during the motion? It is clear that this sort of problems may require several attempts for the student to try and understand before the problem could be solved. Further explanation on this problem is given in (Oleg 2000).

Most simulation of 4BL mechanisms that are available at present are designed using 2D graphics which may not be appropriate for visualization process (Oleg 2000). In addition the workings for the solution of a given problem are not shown in details thus living the student to work on their own to understand. In our approach the student is able to interact with the 4BL mechanism in a real time 3D environment and is able to experiment the parameter updates of the animated 4BL by inserting different values that meets grashofs law. In addition the simulation tool fully functions as an engine to solve the problem by showing all the steps with the final answer. A snapshot of the AR application is shown in Fig. 33.5 along with the pipeline flow chart of the application shown in Fig. 33.5. The interactive paper interface is also shown in Fig. 33.6 at the top left hand side. In this design, seven basic functions were implemented for the user to interact with. For example a symbol could be touch to change the color of the four link bar.

According to Fig. 33.6, the main procedure in most AR applications is to capture video from the webcam as a first step. The AR software then has three main algorithms to apply i.e. (Recognition, Tracking and Rendering). In the recognition phase, the recognition algorithm searches for a “Target or Marker” in the video

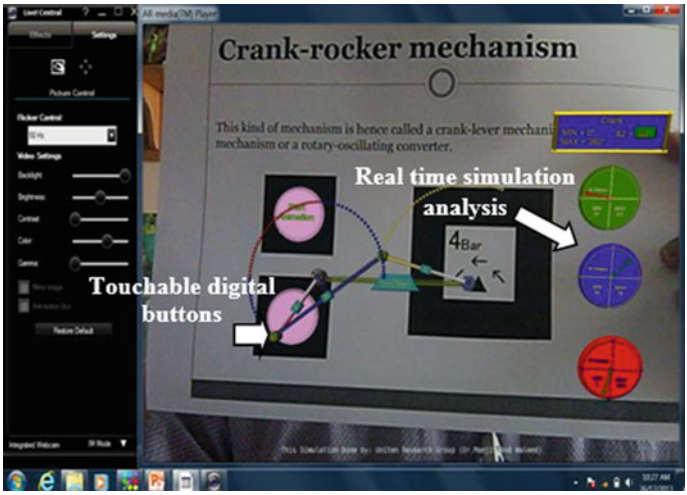

Fig. 33.5 The new interactive interface design for multiple touch functions

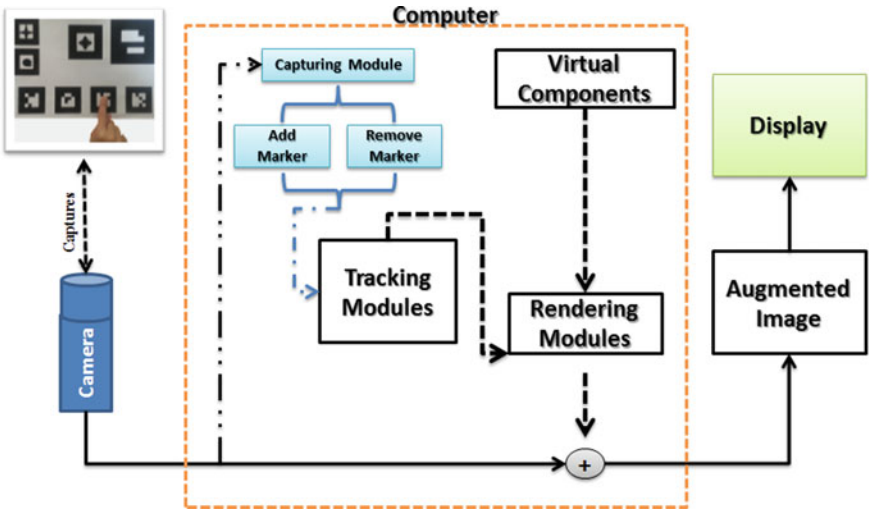

Fig. 33.6 Pipeline flowchart of the application

stream, which can be either a single (Target or Marker) or a group (Target or Marker). While in the tracking and rendering phase, the tracking algorithm tracks the target and imposes a 3-D overlay by adding a virtual object, before rendering it back on the screen in real time.

However, in our approach we do not use markers as the interaction mode, instead we implemented all the functions on a single paper whereby the user do not have trouble in holding and interacting with multiple markers to perform

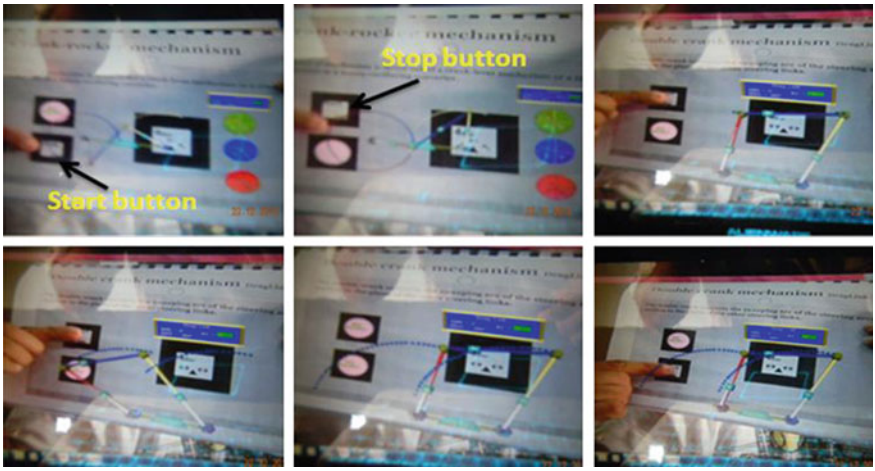

Fig. 33.7 The start and stop button by finger coordination

Fig. 33.8 Users testing the AR system

different functions. To achieve the functionality, all the user needs to do is to touch on a particular function (the two pink circle buttons shown on the left in Fig. 33.5) on the paper with the finger to start the simulation and touch the stop function again to stop/pause the simulation. The simulation could be continued again by touching the start button on the paper as shown in Fig. 33.7. The complete analysis of the problem is computed and shown in the three circles on the right (green, blue and red). This new method of tangible user interface has significantly contributed to the finding of a new type of user interface and could help learners/users to focus more on the problem rather than using markers and spending more time in the interaction process. Figure 33.8 shows a snapshot of users testing the AR application.

33.5 Procedure, Evaluation and Comparative of Single and Multiple Markers Interaction

This section describes on the approach taken in evaluating the new user interface design for visualizing the engineering concepts on the four link bar mechanisms. Many methods are available to measure the reliability of a new user interface/software. However for this research, we designed a self-crafted questionnaire mainly to measure the interaction aspect of the new tangible user interface. Students of University Tenaga Nasional (UNITEN) were selected as the sample data. All students were from the department of mechanical engineering and in particular have taken the course of mechanics dynamics. Students were asked to volunteer as research participants and n = 20 students were selected randomly. After the selection of sample data, students were given an explanation about the purpose of the research and their role in the process. Since we have contributed a new user interface design, five experts on human computer interface from three different countries were also asked to test the multi-function user interface of the AR application. The experts were asked to test the application remotely which was installed at one of our websites followed by answering the user interface satisfaction questionnaires which were then analyzed. The usability test experiment was designed to assess the usefulness interactions, by evaluating the way that the users can input the required data, start/stop the rotations of the virtual models of the four link bar mechanism, and change the properties of the models being simulated. For this purpose, a questionnaire with 10 questions was designed based on the sample questionnaires designed by Kato and Billinghurst (2014) for the User Interface Satisfaction. The questionnaires have been found to be effective technique for the user interface, user interface satisfaction and ease of use. Kato and Billinghurst (2014, Table 3) and Fig. 33.4 summarize the quantitative statistical results of the study. As mentioned earlier the objectives of this paper were to design and compare two user interface i.e. single marker as shown in Fig. 33.9a and multiple touch function as shown in Fig. 33.9b. The students were tested with both the AR systems and the results of the multiple touch/markers are shown in Table 33.1.

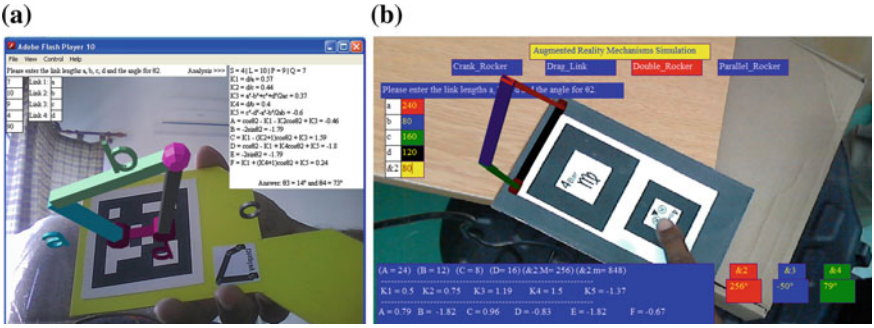

Fig. 33.9 a Single marker with single function. **b** Multiple markers with multiple functions

Table 33.1 Multiple touch interaction results (Students)

Interaction *(Y = yes, N = no, NS = Not sure)*			
Response	Y	N	NS
A1 Provides friendly user interface	**10**	0	2
A2 Manipulation with multiple AR functions is difficult	1	**17**	2
A3 Easy for new users to use and learn	**17**	0	3
A4 I find it difficult to interact with this application	3	**15**	2
A5 A new and interesting way to interact	**19**	0	1
A6 Better than single marker based interaction	**18**	0	2
A7 Overall experience rating (Very good)	**16**	0	4
A8 Allows me to concentrate/focus more on the contents	**19**	0	1

33.6 Results and Discussion

The evaluation results presented here represents the primary phase of the evaluation, examining the first group of students in terms of experimental study. Future study will be done whereby a control group will be used and compared to see if the results sustains or there are any differences in the understanding of the problems presented. On the basis of the results gained in this study, Table 33.2 clearly shows that the students favored and appreciated the use of the AR application and the new user interface in their learning. The dimension on interaction showed positive results (the statistical quantitative results shown in bold text in Table 33.2 provides the evidence). Results on the interaction dimension concluded that the new user interface of the AR application provided friendly user interface (n = 20). On the other hand 17 students felt that it was easy for new users to use the applications and learn. This in turn suggests that students would be able to learn using this

Table 33.2 User interface satisfaction results (HCI Experts)

User Interface Satisfaction *(SA = Strongly Agree, A = Agree, UC = Uncertain)*			
Response	SA	A	UC
The interface has a good balance of graphics versus text		3	2
The design of the interface is attractive	1	4	
It is easy to remember the sequences of operations		3	2
The information displayed on the user-interface is suitable	2	3	
The interface content motivates me to learn	1	4	
The interface has characteristics that make it system appealing	2	3	
It is clear how screen elements (e.g., input box, menu options, etc.*) work*		5	
The acoustic feedback is meaningful	2	2	1
When I use the system, I do not ask for a help	2	3	
The interface is so accurate and assists in achieving the goals		5	
I agree that users can concentrate more on the contents as compared to using the single marker based system	5	0	0

application without the guidance of the instructor (as opposed to the conventional method where a textbook is normally used with the presence of an instructor).

Responses from the HCI experts on the user interface satisfaction dimension showed that 3 people agreed the interface has a good balance of graphics versus text, all 5 people in general felt that the design of the interface is attractive. Three people responded that the operations of the sequence are easy to remember and the information displayed on the user-interface is suitable. Among other notable and favorable responses were; the screen elements were clear, had meaningful acoustic feedback and the interface is so accurate and assists in achieving the goals. Most importantly all the HCI experts agreed that users can concentrate more on the contents as compared to using the single marker based system. As such the study has achieved its objectives for providing a better system for users to visualize and imagine the engineering concepts on 4BL mechanisms. This pilot study has shown that the multiple functions touch interactive paper based user interface has improved the user interaction which provides a new and more natural user interface. Users need not waste too much time in interacting with the system but allows more room for focusing on the contents. Further research is in progress on comparing both the marker based and the new multiple fucntions touch interactive paper user interface in terms of time taken to visualize the engineering concepts with a larger sample size of students.

33.7 Conclusion

In general, the design of the new tangible user interface with multiple touch interactive paper functions in this study provided evidence that augmented reality is a promising technology for education and could be expanded to other domains such as games and entertainment. Students could interact with the application more naturally and they were able to understand the problem better. The use of AR in education is also supported by the 2010 Horizon's Report (Johnson et al. 2010) that predicts that there will be a 2 to 3 year horizon to AR's adoption at the university level, and 4 to 5 years until AR is adopted at the K-12 level. The overall results could be concluded that most of the participants agreed with the usefulness and ease of use of the AR application. The combination of using GUI and TUI makes the AR application useful and interesting. In addition the use of the newly contributed touch to print interaction could assist the users to achieve the goals.

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Chapter 34
Interactive Prophet's Storybook Using Augmented Reality

Anita Mohd Yasin, Mohd Ali Mohd Isa and Nor Adora Endut

Abstract The scarcity of Islamic learning materials having interactive interfaces gave rise to the implementation of our research. In this project, we integrate Augmented Reality (AR) elements into a children's storybook. The Prophet's Storybook integrates a mixed reality interface into a physical printed book to provide users with both reality and virtual experiences seamlessly. A vision-based tracking method is used to overlay virtual models on real book pages, creating an AR scene. When users view an AR scene, they will experience an immersive Virtual Reality (VR) environment. Unlike immersive VR, AR interfaces allow users to view the real world at the same time as virtual imagery attached to real locations and objects. The interface also supports multi-scale collaboration, allowing multiple users to experience the same virtual environment either from an egocentric or an exocentric perspective. The project was tested on an audience of randomly selected children aged 5–6 years.

Keywords Augmented reality · Vision-based tracking method · Interactive prophet's storybook

34.1 Introduction

The technological improvements as well as societal expectations on education instigates the need for innovation in educational practice. The advantages of traditional methods have been proven but there are some deficiencies in terms of

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learning styles. A typical problem faced by educators is on how to increase students' engagement and motivation throughout the learning environment. Integrating AR technologies as interactive agents may assist in addressing this need (Science et al. 2012 and Bazazza et al. 2014).

The Interactive Prophet's Storybook proposes an innovation in the application of augmented reality technology to pre-school students' literature. A prophet's storybook was written for the purpose of transforming the physical book to an Augmented Reality (AR) which is mediated by computer technology. It allows collaboration and animated sequences incorporated with suitable sounds to appear in three dimensional space during the reading or viewing process.

34.2 Related Work

34.2.1 Augmented Reality (AR)

When mentioning about augmented reality, it can be interpreted as one technology that can "develop the next generation, reality-based interface" (Krevelen and Poelman 2010). Besides that AR is part of the overall field that is a mixture of reality. It is the combination of both virtual environment (or virtual reality) and augmented virtuality, where the real objects are added to the virtual environment. AR systems consist of the combination of real and virtual objects in a real environment, registers (aligns) real and virtual objects with each other and runs interactively, in three dimensions, and in real time (Azuma 1997; Azuma et al. 2001). Despite the fact that AR has benefited more research and attention recently, there are various meanings attached to the term by researchers in AR. In addition, AR can be constructed by using the inventive technology and involves different media (for example, body-borne computer, mobile phone, and immersive technologies) (Wu et al. 2013). One of the main advantages obtained by the AR is having a better sense of reality and interaction while it puts an emphasis on organic integration of virtual and real-world environments (Yang 2011).

34.2.2 The Importance of AR in Islamic Learning

Augmented Reality (AR) is a variation of virtual reality which allows users to see the real world with virtual objects superimposed upon or composited with the real world. It combines the real scene viewed by the user and virtual scene generated by the computer that augments the scene with additional information. AR allows users to see the real world together with virtual objects superimposed upon or composited with the real world (Azuma 1997). These objects are interactive and they are displayed in 3D. AR can also add graphics, sounds and haptic feedback to the

natural world as it exists. The use of AR in formal education is very useful when students are dealing with subject matters that they cannot experience by first hand in the real world (Shelton and Hedley 2002). The learning process will take over naturally through simple exploration and discovery in the virtual environment (Mantovani 1996).

The use of AR in Islamic education system is to utilize the AR technology into the Islamic learning process by using modern method for teaching by involving modern technology to attract pre-school students to diversify the use of knowledge.

From the perspective of Islamic education, there has been a lack of Islamic learning materials that incorporates the current computer-assisted technologies. A survey of the literature has revealed that there are scarce resources for Islamic learning materials that incorporate AR technology into their content. This affects the students' outlook on their surroundings in terms of their religious creed (aqidah) and moral (akhlaq). As such, we propose the utilization of the AR technology in the Islamic learning materials to attract pre-school students to diversify the use of modern methods and technologies in educational materials. By applying this method of learning, pre-school students will be taught about the story of the prophet by incorporating the elements of Islamic morals and ethics as references and guidance to their life here and the hereafter.

34.2.3 Learning in Pre-school Education

Previous research conducted by Plowman and Stephen (2007) had discussed the characteristics of pre-school student's interactions between computers and other forms of ICT by practitioners (ICT designer) and peers, for example, through physical or verbal directing or prompting. They came out with a guided interaction concept to explore how effective and efficient that concept applies in the range of technology-based obstacle. They divided the guided interaction concept into two dimensions which are distal and proximal. The research concludes that both distal and proximal interactions produce associated learning outcomes. These learning outcomes have not been explicitly categorised, however, the researchers have mentioned knowledge of the world, operations and dispositions to learn as potential areas of competence. Several factors have been highlighted to affect children's learning such as their developmental stage, own interests and preferences, access to ICT, the quality of guided interaction, and also the particular interests and aptitudes of practitioners and family members.

Having a common workspace among their peers is another factor that may affect preschool learners' experience with technology-related learning materials. This encourages non-verbal behaviours such as observation, gestures and other communication cues. Additionally, the learners share a common relationship with the virtual and physical objects (Billinghurst and Dünser 2012).

34.2.4 Methodology

In this research, the following development stages have been implemented to develop our application. The stages involved were storyboard development, 3D modelling, animation development, natural feature tracking and lastly the completion of the final prototype. Figure 34.1 below illustrates the development stages mentioned above.

The stages are explained in detail in the following subsections.

34.2.4.1 Storyboard Development

Our project begins with the development of the storyboard for the Prophet's Storybook. The storyboard is adapted from the storybook entitled "Cinta Rasul for Kids". This storybook tells the story about the journey of the prophets and messengers to convey the teachings of Islam. The storybook consists of 25 stories of the well-known prophets and messengers, with each of them having their own difficulties during their journey in life. For this project, the life journey of Prophet Sulaiman A.S. was chosen. The book centres on the life of Prophet Sulaiman. Each character is assigned to a different action in relationship to their roles in each scene of the storybook.

34.2.4.2 3D Modelling

All characters were developed using Blender. This product is a free and open-source 3D computer graphics software. The process of modeling involves

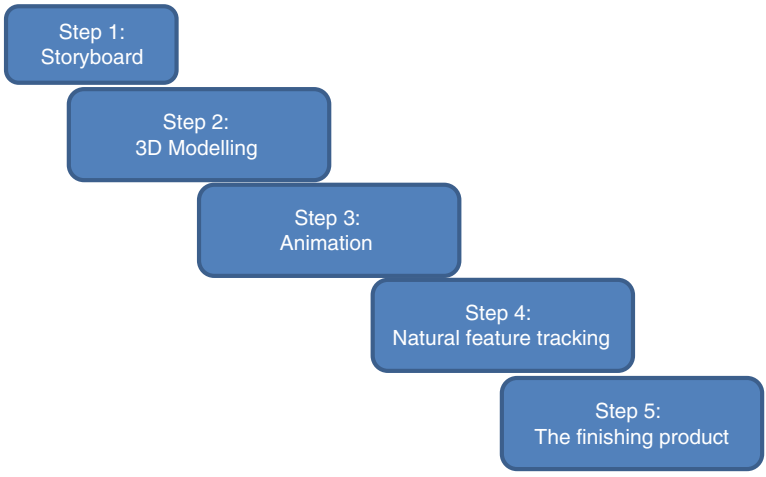

Fig. 34.1 Development stages of the Prophet's Storybook

creating a 3D computer model from a 2-dimensional graphic of an object. Blender software is used to model, apply color or texture and animate each object. Each of the models was assigned with a different texture according to their defined characters to differentiate them. Each character was modeled with low quality polygon by reducing the use of vertices and the number of *face*. This may speed up 3D machine rendering and avoid the overload use of memory. Additional polygons will cause 3D machine to consume additional memory load as it need to render each polygon at once. The next step after modeling the objects is to put bone inside the character for animation purposes. Armature is a joint bone that allows a character to move, jump or response to directed action. Each bone is connected to each other from parent to child. They are assigned with different names to avoid confusion. Bone pose is assigned through Envelop bone display where one bone displays the area of bone part by showing the area that the bone covers for posing or actions.

Next, each model character will be exported to Collada (from collaborative design activity is an interchange file format for interactive 3D applications) format (*.dae), this format is available in FLARManager function which will be called from Paper Vision 3D software.

34.2.4.3 Animation Development

The virtual models displayed in the Prophet's storybook are animated, they appear to be popping out of the book. Each object will be assigned to a different animation and identify the movements for each character. In order to execute this, each part of the object including the character of the scene will be loaded at Blender animation and the time the animation would take place and how long each character is supposed to remain in its position is determined.

34.2.4.4 Natural Feature Tracking

Readers will see 3D images leaping from the pages of the book using a webcam focusing on the marker. If the reader moves around and looks at the book from different positions, the 3D objects will still appear to be attached to the page. This project uses a webcam as an AR detector because the webcam is cheaper compared to building a handheld device. Additionally, a webcam may detect different markers as labels that each of them may be assigned to different scenes of the animation.

34.2.4.5 Prototype Completion

In this stage, the narrations for the storybook will be added. The narrator will read the storylines to assist the interactive 3D animated images. The webcam, acting as a detector, may trigger the animation and sound to pause if it cannot detect the marker assigned. It also may proceed to other animations and sounds if it detects different

marker labels. Finally, all objects and sounds will be exported to collada format (*.dae) that will be loaded to flash builder.

34.2.5 Results

Functional testing was conducted on children aged between 5 to 6 years. The participants were selected randomly. The respondents were asked several questions regarding the interactive Prophet's storybook using AR once they have read the storybook.

34.2.5.1 Overall Functionality

The overall functionality of interactive Prophet's storybook using AR was tested based on accuracy and completeness, of the interactive prophet's storybook as a medium of the learning process. 75 % of the respondents agreed with the overall functionality of the interactive Prophet's storybook using AR. The results are illustrated in Fig. 34.2.

34.2.5.2 Effectiveness

59 % of the participants agreed with the effectiveness of this interactive Prophet's storybook in delivering the content in a more attractive and presentable manner as displayed in Fig. 34.3. The respondents are able to grasp and use the technology that is attached to the storybook. The respondents have found that the animation element is attractive. 41 % of the respondents disagreed about its effectiveness. This has been alluded to lack of content and story flow.

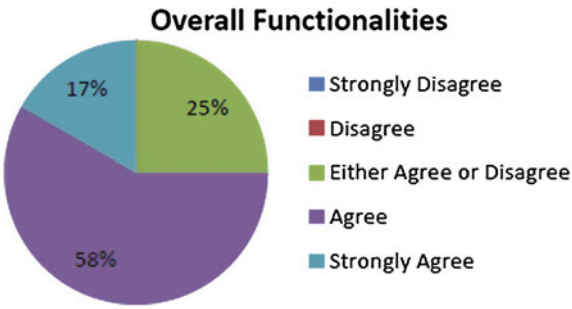

Fig. 34.2 Overall functionality

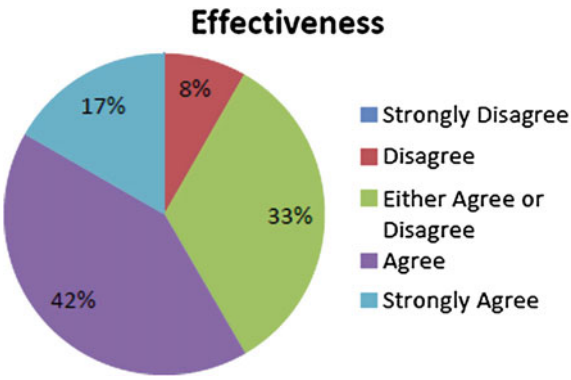

Fig. 34.3 Effectiveness of application

34.2.5.3 User Interface and Level of Confidence

58 % of the children were satisfied with the user interface of the storybook which has incorporated AR. The respondents agreed that they are able to learn better when multimedia elements are incorporated in learning materials as these elements may help improve their knowledge, skills and learning experience. The results of this is displayed in Fig. 34.4.

34.3 Discussion

With the completion of this project, it is hoped that the interactive Prophet's storybook by incorporating AR may assist in improving Islamic education by increasing the understanding among pre-school students about subject matters that they may not be able to experience first-hand in the real world. By incorporating AR elements in traditional printed book students are able to collaborate better when

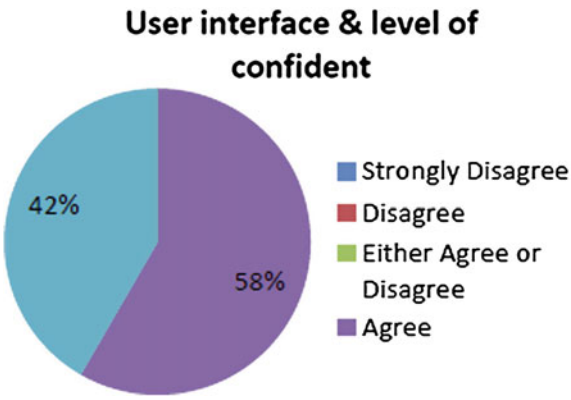

Fig. 34.4 User interface and level of confident

they are in a group and sharing a common workspace; which is the natural surrounding and environment of a pre-school. This technology is suited to help them learn about abstract subject matter, for example, the life and history of a prohet. Also, by combining AR technology with the traditional printed book like the Prophet's storybook it is hoped that it may attract more interest among children by enabling the children to communicate with each other and exchange ideas while they are reading the book together.

34.4 Conclusion

This project was proposed after having done extensive literature analysis on the application of augmented reality technology among pre-school children. The intention to implement AR as a method to provide interactivity on the Prophet's storybook is to overcome the shortage of Islamic and religious learning materials. The use of AR allows collaboration. The animated sequences incorporating sounds to appear in 3D allows for interactivity during the reading/viewing process at the same time enhances the reading/viewing experience. In addition, AR is incorporated in this storybook to cater to a variety of learning styles within the process of leaning Islamic content.

From the perspective of collaboration, AR allows for communication among pre-school students in parallel with the learning process. It may also help the teachers to deliver learning materials better and assist them in explaining abstract concepts in more detail. Collaboration promotes active learning and may eliminate boredom and passiveness. AR technology allows the children to be seated around the book and see each other at the same time as the virtual content which may result in conversational behavior that is similar to face-to-face communication based on collaboration. The development of the AR integrated Prophet's storybook has been conducted by using 5 stages namely storyboard development, 3D modeling, animation development, natural feature tracking and lastly prototype completion. The outcome from this project is a new method of learning that is hoped to make pre-school children understand better about Islamic learning content by incorporating interactivity and encouraging collaboration and communication.

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Chapter 35
Blazing a Trail for Global Access Asia

Siti Azura Abuzar, Salleh Abd Rashid and Siti Amiza Hassan

Abstract The emergence of innovative technologies and the new wave of learning was the impetus for Global Access Asia (GAA). The idea arose during the 12th Asian University Presidents Forum (AUPF) 2013, hosted by University Malaysia Perlis (UniMAP), and a task force with representatives from UniMAP, Bangkok University, Dongseo University (DSU) and Josai International University was formed to advice on the project. It was agreed the platform should be hosted using the facilities of Busan Digital University, a 4-year institution specializing in online education, which belongs to the same educational foundation as Dongseo University. The official proposal for GAA was presented by DSU President Jekuk Chang at the 13th AUPF 2014, hosted by Christian University of Thailand. The proposal was approved by the AUPF Standing Committee, thereby making GAA an official affiliate of the Asian University Presidents Forum. GAA aims to increase international learning opportunities for students of AUPF-member universities through a collaborative online platform focusing on the diversity and global role of Asia. The core idea was each participating university may offer one or two of its top-notch courses online, which students at other participating universities may take for free to earn academic credits. A multilateral academic cooperation agreement may be used to facilitate credit transfer. Comprising a fifteen-week credit-based schedule, courses should address topics relating to Asia, particularly its diversity,

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values, or global role. The paper describes the program at some length, and then moves on to explore opportunities, motivation, developments and challenges.

Keywords Credit transfer · Collaborative online · Diversity · Global Access Asia · GAA

35.1 Introduction

In a world where everyone seems to have smartphones and tablets, traditional education from the basics of pen and paper has begun to change. It has already seen an evolution in the way that people send and receive information. Today's technology and the evolution of learning style have sparked the idea of creating the Global Access Asia (GAA). During the 12th Asian University Presidents Forum (AUPF) 2013, a task force with representatives from University Malaysia Perlis (UniMAP), Bangkok University, Dongseo University (DSU) and Josai International University was formed to advice on the project (Abd Rashid and Mohd Zain 2014).

Global Access Asia (GAA) is an online courseware system operated in affiliation with the Asian University Presidents Forum (AUPF) focusing on the diversity as well as global role of Asia. It was established as an international learning and teaching to promote academic collaboration and to create educational opportunities. GAA aims to increase international learning opportunities for students of AUPF-member universities through a collaborative online platform focusing on the diversity and global role of Asia. Participating institutions may utilize the platform that has been developed by Dongseo University (DSU) and Busan Digital University (BDU). Through this collaborative platform, students of other participating universities will get academic credits online.

35.2 Motivation and Challenges

Today the web is a venue for most interactions and the Internet has become so essential where the entire courses can be deployed online, making it even easier in term of facilitating discussions. Online learning comes at a time of great transformation in how individuals and organizations learn and how they transfer learning into performance in the classroom and online, remains as important as ever.

Demand for online learning is growing faster than demand for more conventional forms of instruction. Many of the challenges in making GAA successful can become opportunities if handled correctly. The challenges that have been identified are in terms of the Internet infrastructure, the accreditation body to overseeing the quality of the courses offered, the trustworthiness of the course provider, and the workloads to both instructors and learners. The main challenges are to provide

efficient and adaptive online learning systems and to provide different courses to different students with different learning abilities. It will change the student's experience as well as the instructor's in term of knowledge and comfort in the use of technology. A well-planned system will address those issues in a strong and effective way, flexible to meet the unique needs of participants.

35.3 Task Force Recommendations

The task force member universities have agreed to offer at least one course each for the initial launch period scheduled for the fall semester of 2015. Other participating universities are also welcome to provide contents for the launch.

35.3.1 Level of Participations

Universities may participate in Global Access Asia in the following ways:

(a) Promote the project at their home institution(s) so that students may audit courses or view non-credit contents.
(b) Sign a multilateral academic cooperation agreement so that students may take credit-based courses.
(c) Contribute one or more credit-based courses or other types of non-credit content to be made available to students of any participating university.

35.3.2 Credit Based Course Details

Initially, only contents based on culture, liberal arts, or introductory subjects are preferred. It is hoped that the Global Access Asia platform may introduce students to the diversity of Asia, the values of Asia, and the role of Asia in the global economy. Credit courses should follow a 15-week schedule, including one week for the midterm and one week for the final exam. Two lectures of at least 25 min in length, or one lecture of at least 50 min in length, should be offered each week, and the overall coursework load should be suitable for two academic credits (76–96 h of student work, including lecture periods). Non-credit contents such as audit-only courses, special lectures, keynote speeches, etc. may also be submitted for inclusion. There are no general restrictions apply for such contents.

The details guideline for the content creation has been circulated among the participating universities (Spyropoulou et al. 2014). Generally, the content creation may involve the process as illustrated by Figs. 35.1 and 35.2.

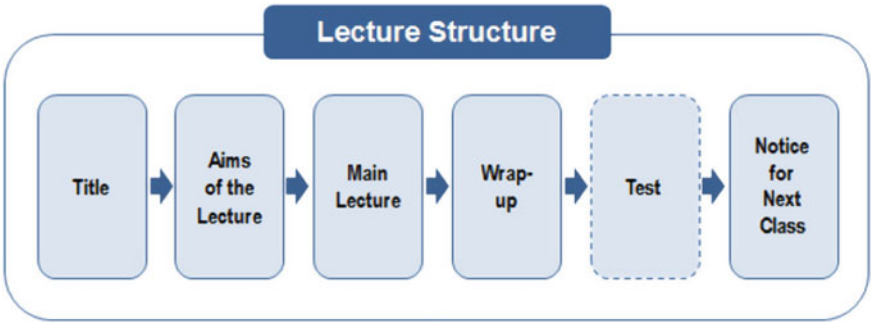

Fig. 35.1 Lecture structure

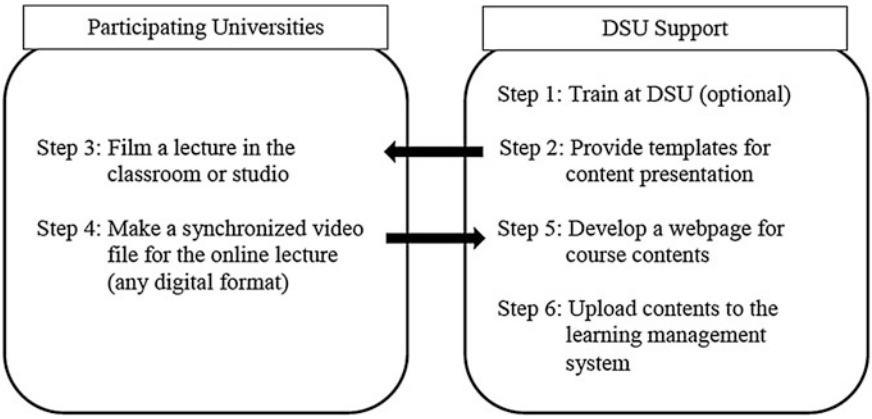

Fig. 35.2 Process of content creation

35.3.3 Credit Transfer

Credit-based courses offered through GAA should be handled in the same way as those offered through student exchange programs. Specifically, the institution offering a course should provide transcripts to each home institution with participating students. A multilateral academic cooperation agreement may be used to facilitate credit transfer. It is the responsibility of home universities to assess the applicability of any courses taken by their students.

Based on the course information provided on the GAA website, along with the transcript issued by the content providing institution, the home institutions shall determine the applicability of the course toward the student's degree requirements, the amount of academic credit to be awarded, and the score/letter grade to be assigned. The content providing and home institutions shall handle all necessary administrative procedures relating to the transfer of academic credits. Various

aspects of these procedures will likely have to be completed prior to the commencement of each semester.

35.3.4 Copyrights

Copyrights of educational contents offered through GAA shall belong to their original creators. Contents must be submitted together with a copyright release that permits them to be viewed by members of other GAA-participating universities. Additional permission to use or modify the contents may be extended to other GAA content-contributing universities. All necessary copyright permissions for the use of such materials shall be obtained prior to submitting the educational contents to DSU for inclusion in the GAA platform. Disputes regarding copyright infringement shall be handled according to the relevant national and international regulations and procedures.

35.3.5 Quality Assurance

A primary intention underlying GAA involves creating mutual benefits for participating institutions by sharing one another's top-notch educational contents. In order to ensure a high quality of educational contents, only contents endorsed by the Chief Official of the contributing university shall be offered through Global Access Asia.

35.4 Next Steps

The task force group has come out with planning for the next steps to make the successful of GAA as below:

March-May 2015: Participating universities are expected to send the lecture contents for upload to the Learning Management System (LMS) by the end of May 2015.
June 2015: DSU as a host for the GAA platform will finalize a list of available courses to be offered and to complete the uploading of course files to the LMS.
July 2015: Participating universities will start promoting GAA courses at their home institution and managing students' course registration.
August 2015: GAA will begin offering courses due to differences of academic semester schedules among participating universities.
September 2015: Target to officially launch of Global Access Asia (GAA).

35.5 Conclusion

Although it is not yet clear how digital education will evolve in the future, one thing is for certain, it is here to stay. If we are introduced to some of these changes now, we will likely have an easier time of adapting to what might still be on the horizon.

One of the most important outcomes of this collaboration project is the sense of pride and partnership felt by everyone involved. The transition to GAA can set participating universities on a positive path to achievement. The engagement of various institutions to materialise the ASIAN community development in all aspects have generated opportunities to boost strategic networking programs among members. GAA is able to play major role in contributing the success of such collaboration by focusing on the diversity and global role of Asia.

Acknowledgements The authors would like to express the deepest gratitude to GAA task force team and Asian University Presidents Forum (AUPF) members.

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Chapter 36
e-Learning Perception and Language Proficiency Among Students in a Malaysian University

Joseph Alagiaraj Thambu Raj, Christina Chin, Spencer Hedley Mogindol and Lindey Easter Apolonius

Abstract e-Learning is fast becoming one of the most popular modes of learning in our educational arena in recent years. The current trend of learning is very much influenced by the expansion of information technology, in tandem with the advancement of the internet age. Could e-Learning take over the teaching and learning process of the future? Maeroff (2003) believes that both online and traditional learning are here to stay. In context, the perception of e-Learning among students would give a clear indication of the possibilities of e-Learning as a means of effective learning mode of the future. Thus, a pilot study was carried out among 75 (44 Diploma and 31 Degree) students from UiTM Sabah to explore the relationship of e-Learning perception and the performance of English language at a national exam. The findings show that there is a strong relationship of 0.682 at significance level of 0.01 between the e-Learning perception that it helps in reading and language proficiency. It is concurrent with Sun et al. (2008) where the students find e-Learning eases and helps in the learning especially for those who had scored for most C+ to A+ grades in the English language national exam.

Keywords Effective learning · e-Learning perception · Language proficiency

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36.1 Introduction

The millennial age has introduced many new technologies in communication to help us in all aspects of life, especially in the teaching and learning process where e-Learning is birthed (Sun et al. 2008). One of the crucial advancements in this area is the world wide web or popularly known as internet which enables e-Learning to be an effective mode of learning for the current and future generations. Thus, the role of e-Learning is fast becoming crucial in the teaching and learning processes as can be seen with the endeavour of Massacussetts Institute of Technology (M.I.T.) to offer all its courses online (Crotty 2011). Furthermore, Sun et al. (2008) found that instructors attitude of e-Learning, perceived ease of use of e-Learning, perceived usefulness are some of the factors that affect learners' satisfaction towards e-Learning. Attitudes towards e-Learning can be used as a gauge towards providing suitable learning environments for teaching and learning in the classroom. The findings in this study could enlighten on the current scenario of e-Learning perception and the relationship to English language proficiency in UiTM Sabah.

36.2 Literature Review

Language is the medium between mind and learning where ineffective language distorts ideas (George 2007). This is crucial as learning a second language like English requires a strategy that can boost the teaching and learning and learning process. Thus, e-Learning can be an effective strategy to learn languages by incorporating engaging videos or presentations, enabling assessment to know the level of achievement as well as provide remediation for weak learners (Seise n.d.). The trend towards e-Learning is not to replace the instructors but rather to enable learning through effective delivery to the learners. This is further supported by Subramaniam (2013) where he stated that the approach to learn the English Language needed to be changed to produce proficient learners.

Despite the development of e-Learning, there are some grievances that need to be addressed, especially in the development of skills in e-Learning where social and emotional aspects of learning are sometimes neglected due to the technicality of e-Learning (Donlevy 2003). As a result, e-Learning might be at its infancy stage in many institutions due to the failure to create effective settings for learning (Herrington and Oliver 2003). Thus, measures must be taken to identify perceptions of e-Learning among students so that appropriate actions can be taken.

Strugar and Bedenik (2014) found that acceptance and success of e-Learning doesn't depend solely on students but also on public and management. Nevertheless, the perception of students can give a clear indication on whether e-Learning is effective in the teaching and learning process. Hence this research was carried out based on the following:

The research questions of this research are

i. What is the relationship between performance in English language and perceptions of e-Learning?
ii. Is there any difference in the perception of importance of e-Learning and the level of proficiency in the English Language?
iii. What is the perception of students towards the level of lecturers' use of e-Learning?

Research Design

This research was implemented through an online survey and random interviews where the survey questions were adapted from Hoesing (2004). The subjects were 44 Diploma and 31 Degree students. The data collected is based on convenience sampling from students who had undergone some experience using computers and internet as there are online assessments included as part of the syllabus of most courses in UiTM Sabah.

The findings in Table 36.1 show that there is a strong positive correlation of 0.682 between perception that e-Learning helps in reading and high grades of English Language in SPM (Malaysian National Secondary School Exam). It reflects the ability of students in the target language which motivates them to use e-Learning for reading. Hence, from class feedback, though e-Learning motivates these students to read but not all proficient students like to read online news but rather read social network postings like facebook and twitter. It is also noted that they need guidance by the instructors or lecturers on what articles they should read from online portals. Classroom instructions would be essential in providing a scaffolding effect on stdents to follow.

Thus, guidance from the instructors or teachers are crucial in e-Learning to promote effective learning. This can be done by relating the articles to be read and posing questions to enhance comprehension. In addition to findings from random interviews of 5 respondents found that students were more interested to read articles that relate to practical topics like relationships, money, role models rather than general topics like effects of smoking, physical disabilities and so on.

Table 36.1 Correlation of grades on the english language and the perception e-Learning helps in reading

			SPM English grade	Helps in reading
Spearman's rho	Grade SPM ENG	Correlation coefficient	1.000	0.682[a]
		Sig. (2-tailed)		0.000
		N	75	75
	Helps in reading	Correlation coefficient	0.682[a]	1.000
		Sig. (2-tailed)	0.000	
		N	75	75

[a]Correlation is significant at the 0.01 level (2-tailed)

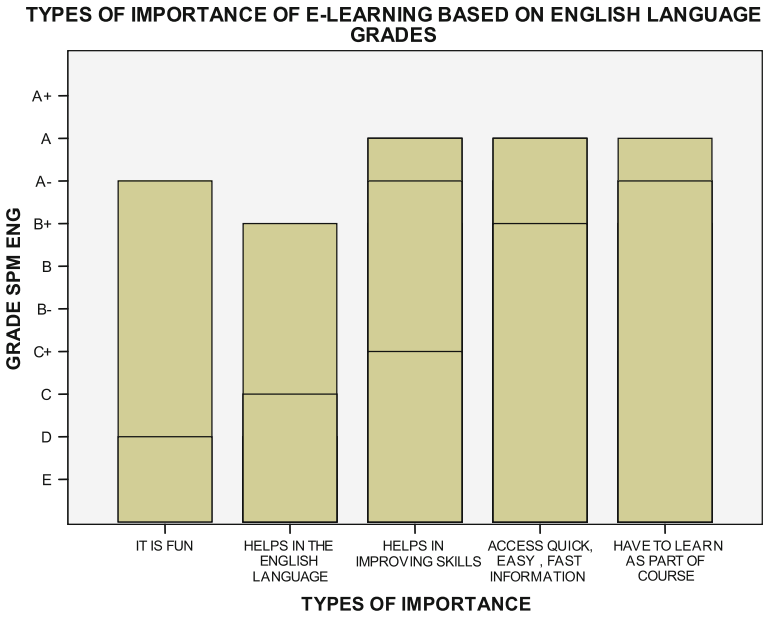
As for the analysis on types of importance based on Chart 1, on how e-Learning is associated according to SPM English grades shows that high proficient students who choose e-Learning as important indicated that they feel e-Learning can help them improve their skills especially in reading, help in accessing information fast and also feel that e-Learning is used as part of assessment in their courses. This also reflects the abiity of the students to use e-Learning to improve on their reading skills.

On the other hand, students who scored lower grades in the English Language perceive e-Learning to be fun and helps in the learning of English language only. From classroom interviews, these students tend to use Google Translator to find meanings of English words by translating the words or phrases into the Malay language. Hence, limited proficient students are dependent on easy way of getting an answer without focussing on the accuracy of the answer.

For example: "the valiant tailor killed the giants" translated to Malay would be "tukang jahit berani membunuh gergasi" which means the tailor was brave to kill the tiger.

As such without proper guidance by the instructors or lecturers they might not get an accurate meaning of the phrases. Thus it is crucial for instructors or lecturers to correct any wrong interpretation by the students.

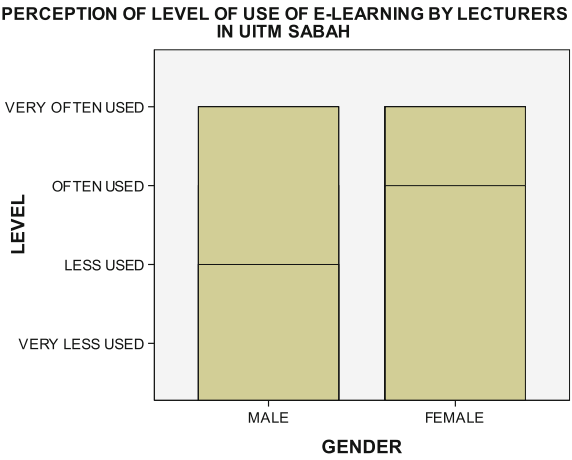
Chart 1



In terms perception of level of e-Learning used by lecturers in UITM Sabah in Chart 2 shows that the female students perceive positively towards the lecturers' use of e-Learning where they perceive the lecturers often and very often use

e-Learning in the teaching and learning process compared to 46.6 % of male students perceive that lecturers use e-Learning less in the teaching and learning process. Generally, this difference of gender perception towards lecturers' use of e-Learning can show that females are more psotive on their outlook compared to the males. Further research need to be carried out why male students do not have positive perception towards the use of e-Learning by the lecturers.

Chart 2



36.3 Conclusion

This research shows that high English proficient students know that e-Learning helps them to improve in reading generally. On the other hand low English proficient students perceive e-Learning as fun and helps them in reading. Thus, how it can help them is not clearly mentioned by low proficient students but guidance by the instructors or lecturers is crucial to direct the students to read appropriate materials accordingly. It also enlighten us that male students need to be given encouragement to use e-Learning by lecturers.

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Chapter 37
Mobile Phone App Insights: L-Listen, I-Interact, R-Reflect, A-Act (LIRA)

Lindey Easter Apolonius, Aries Henry Joseph and Joseph Alagiaraj Thambu Raj

Abstract The use of technology in the university implies that the future of classroom, including learning activities, will inevitably incorporate mobile phones. Indeed, mobile phones have become increasingly integrated into people's lives. Thus, in line with the blended learning method for the ESL learners in Universiti Teknologi MARA (UiTM), educators should integrate the use of mobile phones in the learners' learning process. However, the English Department of the university has not produced any mobile application (app) yet to consolidate the online task based listening activities for the ESL learners. At present, learners are required to get a list of a series of short stories on i-Learn; a UiTM learners' online learning portal. This self-learning activity, L-Listen, I-Interact, R-Reflect, A-Act (LIRA), has to be carried out outside classroom hours. Hence, a simpler, more reliable, and faster way to assess the listening materials is needed for the ESL learners to enhance their listening skills. Thus, a mobile app is intended to be developed for ESL learners to aid them in their language learning activities. A survey was then conducted to gauge their perceptions on the need of a mobile app in enhancing their listening skills. This paper contains the preliminary findings on learners' insights of utilising mobile app in learning. The discussion includes the opportunities and limitations of the use of a mobile app in language learning. This study aids educators' understanding of learners' needs and preferences in learning via mobile phones. Eventually, it will open pathways to innovations in mobile apps for language learning which align well with the learner-centered approach.

Keywords Listening · Mobile application (app) · Language learning activities · Mobile phones · Perception

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37.1 Introduction

The inclusion of technology in the language classroom in Universiti Teknologi MARA (UiTM) has certainly made learning more engaging. Hence, the reason UiTM employs blended learning methods which incorporates face to face instructions as well as online via the students' portal. The use of technology in the university implies that the future of classroom, including learning activities, will inevitably incorporate mobile devices since they have become increasingly integrated into people's lives. Thus, in line with the blended learning method for the ESL learners, educators may need to integrate the use of mobile phone through mobile applications (apps) in the teaching and learning process. Meanwhile, the English Department of the university has not produced any mobile application (app) yet to consolidate the learning activities for the ESL learners. Hence, the researchers intend to develop an application for language learning particularly for a self-learning listening activity. The actual use of the mobile app is predicted from the learners' acceptance of the app as proposed by Davis et al. (1989) in the Technology Acceptance Model. Thus, a survey on learners' acceptance on the mobile app for the listening activity was conducted and the findings gave insights on the need to develop a mobile app to assist learners in the language learning.

37.2 Literature Review

37.2.1 The Use of Mobile Phones for Language Learning

The effectiveness of mobile devices in the classroom has great potential for both teachers as well as language learners (Grimus and Ebner 2015). There is evident acceptance of the use of the mobile devices among language learners mainly in the three skills; vocabulary, listening and reading where the majority of learners prefer to acquire the skills through their mobile phones (Dang 2013). Empirical evidence has also shown faster acquisition using mobile devices (Pegrum et al. 2013). The fact that mobile phones have extensively infiltrated people's lives (Fujimoto 2012) and that mobile devices can be integrated in learning and teaching (Grimus and Ebner 2015), educators would be "foolish" not to take advantage of such devices in any learning context (Motiwalla 2007). Thus, numerous discussions on the use of mobile phones in the field of language learning have stemmed, and resulted diverse learning styles and methods (Baleghizadeh and Oladrostam 2010; Thornton and Houser 2005; Stockwell 2010; Chang and Hsu 2011). The potential use of mobile phones in language learning is vast as Kukulska-Hulme (2009) asserts that other than it enhances retention in learning, they offer a context where learners can learn individually, realistically and autonomously. This permits language learning outside the classroom using mobile phones (Kukulska-Hulme 2009; Kukulska-Hulme and Bull 2009) and opens the possibilities of development of mobile applications that scaffolds language learning.

37.2.2 The Perception of Learners on Mobile Phones for Language Learning

Although the possibility of development of mobile applications that scaffolds language learning is vast, it is necessary to gauge learners' attitudes towards the language learning application (Chen 2013). The understanding of the ways language learners perceives mobile devices as tools to support learning can aid instructors to improve utilisation of mobile devices in attaining the goals in language learning as instructors will be able to investigate how mobile tools can be used (Ibid.). There are conflicting findings in this area as shown in Fujimoto's (2012) and Chen's (2013) studies. Fujimoto (2012) found that most learners were opposed to using mobile devices in the classroom. On the other hand, Chen (2013), revealed that learners have a generally positive attitude towards the usability, effectiveness, and satisfaction of mobile learning. The positive perception of learners on the use of mobile technology can aid language instructors to achieve learning goals more effectively.

37.2.3 The Technology Acceptance Model (TAM)

The evaluation of mobile assisted language learning technology focuses on whether the technology is usable, effective and satisfactory (Sharples 2009). Following Davis et al. (1989) Technology Acceptance Model (TAM), the current study predicts learners' acceptance of the mobile application based on two factors: *perceived usefulness* and *perceived ease of use*. These two factors determined the learners' *behavioral intentions to use* the application. The model suggests that *behavioral intentions to use* will determine *the actual system use*. A direct relationship between *perceived usefulness* and *behavioral intentions to use* is also proposed by TAM. Figure 37.1 presents the Technology Acceptance Model (TAM).

The model in Fig. 37.1 defines *perceived usefulness* (U) as the degree to which a user deems that using the system will augment the user's performance. On the other hand, *perceived ease of use* (E) is specified as the degree to which the user deems

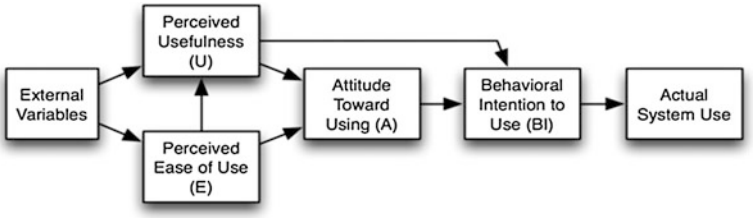


Fig. 37.1 Technology acceptance model (TAM) (Davis et al. 1989)

that using the system will be effortless. The model indicates that both U and E have a substantial influence on a user's *attitude toward using the system* (A). The user's b*ehavioral intentions to use* (BI) are modeled as a function of both A and U. The *actual use* of the system is determined by BI. Davis et al. (1989) affirm BI being the greatest predictor of actual use as it has been consistently confirmed in various research. The use of TAM in this study allows the researchers to predict the information system (mobile application) acceptance before the users have any significant experience with it. TAM has been found to be robust, that replication of it for different tasks and tools are vast (Adams et al. 1992; Morris and Dillon 1997). The developed scales to gauge *perceived usefulness*, *perceived ease of use*, *attitude toward using*, and *behavioral intentions to use* have been validated in previous research (Davis 1989) and are adapted for use in this study.

37.3 Research Design

The ESL learners who took an English course in the first semester diploma course had to fulfill the course requirement by listening to a series of short stories (audio files) on the Internet. The selected lists of short stories were uploaded by the English department of the university on the learners' online learning portal (i-Learn). The self- listening activity, L-Listen, I-Interact, R-Reflect, A-Act (LIRA), is normally carried out during non-class hours. The learners would then be assessed on their listening comprehension skill every 5th, 8th and 11th week of the university academic calendar. Hence, a mobile survey was disseminated by the research team through purposive sampling method to four (4) groups of various courses to gauge their perceptions of a mobile app for the LIRA listening activity. The mobile survey was sent to the participants (N = 119) through the text messaging system, after the academic session was completed.

37.3.1 Research Questions

The survey dealt with the following research questions. It mainly focused on the learners' perceptions of a mobile phone app for language learning.

1. Which type of phone operating system is used among learners?
2. Have learners ever used mobile phone apps for language learning?
3. What perceptions do learners have on the use of mobile phone app for LIRA?
4. What do learners think of the opportunities and limitations to learn the language via mobile phone apps?

37.3.2 Data Collection

The mobile survey was designed to take approximately 15 min to fill in and was kept brief for a higher return rate from the participants. The survey consisting of 10 questions was based on the Technology Acceptance Model (Davis et al. 1989) and adapted from Fujimoto (2012). The questions covered the crucial points which provided answers to the research questions which were mainly learners' previous experience, perceptions, opportunities and limitations of mobile apps for language learning. There were no questions on learners' personal details to protect their privacy in the survey. The questionnaire consisted of "Yes" or "No" and several open-ended questions. All findings that were reported and analysed from the survey were of descriptive statistics.

37.3.3 Limitations of the Study

The survey questions in the study were based on the Technology Acceptance Model (Davis et al. 1989). The scales to gauge perceived usefulness, perceived ease of use, attitude toward using, and behavioral intentions to use have been validated in previous research (Davis 1989) and are adapted for use in this study. Thus, the scales used in the current study were not validated and checked for its reliability as the researchers believed that they would present similar results on validity and reliability test. The nature of the survey did not allow the questionnaire to be presented as in a printed form since it was conducted via text messaging system. Thus, it has to be presented in a simplified version.

37.4 Results and Findings

The findings in the survey were presented using cumulative percentages. The results were described in terms of the mobile device operating systems, learners' perception of a mobile app for LIRA, the opportunities and limitations of mobile apps for language learning. The survey was conducted for five (5) days and only N = 84/119 participants responded voluntarily.

37.4.1 Learners' Mobile Phone Operating System

The main thing that sets these types of mobile phones apart is the operating system that they run. The operating system (OS) is the pivotal software that makes the phone works. The platform operating systems for smartphones are Android OS and

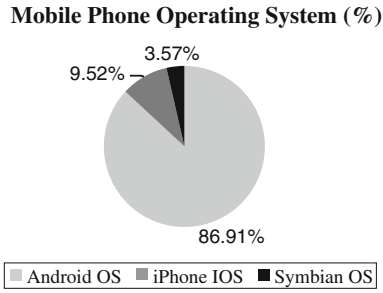


Fig. 37.2 What type of operating system does your mobile phone use?

the iPhone iOS, while other digital phones use the Symbian system. As shown in Fig. 37.2, the findings indicated that most participants (86.91 %) use android mobile phones. The rest of the participants (9.52 %) used iPhone while only 3.57 % participants used mobile phones that use the Symbian mobile operating system.

37.4.2 Learners' Previous Experience of Using Mobile Apps for Language Learning

As shown in Fig. 37.3, a large percentage of participants (96.43 %) of (N = 84) had previous experience in using mobile phone applications for language learning, while only 3.57 % participants had never used any mobile app before. The survey also included an additional question on types of mobile apps that they used for language learning. Hence, the mobile apps used were of dictionary, thesaurus, translator, and grammar.

37.4.3 Learners' Perceptions of a Mobile Application for LIRA

Based on TAM analysis, the *perceived usefulness* (U) of the mobile app for LIRA is presented in perception 1 and 2. A high percentage of participants agreed that a

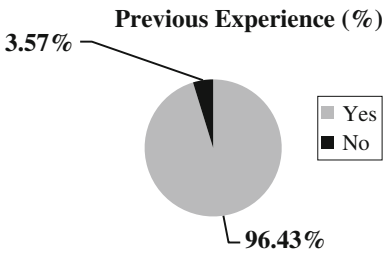


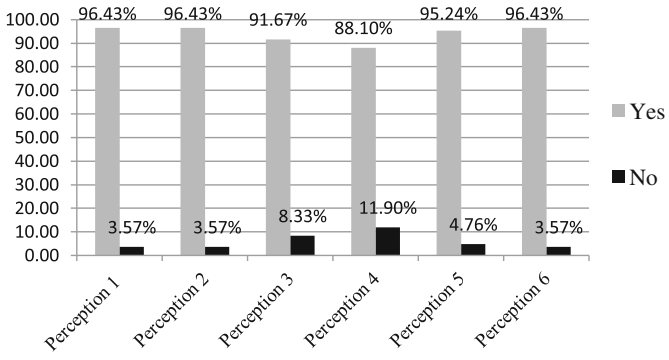
Fig. 37.3 Have you ever used any mobile phone application for language learning?

mobile app for LIRA will help them (96.43 %) and will also be useful for LIRA listening activities (96.43 %). Meanwhile, the *perceived ease of use* (E) of the mobile app for LIRA is presented in perception 3 and 4. The findings showed the participants' positive perceptions of the ease of use of the LIRA mobile app. Hence, the perceptions on mobile app will allow easy access to LIRA listening materials (91.67 %) and will be easier to use for LIRA than going online were reported (88.10 %). As indicated in the TAM model, both *perceived usefulness* (U) of the mobile app and *perceived ease of use* (E) of the mobile app have a substantial influence on learners' *attitude toward using the mobile app* (A). Thus, it is revealed from the findings of perception 5 and 6 that learners have a positive attitude towards the use of mobile app for LIRA. This is further shown from the finding of perception 5 that mobile app will prepare them for LIRA assessment (95.24 %) and perception 6 indicates that mobile app will be the participants' preference to do LIRA activity (96.43 %). Hence, it is established that the participants have a positive *behavioral intentions to use* (BI) the mobile app. This survey thus predicts the learners' acceptance on the mobile app for LIRA and estimates the high usage of the mobile app when it is made available (Table 37.1).

37.4.4 Learners' Opportunities and Limitations

The survey also took into account the participants' views of mobile apps' opportunities and limitations of language learning. The questions were in open-ended

Table 37.1 The perceptions of learners on a mobile app for LIRA



Perception 1- Mobile app will help me with my LIRA listening activities.
Perception 2- Mobile app will be useful for LIRA listening activities.
Perception 3- Mobile app will allow me easy access to LIRA listening materials.
Perception 4- Mobile app will be easier to use for LIRA than going online.
Perception 5- Mobile app will make me prepared for LIRA assessment.
Perception 6- Mobile app will be my preference to do LIRA activity.

form. Hence, the opportunities viewed by participants in language learning were the development of other mobile apps such as language games, grammar games, local bookstores for language materials, dictionary and thesaurus: "I have always used dictionary app in my phone, perhaps if there could be more apps like language or grammar games, it would be good" and "I can spend hours playing games on my phone, maybe if I can play while learning, I may improve my English". It was also mentioned in some of the feedbacks that the use of mobile apps in learning enable them to learn anywhere and at anytime to their convenience: "With mobile apps, I think I can learn English better as I don't just learn in class during English lessons". Another participant stated: "We have classes from morning till evening, maybe if we use mobile apps for learning, we don't need to come to class all the time". Therefore, learning language through mobile apps could give them variety of learning methods and learning would be more fun and exciting. Meanwhile, the Symbian OS phones owners or participants gave positive view on mobile apps developments. They considered changing their mobile phones to smartphones as to keep up with the evolution of learning in the university: "Using mobile app for learning is new. If the university uses mobile app for learning, then I might get a smartphone".

Meanwhile, two participants also noted that one of the possible limitations for mobile apps was the file's large size: "I love learning apps but too many apps will use more of my phone memory"; "My phone get (sic) slower when I download too many applications"; and "I can't install an application if the file is too big and the university wifi is not available". In addition, participants mentioned that learners could easily be distracted whilst listening to LIRA materials if other applications were also used simultaneously i.e. Text messaging on social network: "When the notification for new messages on Whatsapp pop up, I think I'll stop listening and check the message instead" and "I'll get distracted during the listening activity when the Facebook notification suddenly appear (sic) on my screen". Nonetheless, they did not object to the development of the mobile apps as they felt it was deemed necessary to integrate all technologies to assist learning: "Although I get distracted, I think language learning app can help me improve my English". Hence, the responses from the participants were mostly positive. Although there were limitations, most participants were ready to accept the additional method in hope that the learning of language would be further enhanced and consequently beneficial to future language learners in the university.

37.5 Conclusion

Overall, there were encouraging observations that were made from the data. However, this survey was not without limitations which had been discussed earlier. Through consideration of the responses made by participants, most of them demonstrated a positive attitude towards the use of a LIRA mobile app. According to Davis et al. (1989) the participants' behavioral intentions to use (BI) are modeled

as a function of both attitudes towards using the mobile app (A) and perceived usefulness of the app (U). Thus, the study can conclude the positive acceptance of the actual use of the LIRA mobile app. This reaffirms that the future development of the mobile app will be of use to learners. Therefore, the research team will soon develop the mobile app and thereafter conduct a further research on the use of the mobile application for language learning.

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Chapter 38
A Conceptual Framework for Online Training Effectiveness in Malaysian Public Sectors

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Abstract In a constantly changing and evolving global and organizational environment, it is considered necessary to improve the skills of human resources. With a view to understand online training effectiveness among employees, a proposed model is extended from the existing related models based on the conceptual studies. The innovation of information technologies nowadays has contributed to the exponential expansion in business online training. This study uses case study in identifying current status of online training implementation in Malaysian public sectors and what are the criteria of online training implementation determined through different perception of stakeholders. This study was conducted to construct a research model on online training effectiveness qualitatively. In finding the gap of the study, several literatures on online training issues have been reviewed. Based on the literature review, the study posited four constructs adopted from Kirkpatrick's learning theory through Multiple Perspectives Theory lens, which are believed can influence online training effectiveness. The proposed model will be used to understand multiple perspectives of online training implementation among employees in Malaysian public sectors.

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Keywords Online training · Online training effectiveness · Kirkpatrick's learning theory · Multiple perspectives theory

38.1 Introduction

Workplace training has played a vital role in the gaining of knowledge and skills involved to keep up with this information explosion. Online training becomes priceless in the industrialized world as adult learners are restricted to attend face to face training due to time and geographical constraints. Online training is a technique of distributing information throughout an electronic medium without the immediate existence of a human being instructor. By taking benefit of technology, online training can be more cost effective in distributing more knowledge in a more flexible and efficient manner. The innovation of information technologies nowadays has contributed to the expansion in online training. This development of online learning allows employee to gain training experience without attending traditional classroom training. As an organization strives to boost their competitiveness by constantly encourage continuous learning culture, online training continues to grow in popularity as the organization struggles to better meet their immediate and strategic needs for a flexible, well-trained workforce (Ramayah et al. 2012).

The number of employees attending online training courses have increased tremendously when very low percentage of course completion by the employees have been reported, thus raised many questions as whether the online training implementation did not reached its target. Due to lack of studies on what happen to the online training after its initial adoption, implementation and use especially in the context of Malaysian public sectors, the researchers found the need to identify and understand online training effectiveness in these organizations. This includes the current status of online training implementation and multiple perspectives of the stakeholders towards the implementation of online training. The aim of this study is to understand online training effectiveness among employees in Malaysian Public Sectors possibly by adopting the proposed model extended from the existing models based on the conceptual studies. The proposed objectives of the study are to develop a new framework to study multiple perspectives of online training effectiveness in the organization, to identify the criteria of the online training effectiveness in the organization based on the multiple perspectives of the stakeholders, to understand the effectiveness of online training in the organization and to develop a set of online training guidelines to be used by public sectors as reference in improving their online training implementation.

Public Sector e-Learning or better known as EPSA™ is an online training portal provided for employees in Malaysian public sectors as model approach to training/learning independently that are accessible anytime and anywhere. EPSA™ is an initiative of the Malaysian Government mandated to National Institute of Public Administration (INTAN) to promote the use of ICT in continuous and lifelong learning for public sector employees. These employees, either pre-service,

in-service or post-service are eligible to become members as it allows learning to be more cost and time effective. In the information age, the need for continuous learning has created high demand for learning. As a result, the demand for education is beyond the capacity of traditional delivery capability in training institutions. Thus, this online training platform is an inspiration to accommodate to a more challenging training delivery in the global economic environment that could not be housed through physical education in the classroom.

38.2 Literature Review

Some companies measure the success or failure of the implementation based on job performance and others measure based on the outcomes of the program. Success in implementation on performance can mean quality, quantity, or a new way of doing business. The results focus on the strengths and weaknesses of how results are produced. The outcome of effective e-learning might include improved performance, greater speed to market, increased operating efficiency, higher retention, and greater return on investment (Hodges 2009).

Being in an electronic format does not ensure that training is effective and for this type of training to be effective, an online training course must be interactive and can help learners to understand the content easily. The course material and its interface should be streamlined while video and audio instructions are incorporated with interactive simulations as well as testing modules. If it does not add to the real content of the course and increase the knowledge of your trainees, then all of the interactive multimedia elements will end up being more distracting than helpful. The technical design and format will impact how easily learners can learn such as inserting elements of good quality graphic and multimedia system with an appropriate music and sound system (Lim et al. 2007). When designing materials for online training, designer needs to consider the constraints of the employees who have employment, family commitment, and other responsibilities, which may limit their time to learn and finish courses. If the learning system cannot be used easily and efficiently and learners have to spend much time locating information, users become easily frustrated or lose their interest in the material (Park and Wentling 2007). The self-paced flexibility of online training can lead negative as well as a positive outcomes. Although employees have their own flexibility to take the training when it fits their own schedule, but some online training have sets of schedule, with duration and a start to end date or time. Thus, employees probably prefer to have the online training course available on computers inside a dedicated training room. Assigning specific times for trainees to come for training in an environment where they can train undistracted. There is an assumption that because staff have access to training materials they can make use of this in their own time. Such assumptions provide justification that proper materials need to be developed to ensure that online training does not unpleasantly affect employees' work-life balance (Bandopadhyay and Kumar 2005).

Online training environment should be similar to a traditional face-to-face training environment in providing conducive place where learning takes place and learners can have better concentration for them to learn at their own pace and time. When these factors are well taken care off, online training can be highly effective. Either as an addition to or a replacement for the face-to-face classroom environment, online training can be a strong part of your organization's training environment. In the findings by Ruggeri et al. (2013), mixed results were generated but eventually lead to the conclusion that most online training programs are far more effective than no training intervention and are as effective as traditional teaching methods, although positive comparative effects are varied and frequently small. Most organizations keen to expect that online training provided to employees will be able to deliver training more efficiently. However, many arguments have been addressed with organization intentions as to whether efficient online training are related to cost savings matters. In some respects, many researchers found that online training providers view the need to deliver training more efficiently as almost synonymous with cost savings rather than as a matter of addressing issues of quality (Newton and Doonga 2007). Nevertheless, research and evaluation of online training is still limited and does not provide indefensible evidence of its superiority over traditional educational and training delivery methods (Schmeeckle 2003).

While e-learning has been promoted to various levels of users, the intention to continue using such system is still very low (Chiu et al. 2007). Although initial acceptance of e-learning is an important first step toward achieving e-learning success, actual success still needs continuous usage. Among many different theories being studied, Kirkpatrick's Learning is one of the theories that were used to relate to online training effectiveness. Kirkpatrick's Learning Theory (Kirkpatrick 1998) is designed with four levels of evaluation; reactions to the training, learning measures, behavior measures, and results. The link between the training and such long-term results is unclear. Long-term results are affected by multiple causes, and training may be only one of the many possible causes. Holton (1996) also provided the definition of this concept as the degree to which trainers apply to their jobs the knowledge, skills, behaviors, and attitudes they gained in training. The model is interpreted by most of its supporters as requiring evaluation at each of these levels and that there is an increasing logical progression. The four-level Kirkpatrick's model is tested to be appropriate for evaluating e-training (Lanqin et al. 2013). Learning level of Kirkpatrick's model is most commonly used to evaluate corporate training programs (Kramer 2007; Strother 2002). Another study done shows that program evaluation at the reaction and learning levels occurs more frequently than at the behaviors and results levels because they are more immediate and usually much easier to measure (Long et al. 2008).

Apart from Kirkpatrick's Learning theory, there are three other theoretical models that have been widely used in the field of Management Information System to explore the adoption and success of information systems. Bhattacherjee (2001) proposed an Expectation-confirmation Model (ECM) of Information Technology (IT) continuance based on the congruence between individuals' continuance IT usage decisions and consumers' repeat purchase decisions. The ECM posits that an

individual's intention to continue IT usage depends on three variables: the user's level of satisfaction with the IT; the extent of user's confirmation of expectations; and post-adoption expectations, in the form of perceived usefulness. The theory is then adopted from various researchers which relate to the online learning environment. According to the study done by Lee (2010), satisfaction has been proved as the strongest predictor of users' continuance intention, followed by perceived usefulness, attitude, concentration, and perceived behavioural control. The technology acceptance model (TAM), derived from Davis et al. (1989), in particular has become a well-established and powerful model for predicting usage intentions and acceptance of new information technologies, such as internet instant messaging services (Wang et al. 2005), online banking (Pikkarainen et al. 2004), blogs (Hsu and Lin 2008) and on-line games (Hsu and Lu 2004). The other well-known theory, Information Systems (IS) Success Model, proposed by DeLone (2003), was also developed for system evaluation and explaining users' usage intention and satisfaction (Bharati and Chaudhury 2004; Kulkarni et al. 2007). In short, TAM, IS Success Model and ECT are all classic theories adopted by the discipline of Management Information System to explore the behaviours of information system usage.

Many studies on online training focus on measuring and finding out the implementation in learner's perspective (Lim et al. 2007; Long et al. 2008; Park and Wentling 2007; Ramayah et al. 2012; Ruggeri et al. 2013). It also has been argued that many of the studies on online training implementation uses models that focused more on individual level than other perspectives. Therefore, this study choses to combine and extend the Kirkpatrick Learning theory (Kirkpatrick 1998) and Multiple Perspectives theory (Linstone 1989).

38.3 Conceptual Framework

The integration of Kirkpatrick Learning and Multiple Perspectives theory results in the development of multiple perspective of online training implementation framework as illustrated in Fig. 38.1 as the theoretical framework to conduct the empirical research for this study. The framework intends to fill the mentioned gap by looking at the implementation of the online training from various different perspectives beyond individual context within the organizations as it is also suitable to be used in studying organizational context. The understanding of the implementation is a mutual concept and therefore involves two-way process of how the technology affects and is being affected by users. Thus, the concept is being applied to the three perspectives and how they iteratively influence and are influenced by the online training implementation process.

The Organizational Context analyses the viewpoint of the organizations reviewed based on the data collected from the organizations. It describes the duration of data collection, who are the respondents being interviewed, the main activity or services of the organization, the duration that online training has taken

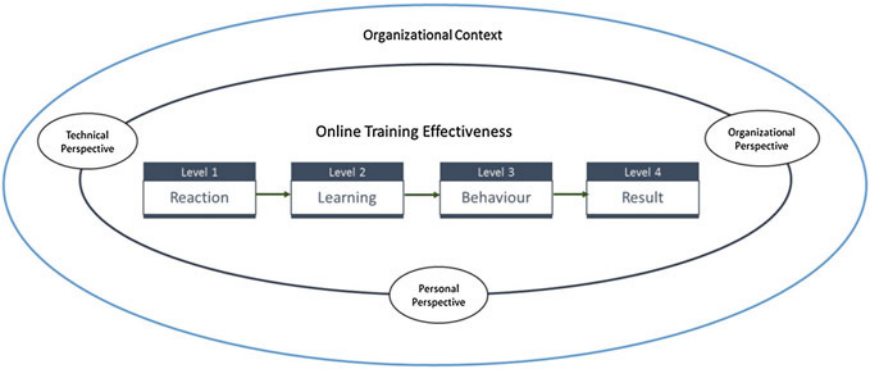

Fig. 38.1 Conceptual framework for online training effectiveness

place in the organization, and the feedback from the top management level towards online training implementation. The policy of the implementation, size of the organization and also the overall IT literacy of the staff in the organizations will also be studied in the organizational context analysis.

The reaction level identifies how the learner personally feels about the training program. It may include their motivation to learn, in other ways the positive reactions of attending the training program, or the negative reactions that may discourage the training occurs (Kirkpatrick 1996, 1998). In the case of online training, it may identify and understand the participants' impression on the various aspects of the training program, which may include the course offered, the content provided in the course and so on. In addition to that, this level also will help the researcher to identify the view of the online training provider on their feelings towards implementing the programs, such as readiness of this group of people in providing the technology. As for the organization's views, the reaction level may identify how the organizations as a whole reacts to the implementation of online learning, which will assist the organization in the motivation or vice versa for the employees to attend the online training program.

In this study, this level of learning will be looked at different aspects of the stakeholders. First, it will be used to identify employees' views of the knowledge and skills acquired from the online training program. Then, the understanding of the learning level will also be identified from the views of the online training providers, for instance, the methods of evaluation used in determining the level of knowledge and skills obtained by the participants of the training programs. As for the organization, this level will help the researcher to recognize organization's point of views of the result of this online training program evaluation and what are the use of this result to the organization.

The behavior level supposed to claim that whatever changes in the employee's individual reactions to online training from the first two level are able to be

identified by compiling the survey. In determining the implementation in this level from the organization's point of view, the overview of the evaluation process will be obtained and understand as this will be a contributing factors to organizational performance either directly or indirectly (Strother 2002) in the long run.

Result level focuses on evaluation attempts to measure the results of training as it directly affects an organization as a whole. This result may be difficult to evaluate because it attempts to evaluate direct impacts of the training to the organizations, which in this case, this will affect both in traditional face-to-face or in online training programs. Organizations may expect that based from the result of this level, reduced costs, higher quality service, increased productivity, and lower rates of employee turnover or absenteeism are the desired results of training programs.

38.4 Research Methodology

Based on the nature of the research questions, this study is best suited in qualitative approach because it accommodates in identifying and understanding multiple perspectives of online training effectiveness among employees in Malaysian Public Sectors across different departments in Malaysia who had experienced using and handling online training at their workplace. The qualitative approach gives the researchers a comprehensive perspective on the phenomenon under study by having conversations with participants in their natural settings to make sense, or to interpret phenomena (Creswell 2012). Case study method suits this study, and the focus of this study is on the effectiveness of online training which correspond with statement made by Benbasat et al. (1987) which concluded that "the case strategy is particularly well-suited to IS research because the technology is relatively new and interest has shifted to organizational rather than technical issues".

The chosen research design for this study comprises of interview and observation. The population framework consist of all employees who are involved in online training either at the ministry, department or government agency in the public sector of Malaysia. The sampling framework for this study consist of selected employees in public sector who are involved in online training either at the ministry, department or government agency at Putrajaya and Klang Valley. The sample of the survey for this study will involve 20 ministries, departments or agencies who had used or currently using online training, which will involve 25 employees at the targeted ministries, departments or agencies from the top management with grade 48 and above and middle management level with grade 41 to 44. Observation will also be conducted on the employees from any three ministries, departments or agencies who is involved in e-learning.

38.5 Conclusion

This research will be contributing towards generating knowledge to the researchers and gives impact to the future of training technology. The knowledge of the participants on online training depends on their understanding of the implementation and use of online training and their own experience throughout their usage of the applications. In summary, this study highlights important factors to be considered by organizations which have already adopted online training system or those considering embarking on this trend. The significance of both management support and organizational support in predicting user continuance intention to take a more active role in ensuring the success of the online training system. This study offers valuable insights to the organization and IT managers pertaining to online training effectiveness. While organizations are well aware of the benefits that online training brings, many do not recognize the critical factors that influence the success of the implementation. Potential online training benefits gained by the employees will help to ensure that organization achieves their return of investments.

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Chapter 39
Development of a One Stop Distance Virtual Learning (DVL) Program for Diploma of Pharmacy Students During Hospital Attachment

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Abstract Blended Learning is the process of incorporating many different ways in which people learn (learning style). As far as pharmacy students are concerned, part of the university-based curriculum, students are required to attach for two semesters in various government hospitals in Malaysia where they are going to be evaluated on their pharmacy practices performance and research projects. Communications are essential for students, hospital preceptors and lecturers during all process. Various medium are utilized including I-Learn, however all medium are not entirely equipped with all essential communication needed. This research aims to develop a one stop Distance Virtual Learning (DVL) program for a fifth and final year Diploma of Pharmacy Students, UiTM Pulau Pinang, Bertam campus who attached at various hospitals in Malaysia. This program was developed using Moodle Platform which is an open source learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments. By using Moodle version 2.8 on an out site server, the modules provided our program with Discussion Forum, Quizzes, Embedded Multimedia, Database, Book, Live Chat and Video Conference. Once registered to the Moodle web portal, students can participate in each of the modules and connected with lecturers where they can address their personal ways of their learning needs. Lecturers' roles are moderating discussions and activities in a way that collectively leads students towards the learning goals of the subject. DVL module, have enhanced the teaching and learning effectiveness of students and lectures.

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Keywords Blended learning · Pharmacy students · Distance virtual learning (DVL) · Hospital attachment

39.1 Introduction

The graduated student quality is the needs factor to student achievement development. Quality ongoing professional development contributes to student growth and success. The student's learning style has been changed, from Gen. X to Gen. Y and to Gen. Z. The quality content and resources that are available to teachers from any place and any time, and the diversity channel of learning that can help student to get their knowledge that can deliver relevant, accessible, and ongoing support has stimulated the development of online teacher professional development programs. The limited learning environment to let student get the opportunity to exchange and share knowledge is decreased between them in real situations. Online teacher professional development programs make it possible for educators to communicate, share knowledge and resources, and reflect via asynchronous interactions. Online learning courseware and Virtual world programs can make it possible for the student to learn has no limit and to communicate, share knowledge and resources (Pattanasith et al. 2015).

Blended Learning is the process of incorporating many different ways in which people learn (learning style) through the use of "blended" virtual and physical resources that include a variety of learning activities and the use of technology (Harona et al. 2011). The Ministry of Education's definition of Blended Learning is "***A mix of face to face and online learning mode where between 30 and 80 % of the course content and activities are delivered online***" (Friesen 2012). A typical example of the delivery method of blended learning would be a combination of technology-based materials along with face-to-face instruction used in the content delivery. A lecturer can begin a course with a well-structured lesson in the classroom, and then to follow-up with an online tutorial. The students then join the online tutorial to continue the learning experience. The integration of a Learning Management System and the traditional face-to-face instruction also be fits the term blended learning. Blended learning is describing the flexibility of space and time learning, archiable communication, and individual 360° self-learning. The module supposes to be interactive, constructive and co-operate engagement. This program also reduces the inhibition of students and communications are clearly tracked (Bonk and Graham 2006).

In the health care base curriculum, Information Technology (IT) in the past decade forced radical changes in health care delivery and patient-oriented care around the globe (Towle 1998). These progressions resulted in worldwide amendments of pharmacy curricula and teaching methodologies to meet increasing demands of an advanced IT based healthcare system (Masys 1998). Within this context, Information and Telecommunication technologies (ICTs) are now being adopted as mode of effective course delivery and teaching aid at various educational

levels. Such tools offer learners a control over content, pace of learning, and time management allowing them to tailor their experiences and accomplish their learning objectives in a timely fashion (Adams et al. 1992; McFarlan 1984; Powell and Dent 1997). Therefore, e-learning is a useful teaching tool in education and is defined as "the use of internet technologies to enhance knowledge and performance" Ruiz et al. (2006).

As far as pharmacy students are concerned part of the university based curriculum students are required to attach for two semesters in various government hospitals in Malaysia including Sabah and Sarawak. During their attachment, they have to take certain assessment based on pharmacy practices of various discipline. On top of that they have to be evaluated by lecturers and preceptors on their performance using their log book. They are also needed to conduct a research project in various fields of pharmacy practices. The projects are supervised by the lecturers on the campus and their preceptors in the hospital. Communication is essential to fulfill the requirements need. Right now, the medium of communication used are Facebooks, emails, Whats App's, faxes and I-Learn.

I-Learn is a program developed by UiTM to offer the online communication between students and lecturers. As far as I-Learn is concerned the system is lacking in communication where the onset chatting, skypes and video conferencing are not possible. The system is not fully equipped with all medium of communication essential for the training effectiveness. Sometime students and lectures needed to skype between each other or using video call to have a better quality of conversation on certain issues that needed to be clarified in further details. On the other hands emails, WhatsApp's and sms will cramp coordinators computer inbox and hand phones memories. The current practice is, students are evaluated through log book provided and no communication between lecturers and preceptors before the evaluation. They only scan the reports and send by emails or hard copies. Some of the marks given needed to be further clarified with the lecturers because some hospitals have different available facilities for training purpose and the exposure of students towards certain issues are various. Blended learning is the best solution for this problem. To date, I-Learn is the best platform to serve the blended learning strategy. However I-learn has many limitations. Other than not a real time communication, it cannot do teleconferencing/video conferencing and skype. All these media of communication are important to have an effective training program, saving student's time, and financial.

This study aims to develop an appropriate model of a one stop Distance Virtual Learning (DVL) program for a fifth and final year Diploma of Pharmacy Students, UiTM Pulau Pinang, Bertam campus who attached at various government hospitals in Malaysia including Sabah and Sarawak.

39.1.1 Literatures Reviews

Blended courses have proven to be among the most popular choices for students at institutions where they are offered. At first glance, this popularity seems intuitive

because blended courses allow students and faculty to take advantage of much of the flexibility and convenience of an online course while retaining the benefits of the face-to-face classroom experience.

Although fully online learning has become well established in higher education, many institutions appear to be struggling with conceptualizing and implementing blended learning. Yet, where blended courses have succeeded, they have most often done so when strategically aligned with an institution's mission and goals. The development and delivery of blended courses can be used to address a variety of institutional, faculty, and student needs.

- For universities, blended courses can be part of a strategy to compensate for limited classroom space, as well as a way to think differently about encouraging faculty collaboration.
- For faculty, blended courses can be a method to infuse new engagement opportunities into established courses or, for some, provide a transitional opportunity between fully face-to-face and fully online instruction.
- For students, blended courses offer the conveniences of online learning combined with the social and instructional interactions that may not lend themselves to online delivery (e.g., lab sections or proctored assessments).

If an institution's blended learning strategy can be designed to address the needs and dynamics of all three constituencies (institution, faculty, and student) simultaneously, then blended learning can become a powerful force for institutional transformation. Blended learning have been implemented in many thought subjects in Malaysia. However, there are limited modules developed for research and industrial students.

39.1.2 Study Objective

This study was conducted to enhance the training effectiveness of Diploma of Pharmacy students attached at various government hospitals in Malaysia. This will cover.

1. The evaluation of the current problem faced by students, preceptors and lecturer through a qualitative survey.
2. The identification of the medium used in the distance learning.
3. The development of a model which of e-learning (blended learning).
4. The organization of a trial run on the developed module.
5. The assessment of the effectiveness of the module developed through qualitative survey.

39.2 Methodology

39.2.1 Study Design

The method of study comprises of three phases.

1. **The first phase** focus to study the model of i-Learn provided by UiTM.
   - 1.1 Analyzing the elements of online learning included the learning and teaching online learning activities management system.
   - 1.2 Analysing the elements of virtual learning environment included the virtual environment tools and channels to learning and teaching.
   - 1.3 Analysing the problem faced by students, hospital preceptors and students through I-Learn module.
   - 1.4 Analysing alternative medium used by students, preceptors and lectures to enhance the effectiveness of training.
2. **Second phase**
   - 2.1 Developing a module of one stop Distance Virtual Learning (DVL).
3. **Third phase**
   - 3.1 Conducting a try out method to the Diploma of Pharmacy students.
   - 3.2 Studying the efficiency of system DVL for part 5 and part 6 students.

Study population:
The population were the fifth and final year Diploma of Pharmacy Students, UiTM Pulau Pinang, Bertam campus who attached at various government hospitals in Malaysia including Sabah and Sarawak. Diploma of pharmacy students were selected as study subjects to participate in this DVL program.
Research tools:
The model of Learning through Distance Virtual Learning (DVL).
The student's learning outcome form.
The student's satisfaction form.
Data analysis:
Qualitative data.

39.3 Result

A. **From the qualitative surveys conducted, we found out that**:

Students:

1. Complaining about lack of communication between lecturers and students to assist them on research methodology and writing a good thesis especially on statistical parts.
2. Too many assessments needed to emails, fax, and some time lost during the process.
3. Log books. Too many log books to be scanned, email, fax. Taken so much of students' time.
4. Travelling to Penang for Final year presentation is very costly, especially from Sabah and Sarawak.
5. Certain issues cannot be settled by a quick time.

Lecturers.

1. Not enough supervision offered to the students and the clinical visit conducted only once or twice per semester is not enough to cover all instruction and formats.
2. Log books send by students sometime missing, have to call and remind again. More work needed.
3. The assignment given cannot be collected on time, drag the lecturers works.
4. Lecturers instruction/comments were not well captured by the students, the expected output are not met.

Preceptors:

1. Some issues related to training, i.e., students allowance, students attitude problems, etc., needed to be conveyed and reported as soon as possible to avoid further worst consequences.
2. Lack of communication between preceptors and lecturer are the major problem faced by them. More communication is needed to enhance the training effectiveness.
3. Fax, phones, emails, sometime cannot fulfill the problem solving issues when more discussion and elaboration are expected.

Coordinators.

1. Lack of communication between lecturers, students and preceptors make it very difficult to solve the problem.
2. Each hospital have different policy and standard operation procedures which needed to be dealt case by case.
3. The distance between hospitals makes it impossible for all parties to sit at the same table to discuss all issues.

B. **Module development**:
From the qualitative feedbacks received from students (previous cohort), lectures, preceptors, and coordinators, we developed an e-learning program which we named it as "One stop Distance Virtual Learning (DVL)". With this program students are capable of conveying an online real time chat with their peers, lecturers and preceptors. Preceptors also are allowed to log in and communicate with their peers from other hospitals, their students and also the lecturers in the UiTM campus. With the availability of skype and teleconference facilities, all meetings, discussion, presentation can be conducted at any hospitals in Malaysia. Other than the common communication similar to what is provided in the I-Learn, DVL can complement the assisting system and at the same time can give more support to the distance learning environment. With DVL system it is possible to arrange final year project presentation through teleconference for the students who are attached far from UiTM Pulau Pinang especially of East Malaysia like Sabah and Sarawak to avoid the long travelling and costing.
This program was developed to enhance the communication capacity of preceptors, lecturers and students in the hospitals and UiTM campus. This program was developed using Moodle Platform. Moodle is an open source learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments. With the wider environment, knowledge can be strengthening if the educators successfully and wisely used it. In this project, we install Moodle version 2.8 on an out site server. The modules installed into our program are Discussion Forum, Quizzes, Embedded Multimedia, Database, Book, Live Chat and Video Conference. Students are asked to register to the Moodle web portal and required to participate in each of the modules so that they can be connecting with lecturers and can address their personal way of their learning needs. Lecturers' roles are moderating discussions and activities in a way that collectively leads students towards the learning goals of the subject. With these modules, we hope that collaboration between lecturers, supervisors and students can be enhanced and give a better impact on learning (Figs. 39.1, 39.2, 39.3 and 39.4).

C. **The result from outcome of the training session to students and lectures to use the model**.
After the development of program we have conducted a trial run of the existing students. We have asked the preceptors and the lecturers to register as a trial period.
We then conducted a qualitative outcome survey on the readiness of all parties involved to take part in the DVL developed.
The feedbacks received from the students saying that the system was user friendly and easy to be used. They were happy with the live chat, skype facilities, discussion, forum and online assessment. However during the training period we were not able to try the teleconferencing module because of we haven't checked the availability of the system in the hospitals. Students

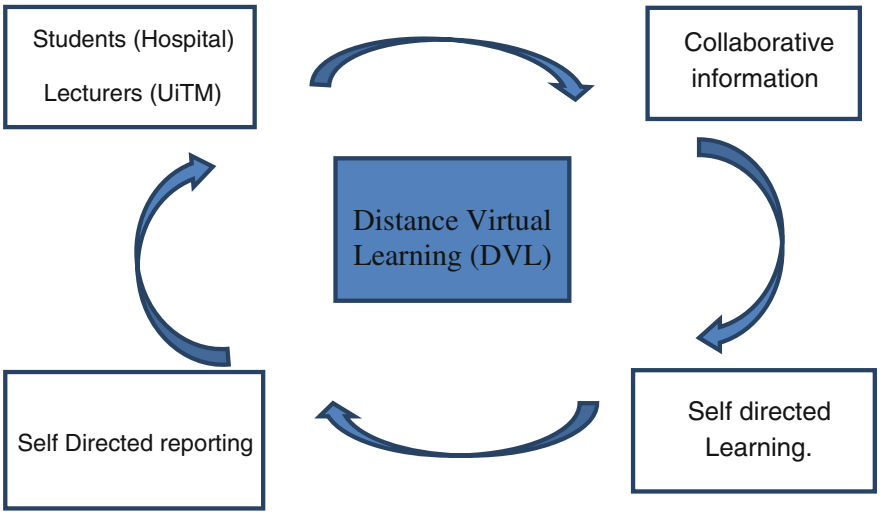

Fig. 39.1 Model of learning though Distance Virtual Learning (DVL) for industrial training students

qualitative satisfaction forms were distributed to get their feed backs. The majority of the students were satisfied with the system and ready to use them during their training.

Students	System is user friendly. The real time chatting is really helpful
Preceptors	This system will ease up their work. Real time communication can help them to settle problems faster. The system will enhance their communication capabilities with the lecturers and thus might help them to discuss problem easier without delay
Lecturers	System is easy to use. User friendly and should be more effective.

D. **Result conducting a try out method**.
All students and lecturers manage to register with the system. The web page name is PHC 322.com. This name is chosen because it is the name of the subject code. During the mock run of the system, all communication needed were successfully worked and the students manage to open all the available facilities. Skypes was tried and it work well. Students were satisfied with the system and ready to use them during their hospital attachment stay.

E. **Discussion**.
This program was developed using Moodle Platform which is an open source learning platform designed to provide educators, administrators and learners with a single robust, secure and integrated system to create personalized learning environments. This module provides many communication tools which enhance teaching effectiveness. Previously preceptors at the hospitals

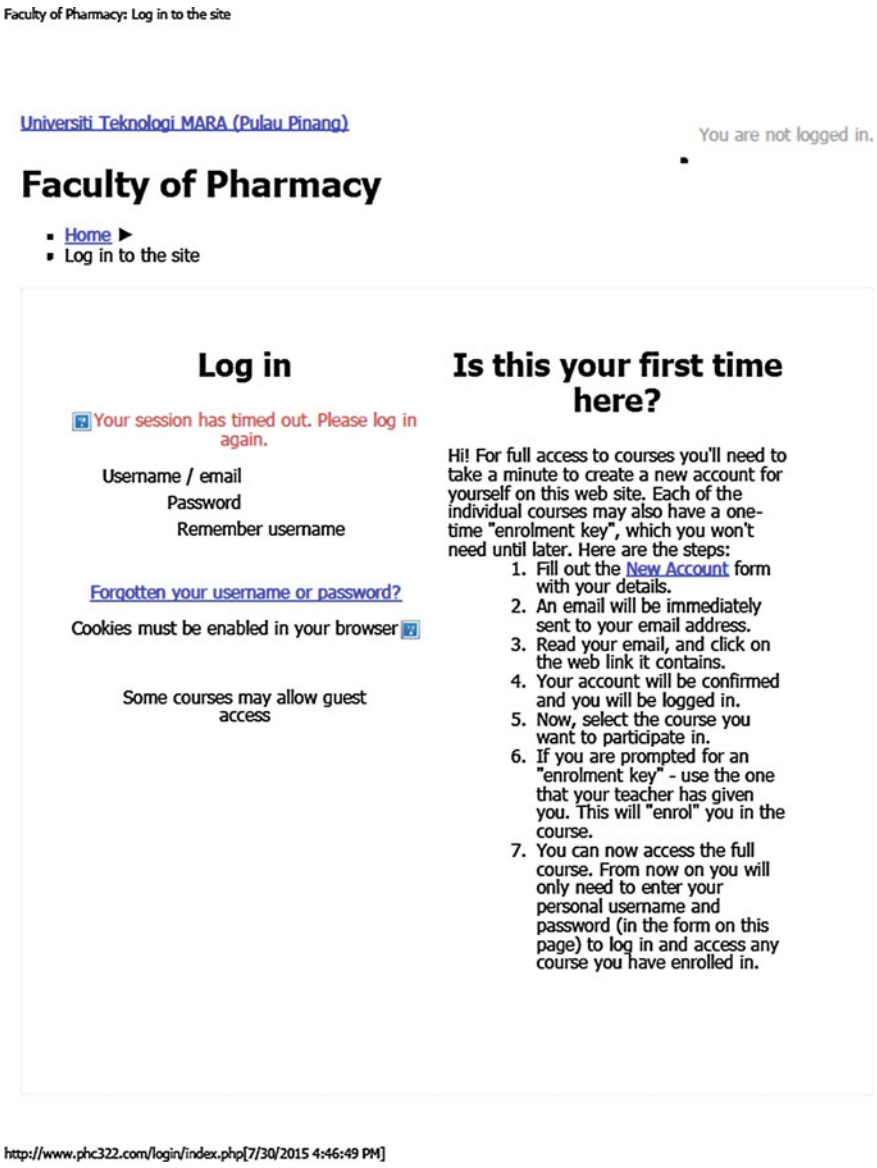

Fig. 39.2 Log in page

tend to ignore some of the problems arose during their preceptorship due to communication barriers and the lack of initiative to try all means has limit the real time problem solving. This system offers a log in procedure for preceptors from the hospitals to participate in the discussion. This is what I-Learn limitation is, where the system only limited to UiTM staff and students.

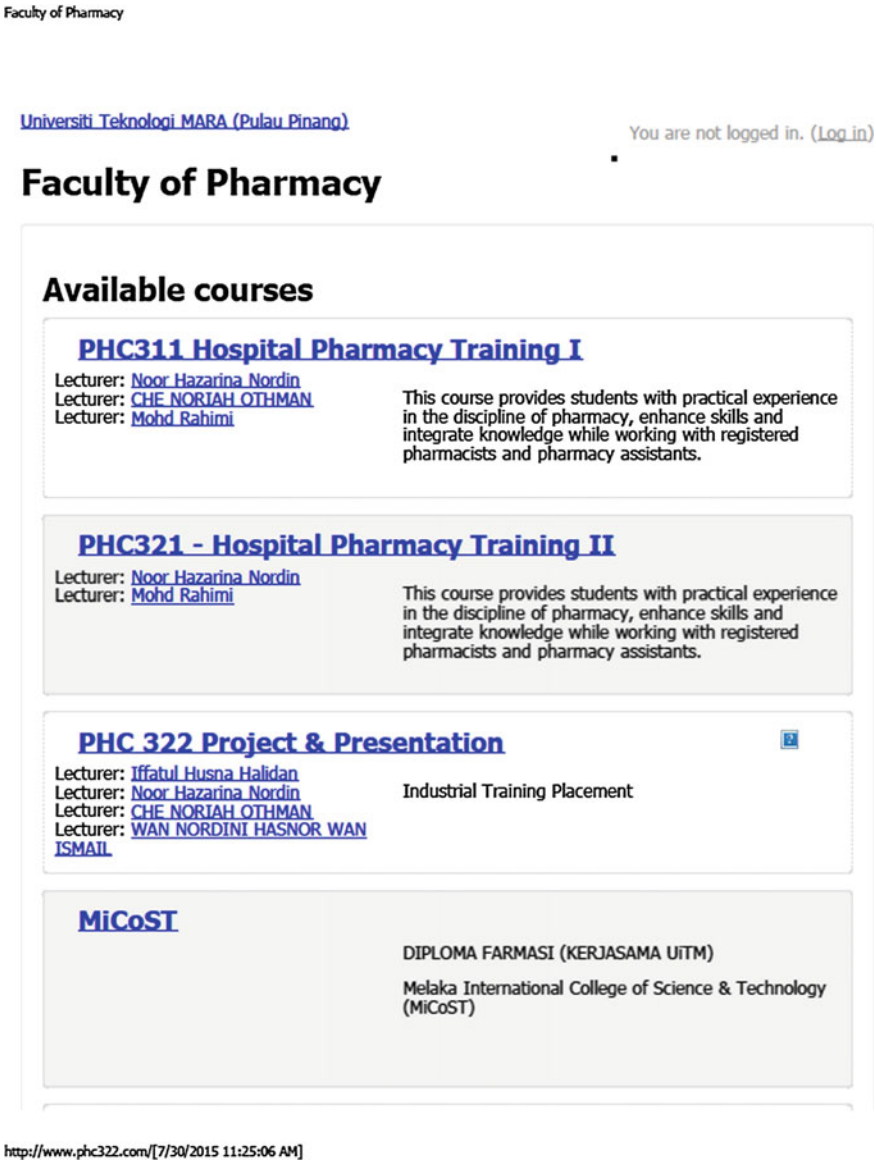

Fig. 39.3 Examples of program codes registered using this system

As far as lecturers are concern this system has east up lecturers work to gather assignments, to report the result and to make a one stop announcement. A more complicated issue which is not solved in written form can be transform into oral online via skype and teleconferencing. Students are well tracked and well

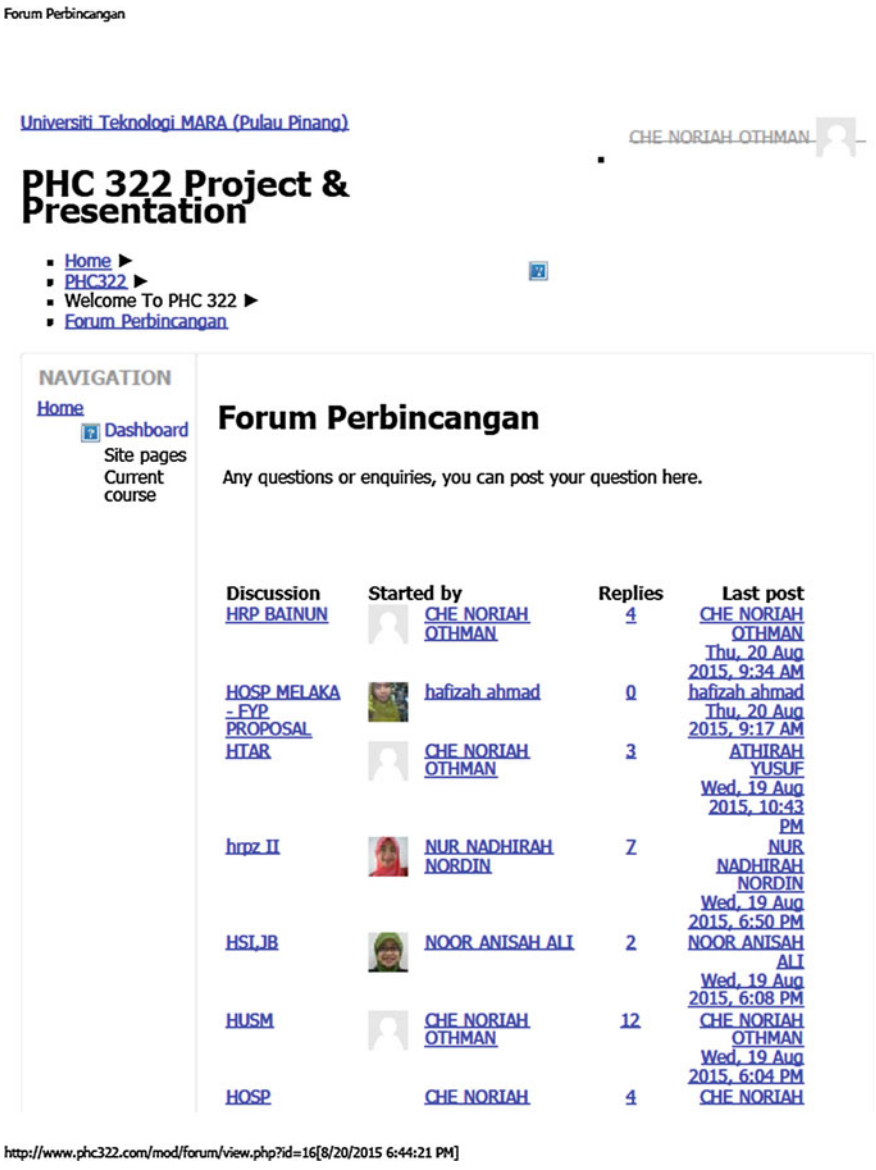

Fig. 39.4 One of the example of a Discussion page

governed with the existing system. All communication are easily tracked and responded.

In term of students participation in the discussion, with the friendly user system communication via this system are really active. A lot of discussion are going on especially on the final year project issues. However the system is still

depend on how frequent and how handy you are with the computer aid. Even though this system is very user friendly, students' initiative to locate the information and use the system wisely are very much depended on.

Similar e-learning system have been developed all over the world. However this is the first system that cater hospital training for Pharmacy students. Although this system is purposely developed for Pharmacy Hospital Training students, it can be flagship and adopted by any other program with similar training module.

We hope when this system is fully utilized we will be able to do an online final year presentation from all over Malaysia including Sabah and Sarawak.

Limitation.

The qualitative study on the problem encountered during training program was conducted on the previous cohort group of students who have enrolled part 5 and part 6. The trial run was conducted on the current students who are going to go for part 5 and part 6. So the result might be bias. However as far as the technology are concern developing a new model always enhance the applicability and facilities. However the feedbacks from hospital preceptors and lecturers are enough to support the need for developing a new teaching model to enhance teaching effectiveness.

Conclusion.

Distance Virtual Learning (DVL) for Industrial training students was appropriated and fit the quality of Diploma of Pharmacy students who attached to different hospitals.

1. DVL can enhance the learning skill of the students.
2. DVL offers better communication between lectures in campus, students and preceptors in hospitals.
3. Real time chatting, skype and teleconference will help the students to be supervised in all means as needed.

DVL will stimulate the training and learning support for the industrial students to ensure the enhancement of the skill and quality of the program implemented.

Recommendation.

Updated educational material with interesting animations should be uploaded in the system in order to draw student's attention. Lecturers should revise information in online based learning and encourage their students to take active part in using DVL. A nationwide study involving students from different courses should be conducted to achieve students' perceptions regarding DVL from a wider perspective. At the same time, lecturer's/instructor's knowledge and command on IT skills and perceptions towards DVL should be access prior to implementing any new IT related teaching tools. As evident from the results broad band facilities and internet connection should be improved and the lecturer should be encouraged to use DVL as part of their assessment.

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Chapter 40
Learning Beyond the Walls: The Role of WhatsApp Groups

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Abstract World nowadays is acquainted with the term "technology" as human are surrounded with gadgets and easy access to information. Past researches have proven the vitality of technology as it eases the life and transformed the way of communication. This advancement in technology is also profound; tremendously changing our education systems and the way teaching and learning occur through the use of social media. The purpose of this study was to investigate the role of one of the social media, namely WhatsApp. Specifically, it studied in what way does the WhatsApp Group assist in improving students' learning process. This study was a quantitative study that was conducted in a college located in Perak. Questionnaires were distributed to 150 respondents by using random sampling. The data were analysed by using the SPSS Version 22.0. The results indicated that WhatsApp Group contributed rather significantly in helping the students to communicate actively and encouraged meaningful learning among the users.

Keywords WhatsApp · Information-sharing · Social media

40.1 Introduction

World nowadays is acquainted with the term "technology" as human are surrounded with gadgets and easy access to information. Past researches have proven the vitality of technology as it eases the life and transformed the way of commu-

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nication. This advancement in technology is also profound, tremendously changing our education systems be it the facilities and the way teaching and learning occur.

This is proven when Bansal and Joshi (2014) stated that teachers now are required to diverse the use of technology in their teaching as students get more technology-savvy. Teachers are expected to convert their traditional teaching method to a more technology-like teaching styles in ensuring the students' interest are sustained during the teaching and learning sessions. This subsequently gave rise to the trend called e-learning and mobile-learning, where technology becomes the enabler for deeper and wider content to be taught (Barhoumi and Rossi 2013).

Learning could be affected by multiple variables, including the cognitive and psychological state of the learner, teacher professionalism and nature and complexity of the pedagogical approach (Amry 2014). Hence, the emergence of m-learning may encourage the construction of knowledge based on social interactions between online students and the teachers as it boosts up the teacher professionalism (Vygotsky 1978). At present, almost 90 % of the mobile phones sales worldwide are for devices powered by Googles's Android and Apple's iOS mobile operating systems (Charles 2013) which provide users easy and free access to instant messaging tools such as WhatsApp application. It is interesting therefore, to study the use of WhatsApp in the educational setting.

40.2 The Study

This research concentrates on the use of technology particularly WhatsApp as a Social Media in academic context since WhatsApp has currently emerged and become popular in Malaysia. On top of that, researchers found that social media have become a trend among teenagers especially the university students to communicate with teachers and lecturers and amongst the peer for the sake of inquiring academic-related information (Madge et al. 2009).

In addition, learning environment of the university itself is a social media-based communication both in academic context or non-academic contexts. A research that has been done in a university in the United States of America justifies that learning through WhatsApp Group may provide opportunity to ask queries related to the problems they are facing and it is proven useful for them to have it beyond the class contact hours. This will similarly benefit the teachers in knowing what students are doing and what difficulties they are facing. Social Media also provide many benefits to users especially the ones with low self-esteem (Ellison et al. 2007) as these users might avoid face-to-face interactions when it comes to discussions on academic-related matters. Furthermore, it may also encourage learning in groups by providing the opportunities to have discussions in a group using their mobile devices (Bansal and Joshi 2014). Weighing the many benefits that WhatsApp has got to offer to its users, this research intended to explore further its role in facilitating learning through the WhatsApp Group function.

Specifically, the objective of this study is to investigate the role of WhatsApp Group in the learning process beyond class hours.

40.3 Literature Review

40.3.1 Social Media and Social Media in Learning

Boyd and Ellison (2009) defined Social Media as web-based services that permit people to (1) create a public or semi-public profile within a bounded system, (2) express a list of other consumers with whom they share a connection, and (3) observe and traverse their list of acquaintances and those made by others within the system. The nature and terminology of these connections may vary from site to site. What makes social media distinct from the others is that it allows users to articulate and make visible their social networks. This creates association amongst individuals that would not otherwise be made, but that is often not the goal, and these meetings are frequently between "latent ties" (Haythornthwaite 2005) who share some offline connection.

Social media governed the traditions in which digital technology is used everywhere in the world. There are distinctive variations within this global adoption, where Americans and others might login to Facebook and Twitter, while Chinese users in China are likely to access Renren and NetEase (Selwyn 2012). Nonetheless, the broad ideologies of social media persist the same. They are internet applications that hooked on flexible and mutual digital content that is authored, critiqued and re-configured by a mass of users. Social Media may permit consumers to interact with each other by creating, editing and sharing new forms of textual, visual and audio content (Shirky 2008). As such, the most direct and significant influence of social media for education is the changing nature of students who are entering schools, colleges or universities. These technologies were related to an enriched social sovereignty with youngsters nowadays who are dominant and control of what they do, as well as where, when and how they do it (Selwyn 2012). Thus, social networks somehow offer a blend of formal and informal education and consequently changing the educational system in the world particularly in Malaysia.

By using Web 2.0 and any Social Medias, different applications have been developed to improve students' awareness, attitudes and skills (Martin 2006). Amongst these applications are blogs, Wikies, social networking websites, and video sharing websites which started to emerge (Johnson et al. 2009). Jones et al. (2010) indicated that Social Media are tools that can be used by teachers and students to facilitate education as students nowadays spend most of their time surfing the net. It is worth exploring the role of social media in changing the way students' learn after class hours so that more can be done to provide assistance to the individual students, either by the peers or the lecturers.

40.3.2 WhatsApp in Learning

The general benefits of using WhatsApp instant messaging application in the learning are as follows; (i) WhatsApp instant messaging enables online co-operation and among teacher and students and can be connected from school or home, (ii) WhatsApp is a free application that is easy to be used, (iii) Groups connected to WhatsApp instant massaging could segment learning matters easily via comments, texting and messaging while discussions are related to the course content taught 100 % in-class, (iv) WhatsApp offers students with the capability to generate a class publication and thus publish their work in the WhatsApp group to allow other students to comment on their works so that it encourages collaborative learning, and (v) Information and knowledge are easily constructed and shared through WhatsApp instant messaging. This is proven when Preston et al. (2013) clarified that students could learn just as well from online lectures as face-to-face lectures since it allowed students to be speedily keep up with updates within the community in the WhatsApp application and respond in an appropriate manner.

Cheung et al. (2010) in their research discovered that students' attitudes were positive and oriented towards the learning process integrating WhatsApp learning activities. On top of that, Bertelsen and Bodker (2009) justified that the respondents in their study recognised the learning process which incorporated WhatsApp mobile learning activities as a treasured process for partaking knowledge to improve learning, exchange experiences and ideas, discuss various academic and social issues and seek help and support during their learning activities. Therefore, it appeared to be natural for them to create posts, share information, and conduct online discussions using the WhatsApp application since learning by using WhatsApp is easy when all things posted by students or teachers will be promptly available for online students working from school or home. This is in line with the perceived usefulness and ease of use based on the Technology Acceptance Model. According to Vygotsky, the level of potential development is determined through problem solving under expert guidance, or in collaboration with more capable peers together yet this led to collaborative learning between teacher and students (Rosenshine and Meister 1994). Henceforward, in collaborative online learning the focus is not only on the teacher, but also on the students' peers and the technology, which supports and enhance communication and interaction in order to put the bridge on the gap between teacher-students. The outcomes of the current researches show that learning through WhatsApp activities bring benefits to students' success, accomplishment and attitudes towards the new teaching and learning environment.

40.4 Methodology

40.4.1 Research Design

This research applied a quantitative approach by employing a survey research to answer the following question: Does WhatsApp Group promote learning beyond class hours?

For this research, 150 students were randomly chosen from the 854 students who are studying in the Higher National Diploma in Business and Marketing (HND BMK) Program in Kolej Professional MARA Seri Iskandar, Perak. The 150 respondents were made up of 43 male and 107 female respondents. A set of questionnaire was distributed to the respondents. The questionnaire consisted of three sections, with Section A focused on the demographic background of the respondents, Section B focused on answering the research question posed in this study while Section C consisted of an open ended question to gauge respondents' overall view on the use of WhatsApp in promoting learning.

Prior to the actual data collection, draft of the questionnaire was checked and verified (Giesen et al. 2012). This pilot test was done to check on the language the researcher used in the survey is up to the students level of proficiency. The completed draft was checked by three experts for the readability and content as validity test.

40.5 Findings

40.5.1 Section A: Demographic Background

Section A of the questionnaire was designed to collect the demographic information of the 150 respondents.

40.5.1.1 Age

Table 40.1 illustrated the distribution of age of the respondents. It was clear that the oldest respondents involved in this study were 19 years old which comprised of 58 respondents while the youngest was 22 years old and above which comprised of only 7 which made up of 4.7 % of the respondents. It was clear that the respondents at the of 18 years old and 20 years old were relatively similar in range which include 39 respondents of 18 years old and 37 respondents of 20 years old.

Table 40.1 Distribution of age

Age	Frequency	Percent (%)
18 years old	39	26.0
19 years old	58	38.7
20 years old	37	24.7
21 years old	9	6.0
22 years and above	7	4.7
Total	150	100.0

Table 40.2 Distribution of Years Using WhatsApp group

	Frequency	Percent (%)
1–2 year	55	36.7
3–4 years	59	39.3
5–6 years	28	18.7
More than 6 years	5	3.3
Others	3	2.0
Total	150	100.0

40.5.1.2 Years of Using WhatsApp Group

Responses analyzed as presented in Table 40.2 indicated that 59 (39.2 %) respondents have been using WhatsApp for 3 to 4 years and followed by 55 respondents who used WhatsApp for 1 to 2 years (36.7 %). In addition, there were 28 students who have experienced using WhatsApp for 5 to 6 years (18.7 %) while 5 students have been using WhatsApp for more than 6 years. There were 3 respondents who opted for others in which 1 of the 3 has been using WhatsApp for only 4 months, and followed by another 2 samples for 7 months and 9 months.

40.5.1.3 Frequency of WhatsApp Checking Daily

Table 40.3 indicated the frequency of WhatsApp Checking Daily by the students. 93 out of 150 students were found to frequently check their WhatsApp more than 16 times daily. The lowest was 1–5 times daily with the frequency of 4 while 27 respondents check their WhatsApp Application for 6 to 10 times daily and 18 students checked their WhatsApp for 11 to 15 times daily. There were 6

Table 40.3 Frequency of WhatsApp checking daily

	Frequency	Percent (%)
1–5 times daily	4	4.0
6–10 times daily	27	18.0
11–15 times daily	18	12.0
More than 16 times daily	93	62.2
Others	6	4.0
Total	150	100.0

Table 40.4 Number of WhatsApp group

	Frequency	Percent (%)
1–3 groups	7	4.7
4–7 groups	67	44.7
8–10 groups	52	34.7
Others	24	16.0
Total	150	100.0

respondents opted for Others where 2 respondents checked his WhatsApp for 19 times daily, and followed by 2 other respondents for 32 times daily, 27 times daily and lastly for more than 20 times daily.

40.5.2 Number of WhatsApp Group

Table 40.4 indicated the number of WhatsApp Group the respondents have in their WhatsApp Application. Majority of the respondents had 4 to 7 groups with the frequency of 67 (44.7 %) while the second highest was 8 to 10 groups with the frequency of 52 (34.7 %). 7 respondents opted for 1 to 3 groups only. There were 24 respondents choose Others. 3 respondents had 11 groups, 3 respondents opted for 13 groups, 1 had 14 groups and same goes to 15 groups and followed by 2 respondents who had 17 groups, 3 respondents had 18 groups, and 2 samples had 19 groups. Next, 5 respondents had more than 20 to 29 groups while 2 respondents had 30 groups and 34 groups. The maximum number of groups the respondent had was 40 groups.

40.5.3 Section B: WhatsApp Group and Learning Process

Table 40.5 clarified that the mean value for item 9 was the lowest with mean value of 2.37 (SD = 0.95). On the contrary, item 5 had the highest mean value of 3.98 with 0.95 standard deviation value. Items 6 (Mean = 3.87, SD = 0.86, D29 (Mean = 3.87, SD = 0.73), D30 (Mean = 3.74, SD = 0.95), were found to have positive improvement on students' learning process.

This section also contained one open ended question. The question was "How does WhatsApp Group help you to improve in sharing information related to the course you undergo?" The feedback were generally positive and a few of the feedbacks were:

> *From the WhatsApp, we can be able to share and inform any information or discuss task that has been given by lecturers because most of the students do not have enough time to go and see lecturers face-to-face so we can just discuss in the WhatsApp Group* (Respondent 17).

Table 40.5 The use of WhatsApp Group in learning

Item	Item detail	Mean	Std. deviation
5	WhatsApp Group may help me to boost up my confident level in voicing out opinion instead of face-to-face interactions	3.98	0.95
6	WhatsApp Group helps me to improve my understanding on matters I do not understand about my course content	3.87	0.86
7	WhatsApp Group may improve the way I communicate with lecturers and classmates by getting rapid feedback	3.87	0.73
8	WhatsApp Group may improve the relationship between lecturer-students and students-students in academic discussion	3.74	0.88
9	WhatsApp Group helps me to improve in developing my skills (Writing, Speaking, Listening, Reading) related to the academic outside of class	2.37	0.95

WhatsApp Groups helps me improve my understanding about anything I don't understand in the class (Respondent 33).

We can forward information which need fast feedback from friends (Respondent 53).

This helps me improve my learning when I take photos during lecturer present and forward it in WhatsApp group so I can help my friends to understand also (Respondent 87)

It helps me to get extra information and knowledge from the forward message from friends. (Respondent 111).

WhatsApp group may help me to discuss about tasks without having to meet and have face-to-face meeting so it improves my time management for meeting face-to-face (Respondent 121).

By having discussion in WhatsApp group, I can improve my pronunciation where the lecturer give the words and ask us to record our voice and try to pronounce the words correctly (Respondent 130).

I can always refer back to the previous messages so that I won't forgot the old information during I do revisions (Respondent 143).

The open-ended responses indicated that there are immense way of information-sharing which facilitates learning amongst the students with WhatsApp Group used as a platform. It could be concluded that the students believed that this medium could benefit them to get information easily particularly by using the online discussions through WhatsApp Group. Furthermore, communication could also be done with fewer expenses. Besides that, students believed that WhatsApp group is very useful to discuss topics related to learning regardless where they are.

40.6 Discussion and Conclusion

Data analyzed represented by Table 40.5 displayed that WhatsApp group could improve not only students' academic learning process but also their social and communication skills. The highest mean score of 3.98 was calculated for item 5 "WhatsApp Group may help me to boost up my confident level in voicing out

opinion instead of face-to-face interactions". This demonstrated the encouragement for students to participate more in discussion by asking more opinions could be done through discussion on WhatsApp group (Kessler 2010). The lecturers could also receive benefit from such discussion in which they can evaluate their students' academic performances based on the topic discussed.

The second highest mean score was 3.87 is calculated for item 6 "WhatsApp Group helps me to improve my understanding on matters I do not understand about my course content". Majority of the students agreed with this item as discussion could be done in more proactive environment in which they would feel more comfortable to voice out opinions (Rojas 2012). Besides that, WhatsApp group also could be the medium for students to revise lessons which have been delivered in class with classmates and lecturers.

The third highest item was represented in the Table 40.5 was item 7 "WhatsApp Group may improve the way I communicate with lecturers and classmates by getting rapid feedback" with the mean score 3.87 while the fourth rank is item 8 "WhatsApp Group may improve the relationship between lecturer-students and students-students in academic discussion" with the mean score 3.74. Both items justified that WhatsApp group is not only useful in enhancing students learning but it could also be beneficial in improving relationship between classmates and lecturers (Tian et al. 2011).

However, the last item represent in Table 40.5, "WhatsApp Group helps me to improve in developing my skills (Writing, Speaking, Listening, Reading) related to the academic outside of class" with mean score 2.37 represented that majority of the students does not believe that WhatsApp group could improve their developing skills such as Writing, Speaking, Listening and Reading. Literature has suggest that this is perhaps due to the use of informal language (Martin 2006).

Aside from that, majority of the students also provided positive feedbacks and comments in the open ended question that was asked in which it required their personal opinion on WhatsApp group towards learning process. It could be concluded that the students believed that this medium could benefit them to get information easily particularly by using the online discussions through WhatsApp Group. Furthermore, communication could also be done with fewer expenses. Besides that, students believed that WhatsApp group is very useful to discuss topics related to learning at anytime and anywhere.

This study has shed lights on the various benefit of using WhatsApp Group in providing a platform for academic discussion to take place. It promotes interactions and the timeliness of students getting response to their questions ensures that students are motivated to learn. As a conclusion, educators should take advantage of the available technology in enabling more meaningful learning, especially after class hours. This does not only encourage learners to learn but also understanding that knowledge can be made ubiquitous with the technology they possess.

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Chapter 41
Creating Enhancement Activities Using a Game Template

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Abstract The use of educational games in instruction is not new. It is one of the ways to achieve Gagné's ninth event of instruction, that is to enhance retention and transfer of the knowledge learned. Games are fun yet challenging. Finding suitable games for instructional purposes is not easy especially for subjects in the content areas. Due to that, the use of game templates can be a considerable option for instructors. Game templates can be developed using simple MS PowerPoint and Visual Basic application. With instructors' creativity, a single game template can be used to develop different types of games. The use of game templates for instructional purposes has yet to be explored thoroughly, thus creating a huge potential demand especially among the e-material developers. The game template is user-friendly and can be customized. It can also be integrated with lessons developed using MS PowerPoint, making learning fun and interesting. When that happens, retention and transfer of knowledge is assured.

Keywords Games · Language activities · Language activities

41.1 Introduction

Gagné (1992) stated in his nine events of instruction that knowledge learned must be internalised in order to help learners to develop expertise in certain areas. Through enhancement activities, learners can apply the knowledge learned in their

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respective areas. Ideally, enhancement activities delivered by instructors can be in various forms ranging from word or sentence level exercise to bigger concepts such as outline, mind mapping and job aids.

Nonetheless, few instructors would venture in game-concept enhancement activities in order to fit with Gagné's series of events. Undeniably, developing a game template can be time consuming as well as it requires certain level of knowledge especially in Information Technology and Software Development.

Utilising a tool that is common to most instructors for a game-like enhancement activity will help the instructors to develop the activities effectively as the features are familiar to them. Due to this realisation, this paper serves the purpose of informing educational instructors on how a game template can be developed by using Microsoft PowerPoint. Concurrently, this single game template can develop varieties of enhancement activities for students.

41.1.1 Statement of Problem

Finding the suitable games for educational purpose is not easy. Instructors have been identifying thus utilising game tools and softwares which suit the ability of the instructors themselves as well as the learners.

Several authoring tools have been identified in order to develop educational games and amongst them are Microsoft PowerPoint, Lecture Maker, Lactora, Flash and Director. One tool will eventually be chosen in order to meet the purpose of this study.

41.1.2 Purpose of the Study

The purpose of this study is to determine the easier way to develop games for educational purposes.

41.1.3 Objectives of the Study

The objectives of this study are as follow:

(a) To determine an application to develop a game template
(b) To develop a game template
(c) To develop educational games for a selected course.

41.1.4 Significance of the Study

The significance of this study are as follow:

(a) Can create own games
(b) Can make learning interesting
(c) Game template is cheaper and flexible.

41.2 Literature Review

41.2.1 Enhancement Activities

Enhancement activities are essentially important to reinforce learner's knowledge learned in the classroom. On the basis that learners need to internalise new knowledge in order to develop self-expertise, reinforcement activities are among the tools (Gagné 1992). Nonetheless, the millennial learners may require a shift for the reinforcements activities. Traditionally, the reinforcement activities like role play or simulation would be the choices among the instructors. Since the movement of Teaching and Learning (TL) are in the direction of blending in the use of Information Technology (IT) as well as e-Learning, instructors are now using entertaining reinforcement activities to adapt with the current change of direction among millennial learners (Robinson 2013).

Green and Bavelier (2015) mentioned that effective enhancement activities are essential to improve learner's cognitive development whilst Boctor (2013), in contrats, stated that enhancement activities help learners to improve practical skills and team building although at some other discussion, the researcher agreed that such activities do provide sufficient impact on thinking skills and improving one's expertise.

Consequently, most researchers believe that enhancement activities should be based on real-life activities, fun and engaging (Robinson 2013; Green and Bavelier 2015; Boctor 2013).

41.2.2 Games

The term millennial learners has always been used by various researchers to represent learners living in the era of internet, mobile phones and video or computer games (Robinson 2013). Escudeiro and Vaz de Carvalho (2013) mentioned that due to the shift of TL's direction, instructors are likely to develop activities that involve the use of technology. Cisic et al. (2007) stated in their study that there are few

aspects that need to be put into consideration when one need to use of technology in a classroom:

(a) New technology
(b) How instructors use the technology
(c) How students use the technology.

These criteria, according to the researchers, are significant especially in designing the best and current technological activities that go well with the need of both parties; the instructors and the learners.

Activities developed through gamification is no longer new to the world of TL. Games can be effective tools in internalising new knowledge so that the learning session will be meaningful. Escudeiro and Vaz de Carvalho (2013) reviewed games as tools that offer immersive and engaging atmosphere to the learners. They added that the trial-and-error feature in a game allows the learners to establish a well learning and to improve collaborative work, social interactions and leadership. On top of that, Robinson (2013) emphasised in her study that game have now become a structured method for instructors to engage with their students other than making the knowledge perceived to sustain longer. Hwang et al. (2012) in addition stated that educational games may create a situated learning environment which may cause essential learning. The games eventually establishes the learner's knowledge for real-world situations. Boctor (2013) and von Wangenheim et al. (2012) agreed that games can be really effectives in reinforcing knowledge that was previously learned.

A good game concept can bring meaningful learning process. Robinson (2013) stated four criteria for educational games:

(a) fun
(b) interactive
(c) responsive
(d) target.

According to Baid and Lambert (2010), learning will eventually appear significant and insightful when game-like activities are developed by considering learner's styles and stimulated methods.

In sum, developing an effective and interactive game is crucial especially when the games are pertaining to TL. In relation to enhancement activities, games can be used to internalise knowledge learned so that there will be a continuity in conveying it.

41.2.3 Microsoft PowerPoint

Microsoft PowerPoint (PP) is a presentation tool which is commonly used by many learners as well as instructors to present a presentation or to deliver lectures. Unquestionably, PP is also used by many corporate marketers and personnels to

present reports. The vast use of PP has made to certain modification in educational technology in which PP is used more than merely a presentation tool.

PP which shares many user-friendly and interactive features such as easily-understood buttons, animations and hyperlink, has made any presentation to be more effective in delivery. Due to its easy-going usage, it is no doubt that PP can be used to develop game templates for a enhancement activity.

Several advantages mentioned by researchers in the use of PP for the purpose of TL. Jones (2003) listed numbers of advantages in using PP. Among them are:

(a) Easy for staff and students
(b) Provides professional templates for staff
(c) Editable
(d) Hiding certain files.

In contrast, Thompson and McNutt (2009) stated that PP can also bring number of ineffectiveness towards learning especially to the students. They claimed that too much of info, lifeless presenter, reading-out-loud are among the deficiencies of using PP. Nonetheless, Nouri and Shahid (2005) concluded that PP can be a strong presentation tool if utilises appropriately because the strong association between the tool and the learners or instructors is apparent.

In addition, Xingeng and Jianxiang (2012) conducted a survey on the effectiveness of using PP among students. The findings are substantially good as they indicate that the number of students who believe that PP is effective for their lesson is greater as compared to the ones who don't. Thus, the researchers concluded that the familiarity of students with PP may have caused the students to reason out as such.

Therefore, to suit with the purpose of this paper, PP is used to develop a game template as PP has features that are easily comprehensible among instructors and learners.

41.3 Methodology

41.3.1 Selection of an Authoring Tool

An Authoring tool is a software that was developed by software developers to create instructional designs and contents. This tool has many features that allow its users to create and develop contents for general or specific purpose. This content is commonly identified as e-content as the end products of an authoring tool usually will be uploaded as e-content. For the purpose of this study, a number of authoring tools have been selected and are listed as follow:

(a) Microsoft PowerPoint
(b) Lecture Maker and Lectora
(c) Adobe Flash and Adobe Director.

The above authoring tools were grouped as such due to the similarities of features with different developer identities. These tools' features were identified and classified under the following categories:

(a) Package features
(b) Navigation
(c) Price and Availability
(d) End product.

These features were then compared and contrasted before an authoring tool that is flexible and user-friendly was selected to create the game template.

41.3.2 Development of a Game Template

A game template was created using the authoring tool that has been selected. This game template serves the purpose of being the main template which later can be utilised to develop several educational games. In creating the game template, the Visual Basic for Applications (VBA) was used. This Microsoft application is used to create interactive features of the educational games such as score board and generating marks or points. Nonetheless, instructors were not required to have indepth knowledge in integrating VBA with the game template. This is due to facts that the game template only requires VBA for the purpose of interactive features mentioned earlier; score board and generating marks or points.

41.3.3 Game Development

Upon completion, a language course was then selected in order to create an educational game using the developed game template. This educational game should comply the learning outcomes of the selected course. A topic was then decided so that the focus of the game can be created. Creative ideas such as thematic storyline and colourful caricatures were also included in making the educational game more interesting to the learners.

41.4 Findings

The findings of this study is as follows:

41.4.1 Selection of an Authoring Tool

(a) Microsoft PowerPoint (PP)
PP is synonymised to any microsoft office user. As a presentation tool, PP offers interactive, user-friendly features that allow its users to create effective PP slides. Amongst the features are the ever ready slide templates and layouts, insertion of images, audios, videos, graphical illustrations, charts and hyperlink, slide transitions, various animations and proofreading functions. The buttons of these features seem to be visible and the instructions on how use the buttons are self-explanatory. PP is normally installed together with other Microsoft Office tools. PP is cost effective as it comes together with the purchase of Microsoft Office. The end product of PP can be viewed and presented using any computer programme as it is compatible in nature due to its wide use.

(b) Lecture Maker and Lactora
Lecture Maker and Lactora are authoring tools that not only integrated normal features of authoring tools such as animation and insertion of audios, videos and graphics but also some other special features such as quiz and test templates. These special features provide more significance in creating online training course as well as e-content. However, the price of these authoring tools which range between 2000 USD and 3000 USD has caused many instructors to opt to other affordable or free authoring tools. These tools too require instructors to acquire certain basic skills in order to navigate them. Undeniably, the end products of Lecture Maker and Lactora are more interactive, content-friendly as well as compatible with any computer programme for viewing purpose.

(c) Adobe Flash and Adobe Director
Similarly, Adobe Flash and Adobe Director consist many interactive features like other mentioned authoring tools. Both Adobe Flash and Adobe Director require their users to code certain scripts when using these softwares in creating e-content. The coding is essential as it causes the features to run smoothly. In acquiring this technique, the users need to learn at certain advanced level of software coding and scripting. In addition, the price of these software is costly and at certain times, their require online updates. Nevertheless, the end products of these softwares are more animated, interactive, high definition and compatible.

Hence, PP was selected for the purpose of creating the game template as it is commonly used by many instructors and trainers due to its self-explanatory and user-friendly features and navigation, cost-effective and the compatibility of the end product.

41.4.2 Development of a Game Template

(a) Game Template

Two game templates were developed using PP and VBA scripting. The first template serves as a template where the game is carried out. Two buttons were created and coloured in blue and red to represent the correct and incorrect options respectively. Whenever, the blue button is clicked, 1 mark will be given whilst when the red button is clicked, 1 mark will be deducted. The more options of answers a game has, the more blue buttons will appear on the game template. The red button on the other hand acts as the distractors to the options (blue buttons) in that game. To carry out the instruction of awarding and deducting marks, scripting codes will be inserted and linked to the template using VBA. Figures 41.1 and 41.2 show the game template as well as the scripting box for the auto calculation using VBA:

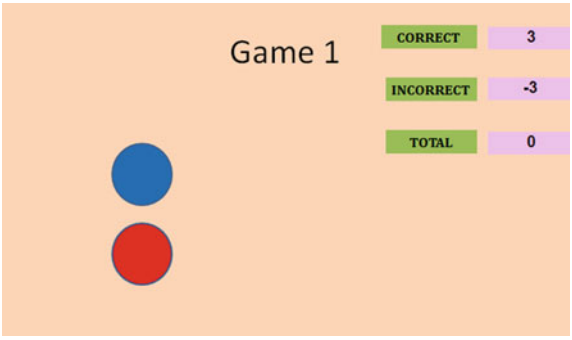

Fig. 41.1 Game template

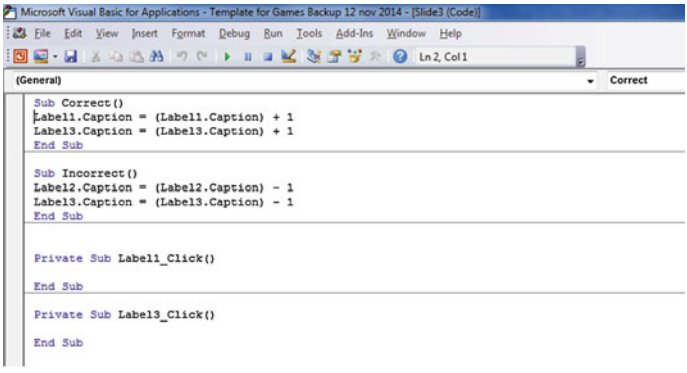

Fig. 41.2 A scripting box for auto calculation using VBA

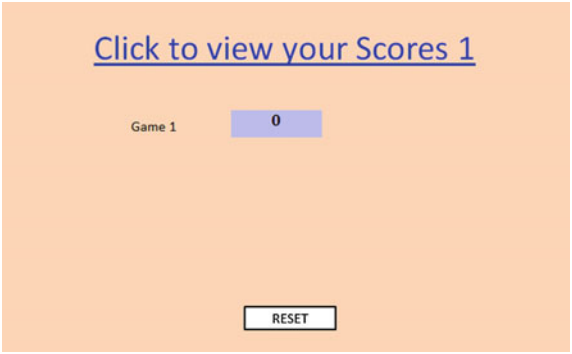

Fig. 41.3 Scoring board template

(b) Scoring Board Template
The second template serves as the scoring board of the game. This scoring board is developed by having two functional buttons that act as the overall score of the game as well as the reset button for a new game. These two buttons were linked to the template by using VBA scripting code. Figures 41.3 and 41.4 show the Scoring Board Template as well as the scripting box for the codes using VBA.

41.4.3 Game Development

The topic "Word Formation" of a language course with the following learning outcomes was selected for the purpose of creating an enhancement activity through game by using the developed game templates:

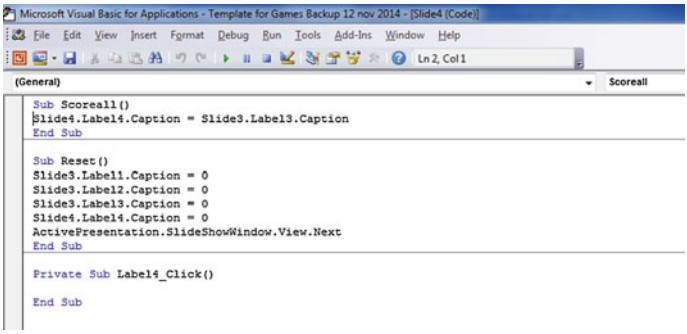

Fig. 41.4 A scripting box using VBA

(a) Define the basic concepts, principles and theories in language and linguistics
(b) Explain the basic concepts, principles and theories in language and linguistics
(c) Analyse the basic concepts and issues related to language and linguistics.

Next, a storyline was developed in order to make the enhancement activity more interesting. The following is the chronology of the enhancement activity:

(a) You were a part time staff at one of the famous event management company. Your first assignment was to organise a pre-graduation dinner for a university. You became so excited because you were informed by your superior that a daughter of a well-known local celebrity would be joining the dinner. Unfortunately, the dinner turned into a disaster. There were many gate-crashers. Invited guests were so upset and they wanted their money back.
(b) Your superior successfully persuaded the university representative to continue the dinner by promising him a 20 % discount from the total payment of the dinner to your company. One of the events during the dinner was to select the Prom King and Queen. You were asked by your superior to help the university representative to select a male and a female students (based on their personality and outfit) to be crowned as Prom King and Queen. However, you were given a final warning for not adding another disaster that you have already made.
(c) There was a blackout during the dinner. After the lights were back, the university representative informed you that one of the girls was missing. You got to know that the missing girl was the daughter of the well-known local celebrity. As the person in charge, you discovered few clues left by the kidnapper. You were determined to solve the clues in order to identify the kidnapper.
(d) Now that you have successfully captured the kidnapper, you needed to locate the missing girl. The only way for you to get to the missing girl is by interrogating the kidnapper. According to the kidnapper, you have to solve some clues on a ransom letter written by the kidnapper.
(e) You finally solved the clues given by the kidnapper. Thus, the missing girl was finally found. The university representative thanked you and you were promoted by your company as full-time permanent event manager. Nonetheless you were given another task and that was to hand in the kidnapper to the police.

The following sub-topics and levels of Bloom's Taxonomy were assigned to the chronology of the enhancement activity respectively:

(a) Coinage—Knowledge
(b) Blended Words—Comprehension
(c) Prefix/Suffix—Application
(d) Word Formation Process—Analysis
(e) Types of Word Formation—Synthesis.

Hence, each level of Bloom's Taxonomy was tested for this enhancement activity. Figures 41.5, 41.6, 41.7, 41.8, 41.9, 41.10, 41.11, 41.12, 41.13, 41.14, 41.15 and 41.16 illustrated the enhancement activity that was developed using the game template:

Fig. 41.5 The home page of the enhancement activity

Fig. 41.6 The main page of game 1: coinage

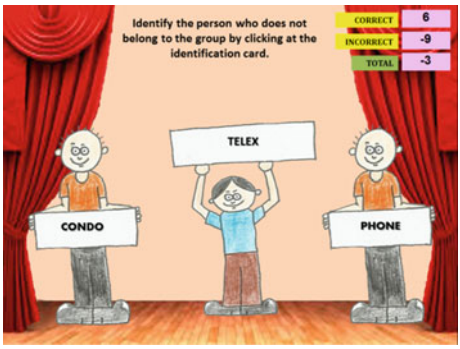

Fig. 41.7 A sample page of game 1: coinage

Fig. 41.8 The main page of game 2: blending

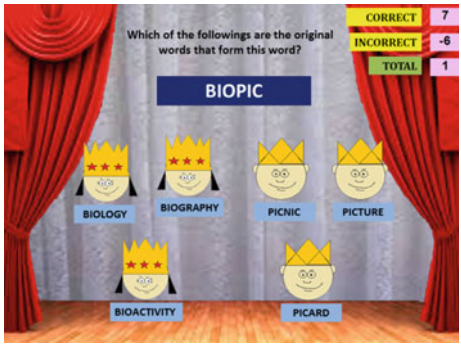

Fig. 41.9 A sample page of game 2: blending

Fig. 41.10 The main page of game 3: derivation

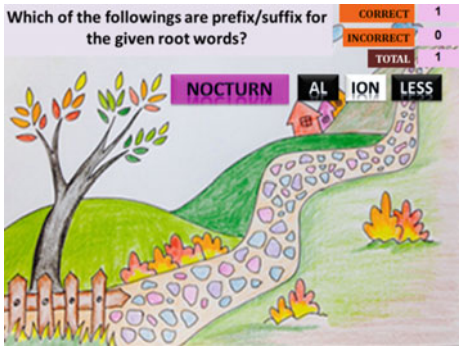

Fig. 41.11 A sample page of game 3: derivation

Fig. 41.12 The main page of game 4: eponyms

Fig. 41.13 Sample page of game 4: eponyms

Fig. 41.14 The main page of game 5: types of word formation process

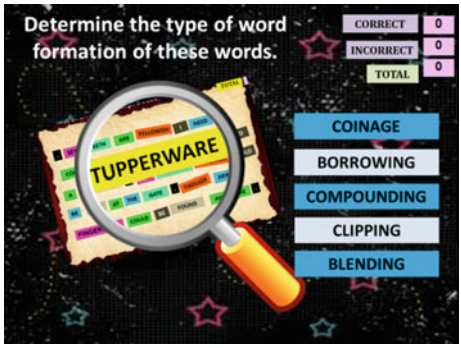

Fig. 41.15 A sample page of game 5: types of word formation process

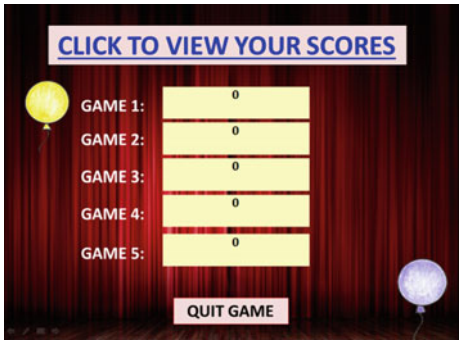

Fig. 41.16 The scoring board

41.5 Conclusion

In conclusion, enhancement activities are vital so that the sustainability of knowledge among learners remain. What more important is to carry out these activities and engage them with learners with the use of technology and current suitability. The positive features of PP has allowed it to be used by the researcher in designing a game template so that a language game can be developed. The essence of gamification for knowledge retention is essential because the millennial learners will find the method effective and interactive.

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Index

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