EDUCATIONAL FUTURES: RETHINKING THEORY AND PRACTICE

Educational Technology and Pedagogic Encounters

Democratic Education in Potentiality

Yusef Waghid, Faiq Waghid and Zayd Waghid

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RETHINKING THEORY AND PRACTICE

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Democratic Education in Potentiality

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PREFACE

This book is an attempt to do something else in the realm of educational technology in the field of teacher education. Nowadays too much is being made of educational technology, often valorising it as a saviour of educational institutions, in particular in relation to teacher education programmes. The reasoning quite too often is: If educational technology 'is used' in the training of teachers for primary and secondary education, then teachers possessing such capacities and skills might just be the panacea education systems require to respond to the challenges of learning, teaching and management in the modern era. We however are less optimistic if educational technology is perceived as an instrumental impetus for change in educational contexts. Such a technical view of education would be equally unresponsive to the demands of good education, because educational change cannot just be envisaged at the level of practice – that is, if we change the practices of teaching, such as altering the techniques we use to teach, then the theories (thoughts and concepts) that guide such practices have to be attended to as well. As Jacques Derrida (2004, p. 153) aptly reminds us, theory (*theoria*) informs practice (praxis) and, in turn, practice modifies theory. By implication, just looking at how educational technology manifests in certain practices would be remiss of giving credence to the significant role of theory in guiding practice. Consequently, this book looks at both the underlying theories of educational technology, and the ways in which practice is guided. Moreover, our work throughout this book is not devoid of producing ends. As for Derrida (2004, p. 148), 'end-orientation' is not necessarily bad in itself, as the 'end' in itself can prepare students to undertake new analyses and evaluations that can result in new possibilities. So, our understanding and situatedness within educational technology (means) – as opposed to using or applying educational technology – is aimed at cultivating practices (ends) that open up possibilities for new ways of democratic action. In other words, we do not pledge in advance that our embeddedness within educational technology has a utilitarian end in mind, but rather that our situatedness within educational technology (a practice itself) leaves open possibilities for new ways of understanding democratic education.

We have organised this book into six interrelated chapters that point towards the cultivation of educational technology as a human practice that guides pedagogic encounters on the basis of taking risks in relation to which the unexpected, unimaginable is always in potentiality:

Chapter 1 introduces educational theory and its links to technology, giving rise to the notion of educational technology as a practice. The authors argue that educational technology, like education, is a human experience that guides pedagogic encounters between teachers and students. In turn, such pedagogic encounters – mostly teaching and learning – are inclined towards the cultivation of democratic education. Hence,

educational technology is inherently democratic, as it can be expanded from liberal deliberative engagements towards actions that are rhizomatic, disruptive and potentially imaginative;

Chapter 2 highlights various instances of educational technology and, in particular, focuses on Facebook as one of the instances in which educational technology becomes manifest. The authors proffer that technological devices or 'tools' have educational potential and invariably engender democratic action, in which students and teachers engage as human agents;

Chapter 3 analyses two teacher-student projects to show how Facebook, as an instance of educational technology, can cultivate democratic action. The main argument of the two case studies is that educational technology has the potential to cultivate autonomous, disruptively equal and deliberatively rhizomatic pedagogic encounters that have a socially just orientation;

Chapter 4 highlights various forms of democratic education that emanate from the case studies, which draw on a continuum of action ranging from deliberatively engaging encounters to the enactment of disruptively rhizomatic assemblages that remain in potentiality. At the core of such pedagogic encounters is the practice of taking risks as teachers and students endeavour to enact democratic moments in their practices;

Chapter 5 examines the implications of disruptive deliberative engagement for learning and teaching in universities and schools. The authors contend that pedagogic encounters amongst students and teachers involve endearing themselves towards participants coming to speech in an atmosphere of co-belonging where possibilities for whatever can emanate from the encounters remain in becoming; and

Chapter 6 investigates the implications of educational technology as a democratic practice for social justice education. Put differently, the authors posit that educational technology is inherently constituted by socially just action that is inextricably linked to ideas of sustainable development, economic development and equity.

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The case studies in this book emerged from the doctoral work in which two of us have been involved and that have been adapted and modified for the purposes of this book:

- Waghid, F. (2013). Towards the Democratisation of Senior Phase School Science Through the Application of Educational Technology. Unpublished Doctoral Dissertation (Department of Curriculum Studies, Faculty of Education: Stellenbosch University); and
- Waghid, Z. (2014). A Discourse Analysis of Education for Social Justice Focusing on Sustainable Development, Equality and Economic Development: Implications for Teaching and Learning. Unpublished Doctoral Dissertation (Department of Education Policy Studies, Faculty of Education: Stellenbosch University).

CHAPTER 1

EDUCATIONAL THEORY AND TECHNOLOGY

INTRODUCTION

Any theory of education has some connection to the thoughts and/or ideas that constitute it. In other words, education is what it is on the grounds of the reasons that guide the notion of education. In a similar way, educational technology is also underscored by the reasons for its use. Now, much of what is happening in primary education involves socialising students into knowledge of disciplines and subjects, whereas secondary and higher education involve initiating (individuating) students into the disciplines with the aim to provoke their critical thoughts in and about such education. Socialising students involves familiarising them with particular truth claims, whereas initiating them relies on provoking their critical thoughts to analyse and question such particular claims (Rorty, 1999, pp. 117–118). Similarly, educational technology is constituted by reasons such as providing opportunities for students to assimilate and discern (socialisation), reflect upon and question, and to 'push our understandings of things into previously unimagined regions' (individuation) (Smeyers & Depaepe, 2007, p. 7). This brings us to a discussion of three prominent educational theories that underscore the understandings of educational technology as espoused in this book.

TOWARDS A DELEUZO-GUATTARIAN NOTION OF EDUCATIONAL TECHNOLOGY

Gilles Deleuze and Félix Guattari (1987, p. xiv) use the metaphor of a plateau to describe an intensive state of thought that can be reactivated or injected into other activities. And, progressing from one plateau at a particular level to other plateaus at alternate levels is not linear (or in a straight line), but rhizomatic (Morss, 2000, p. 193). For Deleuze and Guattari (1987, p. 16), education that is firmly rooted or anchored in foundational – that is, disciplinary and reasoned – thought is 'arborescent' or hierarchical in the sense that education is enacted through a hierarchical superior. For instance, students assimilate predetermined disciplinary content from teachers 'along preestablished paths' and students 'can never get beyond' what they acquired or are expected to acquire (Deleuze & Guattari, 1987, p. 16). In a way, education along the 'path' of 'arborescent' thought is a form of socialisation that signifies a unidirectional relationship between teachers and students. In other words, educational technology, following 'arborescent' thought, encourages interpretations and exchanges between teachers and students that are fixed along a linear and regulated path determined by what is said and heard.

In contrast, rhizomatic education is different from linear, unidirectional thought and, according to Deleuze and Guattari (1987, p. 7) 'the rhizome itself assumes very diverse forms, from ramified surface extension in all directions to concretion into bulbs and tubers … the rhizome includes the best and the worst: potato and couchgrass, or the weed'. The rhizome, '[a subterranean root-like stem] lies upon or slightly under the surface, ready to produce a vertical stem when the opportunity arises' (Morss, 2000, p. 193). Thus, rhizomatic education involves a form of communication that builds upon a network of interconnections with no central organisation. Understanding education as rhizomatic involves mapping the paths of meanings or lines of flight [new shoots and rootlets] that people take to form linkages (Honan, 2004, p. 269). As Alvermann (2000, p. 118) explains, rhizomatic education is about 'looking for middles, rather than beginnings and endings, [which] makes it possible to decenter key linkages and find new ones, not by combining old ones in new ways, but by remaining open to the proliferation of ruptures and discontinuities that in turn create other linkages'. Thus, rhizomatic education, through 'starting anywhere', looks for middles and disrupts the taken-for-granted understanding of linear education. Students and teachers who are engaging rhizomatically are 'constantly open to new connections and alternative possibilities' (Le Grange, 2011, p. 748). They (students and teachers) would map out new possibilities ('vectors of escape') as they endeavour to move beyond the confines of linear exchanges of information. In a way, educational technology is a practice that engenders new possibilities for pedagogic encounters of a rhizomatic kind.

Whereas disciplined, reasoned and communicative education is linear, hierarchical ('arborescent') and 'striated' (strictly bounded and confining), rhizomatic education is chaotic and 'smooth' (that is, unrestricted, open and dynamic) (Ringrose, 2011, p. 602). Rhizomatic education allows students and teachers to constantly 'move between deterritorialisation – freeing ourselves from the restrictions and boundaries of controlled striated spaces – and reterritorialisation – repositioning ourselves within new regimes of striated spaces' (Tamboukou, 2008, p. 360). Territorialisation describes when energy is captured and striated in specific space/time contexts, whereas deterritorialisation is when energy is smooth and momentarily escapes or moves outside normative strata and reterritorialisation describes processes of recuperation of those ruptures (Ringrose, 2011, p. 603). If, for example, one engages in deterritorialised and reterritorialised education, one maps 'vectors of escape' (in relation to freeing one's thoughts from bounded restrictions) and 'lines of flight' (such as propelling one's thoughts about something in multiple and unrestricted directions) that will rupture established and hardened striated thoughts, thus giving rise to 'assemblages'. For Deleuze and Guattari (1987, p. 145),

> [t]he assemblage has two poles or vectors: one vector is oriented towards the strata, upon which it distributes territorialities, relative deterritorializations, reterritorializations; the other is oriented toward the plane of consistency or

> destratification, upon which it conjugates processes of deterritorializations, carrying them to the absolute of the earth. It is along its stratic vector that the assemblage differentiates a form of expression (from the standpoint of which it appears as a collective assemblage of enunciation) from a form of content (from the standpoint of which it appears as a machinic assemblage of bodies); it fits one form to the other, one manifestation to the other, placing them in reciprocal presupposition. But along its diagrammatic or destratified vector, it no longer has two sides; all it retains are traits of expression and content from which it extracts degrees of deterritorialization that add together and cutting edges that conjugate.

According to Deleuze and Guattari (1987, p. 504), assemblages have a dual form: a machinic form of content composed of energetic components (the technical aspect), and a form of expression or enunciation consisting of articulated statements (the social or human aspect). The content of the educational technology assemblages as discussed in Chapter 3 entails the social network media discussions posted technically on two Facebook group sites by anonymous students. Machinic assemblages thus refer to the technical content and human enunciations. Our contention is that we should not equate social media networks such as Facebook with the rhizome, but with immersing ourselves in such educational technology rhizomatically 'from and with the help of computers and electronic media' (Conley, 2009, p. 34). Deleuze and Guattari passed away on the threshold of the proliferation of the new social media and, although they were 'keenly attuned to the first signs of the massive transformations underway … [t]hey did not, however, experience the full impact of new media' (Conley, 2009, p. 36). The point we are making is that the emergence of social media networks such as Facebook did not occur during the lifetime of Deleuze and Guattari, but they were prescient to the new technologies that would contribute to the formation of 'assemblages' of education, as in the case of educational technology potentially harnessing innovative educational contexts. Put differently, following Deleuzo-Guattarian thought, we are attracted to practising educational technology in an attempt to cultivate 'assemblages' of education that can provoke new insights, thoughts and unexpected possibilities – that is, cultivating new 'lines of flight' for deterritorialised and reterritorialised educational possibilities.

In sum, a Deleuzo-Guattarian understanding of educational technology does not separate education from technology, as the combined notion of educational technology is oriented towards the cultivation of 'assemblages' – that is, practices that create possibilities for new imaginings or 'lines of flight'. In a way, such 'assemblages' are deterritorialised and reterritorialised spaces of human experience. These 'assemblages' are not spaces where educational technology educes educative activities during which new insights and unexpected possibilities are rhizomatically harnessed. In other words, technology is not seen in isolation from education, neither is education enacted separately from technology. The educative experiences or new

imaginings are not driven by technology, but rather enacted with technology – that is to say, we practise educational technology rather than use it. The expression of using educational technology involves treating educational technology as a 'thing' that has some technical or instrumental purpose. Of course it is not; educational technology, like educational philosophy or educational science, is a particular theory of education that can effect various practices according to its rationale. So, the point we are making is that educational technology can be practiced in terms of rhizomatism, which gives the practice a distinct way (theory) according to which its pedagogic activities can be realised.

TOWARDS A RANCIÈREAN NOTION OF EDUCATIONAL TECHNOLOGY

Whereas the enactment of educational technology is oriented towards the cultivation of 'assemblages' and is central to a Deleuzo-Guattarian view of the concept, how 'lines of flight' or 'vectors of escape' as new imaginings are engendered cannot just be considered the work of rhizomatic thinkers, especially if one considers that rhizomatic education lays claim to people being 'inside' the practice. In other words, teachers and students potentially produce 'assemblages' as equal 'insiders'. So, when students engage in rhizomatic education they are not treated only as 'insiders' who adhere to the norms of the practice, but their equality depends on them being present – that is, being included in the practice. Instead of assuming that all participants should be 'inside' of the practice of educational technology, Jacques Rancière (2006, p. 18) challenges the view that equality is to be restricted to 'insiders' and instead posits that equality is a claim to be made by all those who are considered as being 'outside' of the practice of educational technology. Put differently, educational technology does not mean that those considered as 'outsiders' who make the claim of equality want to be included in the practice. Rather, as equals they 'want to redefine the [rhizomatic] order in such a way that new identities, new ways of doing and being become possible and can be counted' (Biesta, 2009, p. 110). By implication, rhizomatic educational technology 'is no longer a process of inclusion of excluded parties into the existing order; it rather is a transformation of that order ['assemblage'] in the name of equality … [and the] impetus for the transformation does not come from inside but from outside' (Biesta, 2009, p. 110). In a way, educational technology is about the power of those who have no or little power, those who are qualified or less competent but who nevertheless intervene to install a momentary disruption and dissensus, that is, they are 'intellectually equal in the very act of intervention and they are competent in view of the common [educational technology] from which they are nevertheless excluded' (Masschelein & Simons, 2011: 5). And, for Rancière, 'a dissensus is not a conflict of interests, opinions, or values; it is a division put in the common sense: a dispute about what is given, about the frame in which we see something as given … (Masschelein & Simons, 2011, p. 82). Put differently, when 'outsiders' intervene they verify their equality as beings that are able to speak and act:

> Equality refers to the assumption (and not the fact) that we are all able to (be qualified), and does not refer to the classic idea that we all have equal capacities, share particular qualifications or should have equal opportunities. Equality for Rancière is always intellectual equality and intellect or intelligence [and refers to] an ability to (speak, understand) …. (Masschelein & Simons, 2011, p. 83)

Therefore, assuming that everyone is equal implies assuming that everyone, regardless of their qualifications, 'is able to'; for instance, every student is able to participate in deliberative moments and has the ability to disrupt such encounters through her ability to speak and understand. The importance of Rancière's work is that he allows us to think differently about rhizomatic education and inclusion. In Rancièrean terms then, educational technology would be sporadic in the sense that people from 'outside', in other words less powerful people, disrupt or interrupt practices in the name of equality. Educational technology thus becomes the pedagogic space through which students interrupt the chains of reasons and consequences, causes and effects that shape their learning. As students they are encouraged to create new forms of learning and to discover modes of action to make things happen (Masschelein & Simons, 2011, p. 6). In Rancièrean terms, students situated within educational technology have the equal ability to speak, to understand and to reshape an educational practice.

TOWARDS AN AGAMBENIAN NOTION OF EDUCATIONAL TECHNOLOGY

Although the Italian philosopher Giorgio Agamben does not offer a view on educational technology, it would be apposite to examine his understanding of community in relation to educational technology on the grounds that students and teachers engaging in an encounter that involves educational technology do so as individuals in association with one another. Agamben (2009, p. 86) offers an account of community that is not conditional upon the notion of belonging. In other words, people are not obliged to form some kind of bond through which they belong and through which they seek recognition as individuals or groups. So, students engaging in educational technology do not have to belong together in order to think and act in relation to pedagogic activities. In terms of Agambenian thought, students exist in their singularities – in 'whatever singularity' (Agamben, 2009, p. 87) – and reject all identity and every condition of belonging. Such a view of community makes sense because students engaging in educational technology do not do so on condition that they first had to establish some social bond through which they can express their ideas. They constitute a community engaged in educational technology on the grounds of doing things together without some prior social connection having been established amongst them. They engage in educational technology with their own identities and ways of seeing things (their own singularities), with the relative absence of determinate demands. Put differently, an Agambenian notion

of educational technology considers the participation of students in educational technology as the only concrete demand, without being concerned with their inclusion in any form or another. That is, inclusion in educational technology is not a condition of community. Instead, students 'co-belong without any representable condition of belonging' (Agamben, 2009, p. 86).

What follows is that students engaging in educational technology do so with whatever singularities (that is, social background, computer competence and skills, knowledge of the subjects examined, and understandings of participation). They co-belong to form a community of educational technology (say of Facebook) without affirming an identity to the extent that they would dissolve whenever they wish to do so. They are not bounded by coercion or belonging. What is significant about a community of belonging is that this community emerges through a common interest in, and engagement with educational technology. As such, the possibility exists that they can withdraw whenever the desire, or even disrupt the pedagogic encounters on the grounds that they cannot be curbed in their actions. Such a view of community is not constrained by particular prohibitions, as that in itself could curtail students in their enunciations about what they think about and learn. Put differently, engaging in a community without belonging creates conditions for detachment and withdrawal, so that students freely exercise their autonomy unhindered by the constraints of belonging. As aptly stated by Agamben (2009, p. 87), such students come to the community of educational technology with '[w]hatever singularity, which wants to appropriate belonging itself, its own being-in-language, and thus rejects all identity and every condition of belonging …'.

Extending a Rancièrean notion of disruptive educational technology, an Agambenian view of the practice seems to advocate disruption of whatever is engendered. And, whatever is engendered brings into consideration the view that engaging in educational technology potentially can lead to this or that or whatever understanding or view. The point about students potentially doing things or potentially coming up with ideas or views speaks to their capabilities to do so. In other words, according to Agamben (1999, p. 177), they 'can' come up with something. By implication, a student of educational technology suffers an 'alteration' [a becoming other] through learning' (Agamben, 1999, p. 179). Also, when a student has potential, she also has potential to not-learn insofar as engaging with educational technology is concerned. Agamben (1999, pp. 179–180) aptly claims that '[i]t is potentiality that is not simply the potential to do this or that but potential to not-do, potential not to pass into actuality'. Students engaging in the practice of educational technology, following Agamben, have the potential to learn and also to not learn. By implication, learning is not conceived as some coercive act that students must endure, but rather as a volitional act of thinking and doing to which they are freely drawn and contribute. So, an Agambenian understanding of educational technology encourages the free and open participation of students and teachers where there is much to learn and to not learn, and where the unimagined, unexpected breakthrough is always in becoming.

In sum, an Agambenian notion of educational technology brings to the fore two aspects: to engage in educational technology is to do so without any precondition of belonging – that is, students co-belong in a community of educational technology on the grounds of whatever and whoever they are; and they have the potential and also the impotential to learn in educational technology.

EDUCATIONAL TECHNOLOGY AS A DEMOCRATIC PRACTICE

Thus far we have shown that educational technology is not a thing with which we do certain things, but rather that it is a practice in which we engage. Put differently, educational technology is a practice that is guided by a rationale or theory of doing this or that. It is not that educational technology is used by people, but rather that it is a practice within which students and teachers are situated and whereby they act in a community of co-belonging. Moreover, educational technology can be looked at through different theoretical understandings: first, a Deleuzo-Guattarian notion accentuates the view that educational practices ought to be rhizomatic in the quest to cultivate 'assemblages' of meaning that are smooth and always open to new imaginings (that is, lines of flight or vectors of escape); second, a Rancièrean notion of educational technology educes disruptive action through which students can come to speech on the grounds of being 'outsiders' rather than coerced to be included in pedagogic action; and third, an Agambenian idea of educational technology enhances the view that students remain in potentiality and community – they do not belong to a community of educational technology, but rather co-belong as they endeavour potentially to learn or not learn. The aforementioned notions of educational technology open spaces for different understandings of democratic education to which we shall now turn our attention.

We begin by examining three prominent liberal understandings of democratic education, before going on to an analysis of how the aforementioned poststructuralist notions of educational technology potentially guide democratic education. By way of introduction, democratic education comprises 'the ongoing transformation of uninformed, routine habits of thinking and acting into informed, enlightened habits of reflective inquiry … infused with a deep concern for social cooperation and scientific thoroughness …' (Dewey, cited in Katz, 2009, p. 35). This view of democratic education is contrasted with another, problematic view of education that aims to prepare an individual for adult life in order for him or her to 'assume the roles and responsibilities of an adult in society' (Katz, 2009, p. 35). The latter view of education is consistent with the Christian National Education approach to education in apartheid South Africa, in terms of which the youth should be socialised to become adults, as if societies do not undergo change (Morrow, 1989, p. 52). This latter view of education would not work for our case studies, because students should be educated to think critically for themselves and not wait to be prepared for adult life, where rapid societal change may in any case be prevalent; hence our attraction to democratic education that aims to prepare students to participate in

deliberative discussions with others, and to be attuned to the requirements of social justice (Robertson, 2009, p. 125). We now turn to a discussion of some of the main ideas on liberal democratic education as espoused by Amy Gutmann (1987, 1999), Maxine Greene (1995) and Eamonn Callan (1997).

More than a decade after Amy Gutmann's first edition of *Democratic Education* was published (Gutmann, 1987), the revised edition, with a new preface and epilogue, continues to sustain her compelling argument that education remains political (Gutmann, 1999, p. xiii) and that it continuously should be informed by democratic theory (Gutmann, 1999, p. 14). Her argument that education is political stems from the Deweyan view that education is a form of 'conscious social reproduction' that focuses on 'ways in which citizens are or should be empowered to influence the education that in turn shapes the political values, attitudes, and modes of behaviour of future citizens' (Gutmann, 1999, p. 14). In other words, because education includes 'every social influence that makes us who we are', it can be claimed to be political (Gutmann, 1999, p. 14). Also, the primary aim of a democratic theory of education is 'to cultivate [in students] the skills and virtues of deliberation' (Gutmann, 1999, p. xiii). For Gutmann, 'deliberation is not a single skill or virtue [but rather] it calls upon skills of literacy, numeracy and critical thinking, as well as contextual knowledge, understanding and appreciation of other people's perspectives' (Gutmann, 1999, p. xiii). Considering that democratic education aims to engender in students skills and virtues of deliberation, a democratic classroom can help secure students opportunities to collectively pursue justice with others (Gutmann, 1999, p. xiii). Here, justice refers to students deliberating with one another and giving due recognition to one another's points of view through listening, reflecting and disagreeing in an atmosphere of mutual respect.

Gutmann is not alone in linking democratic education to the notion of deliberation. There are at least two democratic decision-making models, namely the aggregative and the deliberative models of decision making (Biesta, 2009, p. 103). The first model is concerned with the aggregation of preferences with regard to choosing policies or public officials according to a democratic decision-making process. This model considers values as subjective and non-rational and simply involves a competition between private interests and private preferences (Biesta, 2009, p. 103). Aggregation relies mostly on majority rule, which might not always reflect the most convincing decisions. Over the past two decades, democratic decision making has been changed into a deliberative transformation of preferences – a form of decision making that involves argumentation by participants towards collective action (Young, 2000, p. 22). Whereas the aggregative model looks at which preference has the most numerical support, the deliberative model ensures that the individuals participating in the decision-making process are persuaded by the most appropriate reasons, rather than being coerced (Young, 2000, p. 23). Deliberation happens when reflection on preferences takes place in a non-coercive manner, because it 'rules out domination via the exercise of power, manipulation, indoctrination, propaganda, deception, expression of mere self-interest …' (Dryzek, 2000, p. 2).

This deliberative model also shows congruence with the core values of democracy, as it allows individuals to engage with each other under inclusive equality (Young, 2000, p. 26). Of course, the argument can be used that teachers in classrooms have pedagogical authority, as they decide when a pedagogical episode begins and ends, without considering the agency of students. Hence, deliberative democracy might not be possible in such classrooms. However, if teachers engage with students under conditions of inclusive equality, they would not consider themselves only as decision makers with unchallenged authority, but rather as agents who actively promote student participation under conditions of 'inclusive equality' – that is, recognising the autonomy of students to contribute to the learning process. What follows is that a deliberative approach to learning has a robust educational perspective, because it allows individuals to gain new information and look at situations from different perspectives, or enlightens them to perceive that their judgments may be based on prejudice, ignorance or misunderstanding with regard to the judgments made by others. In this way, individuals become more tolerant and knowledgeable of the interests of others (Warren, 1992, p. 8).

A deliberative decision-making model entails several normative ideas that are a prerequisite for such a model to be integrated successfully (Katz, 2009, p. 105). In relation to such normative ideas, Young (2000, p. 24) makes an interesting delineation between reasonableness and rationality. Young (2000, p. 24) sees reasonableness as a necessary condition for deliberative decision making, and rationality as supplementary to it. Reasonableness, as defined by Young (2000, p. 25), is the willingness to listen to others who want to explain why their ideas are (in)appropriate or wrong and right. This perspective therefore not only sees deliberation as a form of political decision making, but entails the emergence of deliberation as a communicative virtue. Rationality, in turn, involves giving an account of one's reasons in the light of what others have to say. Therefore, rationality is considered as supplementary to reasonableness.

Furthermore, democratic education has in mind citizens who deliberate (Robertson, 2009, p. 116). Deliberation, simply put, is a process of discussion among individuals on an equal footing who encourage others to engage in dialogue, taking into consideration alternatives, relevance and worthiness, so as to collectively choose a direction to follow (Robertson, 2009, p. 116). Notions of deliberative democracy primarily denote having a strong public sphere and opportunities for vivid discussion (Held, 1987, p. 3). Moreover, a distinction should be made between deliberators and debaters. Unlike debaters, deliberators are open to reason and the possibility of being wrong (Robertson, 2009, p. 115). Robertson (2009, p. 117) argues that deliberation aims to convert disagreement to agreement. Although disagreement may persist, the mutual respect involved in the process of deliberation will enhance legitimacy, even if it goes against the beliefs of certain individuals participating in the process (Robertson, 2009, p. 118). Supporters of deliberative democratic education propose that a special type of conversation, characterised by difference and disagreement, is required (Witschge, 2002, p. 1).

Through persuasion rather than coercion, deliberators are amenable to changing their judgements during interactions within a sphere of deliberative engagement (Dryzek, 2000, p. 1). Also, 'deliberators, unlike debaters, are open to rational persuasion, [and] to the possibility of being shown wrong' (Robertson, 2009, p. 117). The legitimacy of decisions rests upon a deliberative process through which individuals' will is formed [consciously], and not by the expression of some pre-determined will (Manin, 1987, p. 338). And, since deliberation is characterised by individuals reaching a consensus through the same virtues that underpin a democracy, such as willingness and respect, it therefore can be regarded as an important civic virtue (Robertson, 2009, p. 115). This civic virtue is important in classroom practices, as it allows students to communicate with one another and with teachers in a democratic manner, making learning two-directional, and not just the teacher imposing his or her views on the students.

Young (2000, p. 26) suggests that there are several modes of political communication that should be incorporated as part of the deliberation process, because not all individuals in a public sphere necessarily have the eloquence and articulateness to make their points. These modes of communication include public acknowledgment, rhetoric, and narrative or storytelling. Public acknowledgement necessitates that one recognises participants in conflict resolution, especially if there is a difference in opinion or interest (Katz, 2009, p. 106). Acknowledging people publicly is a matter of greeting them and treating them courteously, even in the event of a serious disagreement. Young (2000, p. 55) suggests that rhetoric can help participants in a deliberation to articulate arguments and statements in ways that are appropriate to a situation. It allows arguments to be articulated with embodied style and tone (Young, 2000, p. 55). Young (2000, p. 56) avers that, in any form of inclusive democratic communication, individuals will have different biases, prejudices or stereotypes, which implies that their understandings of others and interpretations of events would differ as well. A narrative could be articulated (as in storytelling) to deal with these biases, prejudices or stereotypes in ways that cause conflict in inclusive democratic communication. People would offer their narratives of how they understand and explain events in society, based, of course, on their prejudices and ways of understanding.

In the main, the monumental contribution of Gutmann to the revised edition of *Democratic Education* (1999) extends the relationship between democracy and education that was made famous by John Dewey (1916/1966) and John Rawls (1971), on which many contemporary democratic educationists and theorists have built their contributions on a democratic theory of education. According to Gutmann (1999, p. 308), democratic education should, firstly, 'introduce students to competing perspectives, and should equip them to deliberate as equal citizens about why and when it is justifiable to agree to disagree over an issue … and when it is morally necessary to decide collectively on a single substantive policy (such as racial and gender nondiscrimination)'; secondly, it should cultivate equal dignity and civic equality amongst students and teachers (Gutmann, 1999, p. 312); and

thirdly, it should 'teach understanding and appreciation of liberty and justice for all from multiple perspectives' (Gutmann, 1999, p. 315).

Maxine Greene's (1995) *Releasing the Imagination* offers a vivid account of human actions in relation to democratic education. She makes a cogent argument for reshaping human imagination through multiple forms of (democratic) dialogue: 'dialogue among the young who come from different cultures and different modes of life, dialogue among people who have come together to solve problems that seem worth solving to all of them, dialogue among people undertaking shared tasks, protesting injustices, avoiding or overcoming dependencies or illnesses' (Greene, 1995, p. 5). In her view, if the aforementioned dialogues are initiated in classrooms, students are 'stirred to reach out on their own initiatives' (Greene, 1995, p. 5). What attracts us to Greene's account of the dialogical relationship between students and teachers that should occur in the classroom is the fact that a democratic community of students and teachers is never complete or final, but 'always in the making' (Greene, 1995, p. 39), or in potentiality (Agamben, 1999). In Greene's (1995, p. 43) words, our democratic classrooms

> ought to resound with the voices of articulate young people in dialogues always incomplete because there is always more to be discovered and more to be said … [that is, we must want our students] to achieve friendship as each one stirs to wide-awakeness, to imaginative action, and to renewed consciousness of possibility.

Greene's notion of democratic education is undergirded by at least three aspects: firstly, teachers should stimulate students to 'reach out for meanings, go beyond conventional limits … seek coherence and explanations [that] are to be better able to provoke and release rather than to impose and control' (Greene, 1995, p. 57); secondly, students should 'tell their stories [or narratives] not only that we [teachers] can hear them but so that they can make meaningful the birth of their own rationality' (Greene, 1995, p. 54); and thirdly, teachers should be attentive to and 'transform what is inhuman [that is, torture, exclusion, victimisation, hunger, famine and starvation]' (Greene, 1995, p. 114). What follows from the aforementioned understanding of democratic education as participating in dialogues is that the latter is closely connected to arousing in students an awareness of social injustices by stimulating them to search for 'new beginnings', to open up to others the texts of their 'lived lives', and to show their outrage about human suffering and other forms of injustice.

The need to cultivate dialogues so that students can narrate their stories and be provoked to 'release their imagination' is based on an understanding that individuals should be included in the deliberative process of engagement. This view of democratic education as inclusion is supported by others, as will be elaborated on now. Democratising education or, more specifically democratic education, may be described as including those who are not part of a democratic sphere in a sphere of inclusion (Biesta, 1999, p. 8). Inclusion is one of the core values of a democratic

education, as the whole point of democratic education ultimately is to achieve the inclusion of everyone (Biesta, 1999, p. 1). Inclusion also has a part to play in the legitimacy of democracy, as democratic decision making (and, we would argue, democratic education) depends on the input of the affected to be part of the decision-making process in order to influence the outcome (Young, 2000, p. 5). Moreover, if one bears in mind that democratisation involves bringing into the sphere of democratic education those individuals who previously were not included (Biesta, 1999, p. 8), inclusion can be considered a fundamental requirement for democratic education. And, as has been discussed previously, Biesta makes the distinction between two assumptions with regard to inclusion, namely internal inclusion, which refers to how we can make our practices even more inclusive, and external inclusion, which looks at bringing more people into a democratic deliberative sphere (Biesta, 1999, p. 5). Whereas the first assumption is focused on making individuals even more attentive to dissimilarity (Biesta, 1999, p. 5), the second assumption demands of those who are in a democratic sphere to bring more individuals into that sphere so that they may be guided into democracy by values such as rationality and tolerance, which are indicative of the democratic sphere (Biesta, 1999, p. 6). Again there is an educational potential for this notion of inclusion, as educational practices in the class can become even more inclusive (internal inclusion) and links can be formed with other classrooms, and with organisations and other schools – examples of external inclusion.

Eamonn Callan's *Creating Citizens* offers a political account of education that hopefully will teach students democratic virtues such as justice, tolerance and mutual respect so that they can participate competently in dialogue as citizens (Callan, 1997, p. 28). Callan's notion of democratic education is threefold: firstly, to teach learners to speak their minds without being silenced because of dissent (Callan, 1997, pp. 206, 209); secondly, to encourage learners to participate in a distress-provoking dialogue on the basis that one is not more than the topic of conversation (Callan, 1997, pp. 204, 206); and thirdly, to initiate learners into a sense of justice according to which they accept the responsibility for the rights of others, that is, to care about others as partners, and to restrain themselves from violating others' rights (Callan, 1997, pp. 73, 76, 79).

Following Gutmann (1987), Greene (1995) and Callan (1997), democratic education is an act of the political that implies that students and teachers, firstly, engage in dialogues in which they function as civic equals on the basis that their deliberative speech acts will receive due recognition by the other, even belligerently; secondly, are attentive to social injustices such as the marginalisation and exclusion of the weaker other; and thirdly, embark on communicative action with the aim of solving particular problems and reaching out to that which is still to come, more specifically stimulating one another towards the unimaginable. With the aforementioned background of democratic education in mind, we shall now examine

how such liberal understandings of democratic education can be extended through poststructuralist understandings of educational technology.

Poststructuralist notions of educational technology are constituted by pedagogic actions that prompt students and teachers to take risks in association with one another with the intent to disrupt assemblages/spaces of meaning making. First, the upshot of such a view of educational technology that stimulates students to take risks in their pedagogic encounters is that democratic action is not confined only to inclusion, but also opens up risk taking to disruptive student agency. This implies that students would not just endeavour to be included in pedagogic encounters, but as 'outsiders' would endeavour to disrupt such encounters so as to speak their minds and thus come to speech. Second, risk taking within pedagogic encounters underscored by educational technology not only open students and teachers to deliberative engagements of a distressful and provocative kind, but would also evoke the potentialities of students to reach out to new beginnings in a community in which they co-belong. In other words, students situated within the practices of educational technology would not be coerced to belong, as their engagement with others remains unconditional – that is, their autonomy is unconstrained in the sense that they can be attached with to the possibility of detachment from the pedagogic encounters. Third, taking risks would not only engender opportunities for students to achieve their potentialities, but also for them to recognise the possibilities of their impotentialities. In other words, with educational technology, students can learn from pedagogic encounters and also not learn from them. And, if students recognise their potential to not learn, then the possibility for the unexpected to happen would be a possible outcome of democratic encounters. Also, the idea of evoking students' potentialities involves them becoming whatever 'altered' being, which implies that in a community of co-belonging they can reach a consensus, dissensus or something else. In this way, democratic education in potentiality – in becoming – does not depend on students attaining a consensus or agreement. Pedagogic encounters informed by democratic education in potentiality always allow something new to be expected, that is, some unexpected, unimagined, incalculable plateau to be envisaged where 'assemblages' of learning can be whatever happens.

SUMMARY

Engaging in and with educational technology can be an extended democratic practice on the grounds that pedagogic encounters amongst teachers and students are not just confined to deliberative encounters in which inclusion and provocation hold sway. Rather, such pedagogic encounters would be stimulated by the possibility of students taking risks as they endeavour to disrupt the encounters, unhindered by conditions of belonging to the cultivation of whatever 'assemblages' of meaning

making, where the unimaginable, the incalculable is both in potentiality and impotentiality. There always will be more to learn, as the pedagogic encounters are never actualised, for the latter would imply that deliberations would have ceased, inclusion would have been attained, and risk taking would have been stunted. Thus, democratic educational technology is always in potentiality, as there is always more to encounter, more to learn and more to discover.

CHAPTER 2

EDUCATIONAL TECHNOLOGY AND THE ENACTMENT OF DEMOCRATIC CHANGE

INTRODUCTION

In the previous chapter we offered an account of educational technology and its potential links to rhizomatic action, disruptive action and risk taking as extensions of democratic education. We shall now move to a discussion of some of the technical advances made in educational technology. In the discussion, the technological 'tools' will not be examined as separate entities from the educational effects they potentially offer, for the reason that the argument of this book is that educational technology in itself is a practice. Of course, education can still exist without technology, but to refer to educational technology is a recognition that the educational implications of the practice would be something else than with education on its own. In the main, the practice of educational technology, as has been espoused in the previous chapter, is a political act of meaning making with democratic dimensions. That is, with educational technology the practices of such an educational endeavour would embrace the political – that is, invariably would be democratic and intertwined with socially just actions. So, in the next section we analyse some of the 'tools' with their concomitant educational implications, that is, look at instances of educational technology.

Technological advancement in areas of social networking, social media, smartphones and tablet computers has provided teachers with a challenge to engage students on a newly developed front whilst still complying with sound pedagogical practices (McHaney, 2011, p. 1). McHaney (2011, p. 3) suggests that those who embrace technology will thrive and excel, in contrast to those who do not. There are various technologies that have enabled a transition towards more meaningful pedagogical experiences for students. This transition has presented teachers with the challenge of understanding how the technology works and how it can be implemented effectively. The challenges suggested by McHaney (2011, p. 51) should not be a reason for concern, as students of the current generation are eager and ready to accept educational technology such as Facebook – a situation that augurs well for successful technology implementation in pedagogic encounters. It should be noted, however, that even if there is an indication that students exhibit a positive attitude towards technology, it does not necessarily indicate that they are able to use it effectively towards improving their learning. A reason for this is that they are not necessarily capable of filtering information that is of relevance to them. The teacher's role in the current era is to encourage students to develop good

instincts that would ensure continuity and the credible implementation of pedagogic action (McHaney, 2011, p. 51). Although many individuals in education hold the view that students need to use traditional sources of knowledge, such as libraries, McHaney (2011, p. 51) suggests that it would be more beneficial for students to be exposed to the wealth of knowledge, albeit of varying degrees of quality, that is to be found on the Internet. Students often use the Internet as a resource for reports or projects, with varying degrees of success. Although their learning may in some cases be inhibited by the fact that they use Internet resources of low quality, it cannot be denied that their exposure to such a massive resource can only be positive. It is here that teachers can help students filter through the wealth of information on the Internet in order to contribute to a fuller pedagogical experience for them. The ease with which information is accessed and disseminated is a reality for students, and they need to be able to deal with this reality (McHaney, 2011, p. 51). It should be noted that, even with the wealth of information that is available to students through the use of various technologies, these should not be used just for the sake of using technology (McHaney, 2011, p. 51). Integrating any new technology into teachers' teaching needs to make sense, that is, teachers should encourage students to be more attentive to learning within the practice of educational technology. When we come across a new technology it often requires some imagination to integrate it into classroom practices successfully in order to make the learning experience more meaningful and exciting for students. It is this kind of imagination that can push aside obsolete teaching pedagogies to cultivate better pedagogical experiences for students (McHaney, 2011, p. 53).

In the contemporary era it is hoped that education incorporating information and communications technologies (ICTs) will encourage flexibility of mind, a creative spirit and a network of contact to ensure sustainability in a competitive world (McHaney, 2011, p. xiii). Not all technology may be effective in the pursuit of this endeavour (McHaney, 2011, p. xiii). McHaney (2011, p. xvii) calls current students 'millennials'. These students are not necessarily smarter or superior, but do have different expectations of the world to students of past generations (McHaney, 2011, p. xvii). These students or 'millennials' are distinguishable from other generations in that they have incorporated social media and other forms of communication technology into their everyday lives. They also have been endowed the capability to customise their social media experience, and are able to commoditise, filter and synthesise information (McHaney, 2011, p. xvii). On the downside, these individuals may have little regard for online privacy, may have developed a social order on the web and may engage in inappropriate activities on the web (McHaney, 2011, p. xvii).

Despite this downside, their engagement with the web holds much promise in the sense that technology can help to produce a fuller pedagogical experience for these students (McHaney, 2011, p. xviii). Working towards a fuller pedagogical experience has been aided by the advent of many applications for social computing, social media and smartphone devices to promote such an experience for students

(McHaney, 2011, p. xviii). Various forms of technology thus have converged with one another. The convergence of technology is known as Web 2.0, which consists of five components, namely social computing, social media, content sharing, filtering and web applications (McHaney, 2011, p. xviii). These technologies, which are linked to free information sources, have reshaped the ways in which individuals filter, sort and find relevant information, resulting in new possibilities for learning. Students inherently expect learning material on platforms of their own choice (McHaney, 2011, p. xviii). McHaney (2011, p. xviii) suggests that, when these components are integrated into classroom practices, there is potential for richer knowledge delivery to the millennials that we encounter in classrooms today. Moreover, Garrison and Anderson (2003, p. 42) posit that educational technology can contribute to democratising classroom pedagogy in the following ways: by keeping an educational group of students synchronised or acting together; by developing connections between students' existing mental schemas and new content, information and skills acquired; by guiding the way students interact with one another; and by making it possible for students to follow individual interests and interactive paths.

In fact, what has been discussed thus far in relation to educational technology is that technology can facilitate learning on-line, such as through Facebook – that is, a form of e-learning that makes it possible to transform teaching and learning in classrooms. In this regard, Garrison and Anderson (2003, p. xiii) hold that 'e-learning [such as learning through the educational technology of Facebook] can create asynchronous communities of inquiry which have the potential to support the development of communities of learning, while still allowing anytime-anywhere access by students'. In this way, e-learning [an instance of educational technology], as we shall show in the next chapter, can engender what Garrison and Anderson (2003, p. xi) refer to as 'explosive, unprecedented, amazing and disruptive' pedagogical opportunities for both students and teachers.

This brings us to a discussion of various technologies in the context of educational technology.

MOBILE PHONES

One technology that we have identified as an educational technology is the mobile telephone. Almost every individual in the modern era owns a mobile telephone and it has redefined the way we conduct our daily lives. McHaney (2011, p. 61) suggests that the mobile telephone has become the main learning tool for the generation of millennial students. Although most individuals have mobile telephones, phones range from simple communication tools to advanced smartphones with equal or more capabilities than that of expensive desktop computers. But despite the differences in the capabilities of these devices, at the core they all allow for communication between users of mobile telephones and other devices. Mobile telephones have a pedagogical potential to democratise learning experiences. With the advent of the mobile telephone, and its accessibility to students, there has been a reassessment of

the use of these devices in classrooms as tools for teaching and learning. Although primary research conducted in this field suggests that mobile technology can change the educational landscape, the rate at which mobile technology has permeated this landscape has been slow (McHaney, 2011, p. 61). There is no doubt that the future of education is heading towards what researchers term ‘m-learning’, where mobile technology defines education (McHaney, 2011, p. 61).

Modern mobile phones, also called cellular phones or cell phones, have come a long way from the bulky, heavy and overpriced devices that were launched by the Motorola group in 1973 (McHaney, 2011, p. 61). Today, mobile phones are small, inconspicuous and have the same processing power as expensive desktop computers had just a few years earlier. These mobile phones are no longer regarded only as devices for communication, but have evolved into mobile computing platforms known as smartphones. These smartphones have the same capabilities as many desktop or laptop computers, such as Internet connectivity, word processing, media playing, still and video cameras, videoconferencing, GPS navigation, e-mail services, sound recorders and text messaging. The first smartphone was manufactured by Nokia in 1996 and sparked a revolution in the mobile phone circuit as competing phone manufacturers began to integrate sophisticated microprocessors into smartphones (McHaney, 2011, p. 62). The implication was that third-party software developers were able to design many applications that would work on the hardware that was incorporated into these devices. This can be viewed as an important development for teaching and learning, as many of the applications developed have educational potential.

Following the advent of the smartphone in 1996 there have been many developments in the smartphone market. In 2005, Nokia rebranded a division of its smartphone section as a mobile computer, and Apple launched the first iPhone in 2007. With the launch of the iPhone, many third-party software developers started to develop applications specifically for the iPhone operating system that could be downloaded from Apple’s highly successful online music store, iTunes. Many of these applications were designed specifically for teaching and learning (McHaney, 2011, p. 62). The applications designed for the iPhone platform are specific to the iPhone operating platform. However, in 2008, a number of companies in the information technology sector, such as Google, Intel, Motorola and eBay, formed the Open Handset Alliance to counter Apple’s domination of the smartphone sector. Google developed an open-source platform known as Android. This meant that many third-party software developers could develop applications for phones running such an operating platform (McHaney, 2011, p. 63). Many of the applications developed for the Android operating platform are free of charge, and many have educational potential.

As university teachers, all three of us use our mobile phones as a teaching tool. Traditionally, teachers who have embraced technology in the classroom use laptops or desktop computers connected to data projectors to augment teaching and learning. These laptops and desktop computers are used to better convey content

to students in a more fun, intensive and effective manner. PowerPoint, images, YouTube, the Internet, flash animations and videos are just some of the resources available to teachers to enhance the teaching and learning process. In most cases, laptops or desktop computers are very expensive, and some classrooms have limited Internet connectivity that is difficult to maintain. Given the South African context, where there is a shortage of classrooms, let alone laptops or desktop computers, it is our contention that smartphones can be a more than adequate replacement for an expensive laptop or desktop. All of us often connect our smartphone to a data projector through a video cable to present work using PowerPoint or other of the educational resources we have mentioned. These devices are much cheaper than expensive laptops or desktop computers, but have the same functionality for teaching and learning.

SOCIAL COMPUTING

Another key technology with which to pursue pedagogic action is Web 2.0. Web 2.0 is not necessarily radically different from the Internet we have become accustomed to since its inception in the 1950s, but it redefines the World Wide Web to incorporate web-based applications that promote information sharing, interoperability and collaboration. What attracted us to this technology is its educational potential. McHaney (2011, p. xviii) suggests that incorporating Web 2.0 into classroom pedagogy creates the potential for rich knowledge delivery. Web 2.0 is an interactive form of technology, consisting of 'architectures embodying a principle of decentralisation underlying the Internet' (Peters & Roberts, 2012, p. 132). A deep transformation has occurred as a result of Web 2.0 technologies. Instead of going onto the web to read static content, users, and especially young people, increasingly go onto the web to share their ideas and creations. The rise of user-generated content and media, such as blogging and social networking, has created revolutionary new social media that use the Internet as a platform through Web 2.0 technologies (Peters & Roberts, 2012, p. 133). In this book we focus on two forms of social computing, namely social networks and social media.

Social networks have changed human interaction in a dramatic way. They have revolutionised the ways individuals interact, connect and share information (Towner & Munoz, 2011, p. 34). Essentially, social networks are linked websites that give people a sense of a mobile community in which there is sharing of information on a person's character and interests (McHaney, 2011, p. 81). Social networks encourage the communal exchange of text, audio or video in real time. Facebook, MySpace and MSN Messenger are but a few examples of social networking. Social networking allows users to set up online identities, known as profiles. These profiles can be viewed by others in this online community, and may display bio-geographical information, pictures, and the likes and dislikes of the user, as well as what currently is on the mind of the user via a status update (McHaney, 2011, p. 81). Since the inception of these social networking websites there has been a redefining of the

ways in which students learn, do homework, read and participate in discussions (McHaney, 2011). McHaney (2011, p. 81) indicates that, in his research and surveys, all students emphasised the importance of social networks and interwove their academic experience with the social network community of which they form part.

Facebook

One of the largest social networking websites is Facebook. Given their level of personal involvement and the time students spend on Facebook, as well as its potential for community development, teachers like ourselves are attempting to integrate Facebook into our teaching pedagogy (Towner & Munoz, 2011, p. 35). Facebook had humble origins, being developed in a dorm room by a Harvard University student, Mark Zuckerberg. Today, Facebook is the most popular social networking site, with an ever-expanding user number, already topping 850 million (McHaney, 2011, p. 82). Zuckerberg initially intended Facebook to be a tool for students on campus to be more socially connected, but his creation quickly grew into the phenomenon it is today, incorporating users of different ages and from different countries and backgrounds, all connected through a single website. Facebook now is regarded as an essential part of students' social life, not only as a communication tool, but also for electronic socialisation (Towner & Munoz, 2011, p. 33). What appeals to many Facebook users is that it allows each user to customise his or her profile in terms of profile pictures, photos and interests, with specific categories such as favourite music, favourite movies, sports played, work information, schooling and qualifications, to mention but a few. This means that the users can portray the profile they would like other users to see. These profiles can be searched for in a similar way to which a search engine such as Google operates, although it only displays profiles and groups. Once a user profile has been found using the built-in search engine, a request to '[be]friend' the user can be sent and, once the request is accepted, the two profiles will be linked together; that is, they are Facebook friends. 'Friends' on Facebook are listed under a friend list, and other users can view friend lists. In this way, profiles are stored in a list much like a telephone directory. A database of profiles is produced and the consequence is that 'friends' of 'friends' can be linked together. Users on Facebook can also join groups. These groups have members who share similar interests. Many groups have already been created by non-profit organisations for doing good, or groups can be created for social reasons (McHaney, 2011, p. 83). These groups may serve as noticeboards to promote events or publicise important information. A group allows members of a Facebook community with similar interests to meet, interact and seek out information with other members of the group.

Many students regard secondary and tertiary studies as being social experiences, and students are able to communicate with friends or friends of friends through these Facebook groups to gain insight when writing reports or preparing for examinations (McHaney, 2011, p. 80). This form of social interaction among

students who form part of this community facilitates knowledge creation (McHaney, 2011, p. 81). That being said, many connected individuals all contributing to knowledge production seems to be far more engaging than a group of students gaining knowledge on a particular aspect from a single teacher in a classroom. The point we are making is that being engaged collectively is educationally far more enriching than being subjected to a process of transmission of knowledge, often in a non-engaged way, by a teacher. In this way, classroom practices are democratised through the engagement of students and teachers, rather than students being subjected to disinterested knowledge transmission by the teacher – the engagement of teachers and students therefore should be an assemblage that is both recuperative and disruptive of the striations that order the assemblage (Ringrose, 2011, p. 613).

As Facebook's popularity has increased, teachers and students have come into increasing contact as they share the same social space (Towner & Munoz, 2011, p. 36). Mazer, Murphey and Simonds (2009, p. 174) suggest that teachers with a rich self-disclosure on Facebook increase students' motivation and affective learning, as well as their own credibility. These relationships built up on Facebook result in students communicating more effectively in classroom practices, as the students are more familiar with their teachers. This is in congruence with research conducted in the field of social networking, which indicates that online environments such as Facebook increase class satisfaction, a sense of community and learner performance (Beaudoin, 2002, p. 147) – that is, a matter of democratising classroom practices. Concerns about privacy, in that there is an erosion of the professional boundaries between students and teachers, are often scrutinised (Towner & Munoz, 2011, p. 38). Many teacher training institutions propose that teachers always maintain a professional relationship with students and that they do not become close to their students, such as friends do, to ensure that there is a relationship of respect between the teacher and the students (Towner & Munoz, 2011, p. 38). This may be true, as '[be]friending' learners [students] on Facebook may have certain negative implications for [teacher] educator freedom, although it does enhance the social relationship between educators [teachers] and learners [students] and this might not necessarily be harmful for the pedagogical process. Also, '[be]friending' on Facebook cannot be regarded as equivalent to befriending an individual in reality (Towner & Munoz, 2011, p. 38). Therefore, there seems to be some distance that is retained and, we would argue, enough space for teachers to exercise their pedagogical authority.

Instead, Facebook offers students a convenient way to be in contact with their teachers, as teachers are not always afforded the opportunity to communicate with students to address students' post-lesson questions or issues of general enquiry (Li & Pitts, 2009, p. 175). It allows students the facility to communicate with teachers when time constraints do not permit face-to-face interaction (Li & Pitts, 2009, p. 175). This is in consonance with the perceptions of students using Facebook, namely that it is more a learning tool for students than a means of instruction for teachers (Towner & Munoz, 2011, p. 50). The negative perception of Facebook, in

particular that it could undermine a teacher's pedagogical authority, is due to the fact that there is a general lack of knowledge regarding Facebook's educational potential (Towner & Munoz, 2011, p. 51). Facebook, as with various other technologies, is improving in terms of functionality and features that have contributed to it becoming a credible means of knowledge dissemination (Towner & Munoz, 2011, p. 51). It is up to teachers to implement Facebook effectively to facilitate forms of learning that go beyond the perception that Facebook is mostly used as a recreational tool (Towner & Munoz, 2011, p. 51).

Research indicates, however, that some students are less accepting of using Facebook as an informal or formal teaching tool (Towner & Munoz, 2011, p. 49). In these cases it is primarily due to the fact that the students are not open to the Facebook capability of personal communication with their teachers (Towner & Munoz, 2011, p. 49). Teachers therefore need to be cognisant of these students and address their concerns. With regard to students seemingly being disinterested in using Facebook for pedagogical purposes, Towner and Munoz (2011, p. 49) suggest creating Facebook groups and using the many security-filtering options currently available to create Facebook profiles separate from their personal profiles, instead of communicating one-on-one with students on a personal level. The next chapter expands on these ideas on how to implement Facebook effectively.

We use Facebook by creating two groups that students are allowed to join. A group allows members of the Facebook community with similar interests to meet, interact and seek out information with fellow members of the group. For example, students are able to communicate with friends or friends of friends to gain insight when writing reports or preparing for exams (McHaney, 2011, p. 80). This form of social interaction amongst students who form part of the community facilitates knowledge creation (McHaney, 2011, p. 81). And, as has been mentioned, the advantage of being connected via Facebook has pedagogical implications for students and teachers, as the opportunity to be engaged rather than just being subjected to the transmission of knowledge seems to be pedagogically more valuable. The purpose of Facebook groups is twofold: firstly, Facebook can be used as a noticeboard, reminding students of assignment due dates, test dates and content to be covered in the classroom; and secondly, Facebook groups may be used to encourage discussion among students and also to ensure that all students are connected. Through this form of engagement, Facebook groups can pool their knowledge when doing assignments and preparing for examinations. Messages can be posted on user 'walls' located on profile pages, or privately, making communication between profiles easier and convenient. Facebook's strength is the ease with which relationships between individuals can be maintained and communicated (McHaney, 2011, p. 82).

Moreover, McHaney (2011, p. 83) suggests that, even though many tertiary institutions have worked on ways to integrate Facebook into classroom practices, students do not necessarily want to expose themselves to their teachers. Facebook has developed various filtering mechanisms to ensure that these privacy concerns on the part of users are addressed. As we mentioned earlier, the fact that smartphones

are becoming increasingly more powerful and that their capabilities are parallel to those of laptops or desktop computers means that Facebook can work on mobile phones. Phones can access Facebook via their integrated web browsers, or through specially written Facebook applications. We have already indicated the potential for mobile smartphones as teaching tools and the fact that many people are realising Facebook's potential for teaching and learning. The convergence of these two technologies can be seen as an important pedagogical development for teaching and learning. Thus, Facebook has the potential to engage students collectively, allowing them to interact with one another and with teachers autonomously. And, when the latter occurs, education in classrooms can be democratised, because democratisation emphasises that students and teachers engage with one another, listen to one another's views and offer responses to one another's claims about knowledge. By using Facebook, students have an opportunity to be included as 'outsiders' who can disrupt the pedagogical process. They can express their voices through messages in cryptic style and in this way remain connected and involved.

The next form of social networking we would like to discuss is that of instant messaging (IM).

Instant Messaging, such as BlackBerry Messenger (BBM) and WhatsApp

In South Africa, instant messaging has become the most popular form of communication since social computing's transition from exclusively using desktop computers to the almost exclusive use of mobile smartphones. Examples of instant messaging are the now almost unused Mxit, BlackBerry messenger (BBM) and WhatsApp. Instant messaging has gained popularity, as it allows individuals to communicate in real time and is inexpensive. Instant messaging services have evolved from the days when only texting between individuals could be achieved. In recent times, instant messaging services such as those we have mentioned allow for group chat, which allows many individuals to communicate with one another in real time. Pictures, videos and other forms of media can now all be exchanged between individuals in a group chat. Instant messaging services do not have the level of customisation of profiles that social networking sites such as Facebook have, and therefore the privacy concerns of Facebook users do not exist on this platform. Instant messaging services allow anonymity, which may have positive as well as negative implications for users.

Videoconferencing (Incorporating Skype)

Another form of social networking that we would like to discuss is that of videoconferencing. Videoconferencing is similar to instant messaging services, but as the name indicates it involves a video component. Like instant messaging, videoconferencing allows two users to communicate privately or multiple users to communicate collectively. This form of communication is not necessarily

revolutionary, as illustrated by television news coverage where reporters in different locations communicate with news anchors. What can be considered an important development is that almost any novice with a computer with a webcam and an Internet connection has the same functionality as news channels. As we have mentioned, many technologies are converging and this also is the case with videoconferencing. Skype, one of the most popular videoconferencing tools, allows for communication between landlines, mobile phones and desktop computers – an indication of this convergence. A further indication of this is that Microsoft Corporation recently bought Skype (Rapid Response Team, 2011). And, since Microsoft has a mobile and a gaming division, which manufactures consoles such as the Xbox 360, one could presume that it will not be long before people are able to videoconference from their living rooms via gaming consoles. It does not take much imagination to realise that Skype can be used as a teaching tool. Hypothetically, a virtual learning environment can be set up in which students all sit in front of their computers, televisions or phones at home, school, university or wherever they have cell phone reception to communicate with one another and with their teachers. A teacher can easily distribute course content in the form of diagrams, audio and video through Skype. This would be a revelation for distance learning. There are various implications for this form of learning, but in South Africa we still are a long way from making this hypothetical scenario a reality. Many South African schools lack the infrastructure to enable these forms of learning, as students are unable to afford the hardware required for this functionality. Also, Internet bandwidth in South Africa is relatively expensive. However, if schools can make such facilities available to teachers and students, then Skype can be used effectively to contribute towards the democratisation of the classroom by encouraging deliberative teaching and learning (Michelle, 2010, p. 3). For instance, in their classroom, students can be connected via Skype to other students at different educational institutions. The students can engage with these other students and at times disrupt pedagogic relations. This process of rupture can propel other students to do likewise. That is, via Skype, other students can offer perhaps unheard-of views to be considered by students in classrooms. In this way the classroom can be democratised.

Twitter and YouTube

The next form of social computing that we would like to discuss is that of social media. Social media allow users to disseminate content in the form of text, video and audio to encourage interaction (Facebook initially was a social network. Recently it has evolved into a form of social media as well). The introduction of social media has democratised information and knowledge, allowing teachers and students to become knowledge producers rather than just consumers (McHaney, 2011, p. 100). There are many forms of social media that can be used to engender democratisation. Democratisation does not only involve teachers and students collaborating, participating and engaging with one another, but also allows both

parties to disrupt the forms of engagement on the grounds that they, firstly, have an equal opportunity to exercise their autonomy, and secondly, can rupture their learning by creating possibilities for unexpected breakthroughs to emerge. However, achieving the aforementioned democratic practices depends on the 'assemblages' that students construct on the social media discussion sites.

Social media that can contribute to enhancing democratisation include blogging, RSS (Rich Site Summary), podcasting, screen casting and wikis. In South Africa, the two that are by far the most readily available and feasible forms of social media are YouTube and Twitter, largely because they are compatible with many of the mobile devices that students own. Twitter, also termed a form of micro-blogging, incorporates facets of social networking, instant messaging and blogging. Twitter was created by Jack Dorsey in 2006 and was initially called twttr to coincide with the naming of other forms of texting services involving character code acronyms, such as sms (short messaging service) and mms (multimedia messaging service) (Chamberlin & Lehmann, 2011, p. 377). Dorsey's idea behind Twitter was that it would allow individuals to send text messages to a group of individuals, in contrast to sms's, which only allow one individual at a time to receive a text message (Chamberlin & Lehmann, 2011, p. 377). It was only in 2007 that Twitter took hold, when it was used by conference attendees at the South by Southwest (SXSSW) Conference (Miller, 2009). Twitter allowed the conference attendees to communicate with one another on presentations and events at the conference. By 2013 there were over 10,000,000 Twitter users (Miller, 2009). Twitter allows individuals to send 140-character messages to individuals who subscribe to them. In this way, all subscribers receive the message when an author sends a text message, known as a tweet. What appeals to users of Twitter is that it does not have a steep learning curve, as it does exactly what it is supposed to do, unlike much other Web 2.0 technology. It is also compatible with many devices, such as tablets, smartphones and computers, thus making it accessible to many (Chamberlin & Lehmann, 2011, p. 379).

As Twitter users, two of the authors are able to reach students who subscribe to their tweets. In this way they remind students of homework, assignments and content to be covered in tests. Twitter also allows subscribers to comment on these tweets. Twitter therefore has the potential to allow real-time relationships in a virtual sphere (Chamberlin & Lehmann, 2011, p. 376). In this way, Twitter has the potential to be an important networking and learning tool (Chamberlin & Lehmann, 2011, p. 376). The two of us use Twitter to share resources. Through peer networking with individuals with similar interests, Twitter can become a continuous source of new ideas (Chamberlin & Lehmann, 2011, p. 377). Subscribing to professional people's tweets allows a subscriber to tap into a list of other followers who, in many cases, have the same interests. The use of Twitter also may have positive implications for distance learning. Chamberlin and Lehmann (2011, p. 378) indicate in their surveys that distance students who are unable to communicate and interact with fellow students encounter feelings of confusion and are often conflicted regarding course

content, in contrast to students on residential university campuses. They suggest that a Twitter network of distance students can overcome this problem, because Twitter can be a means for distance students to ask fellow students questions regarding course content.

In addition, Twitter can push discussions past the constraints of a classroom and can be used by students as a source of information (Chamberlin & Lehmann, 2011, p. 110). This may be achieved by allowing students to follow individuals in fields such as business or medicine who tweet about their job experiences. Twitter has an integrated search tool that allows users to search for individuals who tweet about their field of work. For students this can be a rich stream of ideas, resources and knowledge (Chamberlin & Lehmann, 2011, p. 381). It could even be a virtual form of job shadowing (McHaney, 2011, p. 110). Thus, Twitter allows teachers and students to tap into a global network in various fields of education (Chamberlin & Lehmann, 2011, p. 375).

Many celebrities in sport, music and television use Twitter as a means of reaching their fan base. For many of these individuals, Twitter has become an important public relations tool. Many higher education institutions have begun to use Twitter for public relations and also to develop a sense of community amongst students and university academics. Useful information, such as reminders and safety information, can be disseminated among students quickly (McHaney, 2011, p. 109).

Another popular social media site is YouTube. Burke, Snyder and Rager (2009, p. 1) suggest that creative classroom techniques incorporating technology such as YouTube can be used to promote a productive and enriched learning environment. YouTube is a popular video-sharing website where users can upload, view and share video clips for scholarly and non-scholarly communication (Duffy, 2006, p. 119). YouTube is regarded as an important in-class and online resource for teachers who wish to establish a sense of classroom community (Burke et al., 2009, p. 1). YouTube can be used to integrate relevant content and to encourage reflection amongst students (Burke et al., 2009, p. 1). YouTube was created in 2005 as a public-access platform allowing users to access www.YouTube.com from mobile devices and desktop computers with an Internet connection. On average, 100 million videos are viewed each day and approximately 65,000 video clips are uploaded every day, making it one of the largest social networking sites on the Internet (Duffy, 2006, p. 123). Many students enrolled at tertiary institutions already rely heavily on the Internet for educational purposes (Burke et al., 2009, p. 2).

YouTube's educational potential lies in the fact that it forms part of some of the technology used by students in their everyday lives. It therefore is familiar to them and they are adept at having to use it in their educational practices (Burke et al., 2009, p. 2). When used in teaching and learning, YouTube is said to support students' digital learning style, as they have become habituated to using technology for learning (Burke et al., 2009, p. 2). There is not a steep learning curve for using YouTube, therefore users who are not familiar with this form of social media can learn to use it easily and its use will provide them with marketable skills for their

future careers (Burke et al., 2009, p. 2). If students are instructed to use YouTube effectively, they can be taught how to use or create content that will give rise to more engaging learning environments (democratic, we would say) (Burke et al., 2009, p. 2).

Since YouTube can be accessed from any device through an Internet connection, it has implications for (distance) learning. Pre-recorded lessons can be uploaded onto YouTube, thus allowing students to stream content on various devices. Students can access these lessons at any time, from any place and for free. We constantly use YouTube as a means of enhancing our professional development in the subjects we teach. We often stream YouTube clips posted by colleagues demonstrating how to inquire about various issues in education. Lecturers at tertiary institutions are posting videos online (videocasting) for use by both online and in-class learners (Burke et al., 2009, p. 2). In this way, teachers can expand their existing audience, increase their ability to provide online courses and enhance an institution's awareness of programmes (Burke et al., 2009, p. 2). This provides yet another means to engage students in pedagogic relations (Burke et al., 2009, p. 2).

Some of the features that ensure that students do not remain passive participants and that maximise learning lie in the following YouTube characteristics. YouTube contains a wealth of videos, including movies, TV shows, music videos, video blogging and short, original videos (Duffy, 2006, p. 123). Having students exposed to different sources of content can only be beneficial to them. YouTube also allows users to upload videos. In our classrooms we allow students to upload videos of educational issues that they have recorded in class using their mobile devices. We do this to show that the 'striated' spaces of learning they currently occupy can be 'deterritorialised' to engender new paths of meaning. So, videos are used to generate discussion amongst students. Some content on YouTube may be regarded as inappropriate, however, YouTube encourages users to flag these videos so that they can be removed. YouTube's ability to generate discussion comes from it allowing registered users to comment on video clips. These comments appear as text bubbles that arrange the comments in the form of dialogues. Furthermore, YouTube allows users to rate videos, and the number of times a video is viewed is displayed and can provide an indication of its effectiveness. For example, a video uploaded by two university academics on a mathematics concept has received approximately one million views, thus indicating its success (Burke et al., 2009, p. 2).

Because video clips on YouTube can be paused, the pace of a lesson can be dictated by a teacher or by a student's level of understanding. This affords the student an opportunity to reflect on the imagery in a video clip during the lesson. Another feature of YouTube is the ability to attach notes to videos, which means that the video can be played in a classroom and notes can be added at specific tracking intervals. The videos can then be viewed and the notes can help promote class discussion and provide opportunities for brainstorming (Duffy, 2006, p. 124). YouTube also offers teachers the opportunity to mute audio in a video clip, with

the implication that teachers are afforded the opportunity to narrate students' contributions through a specific clip.

IMPEDIMENTS THAT MAKE EDUCATIONAL TECHNOLOGY UNATTRACTIVE FOR USE IN PEDAGOGIC RELATIONS

The use of educational technology in teaching and learning is important to prepare students to function in an information age (Bingimlas, 2009, p. 235). In order to effectively integrate information and communications technologies (ICTs) in the classroom it is imperative that integrators such as teachers identify possible impediments to overcome the barriers to their use (Bingimlas, 2009, p. 235). An understanding of the barriers to integrating educational technology may serve as a point of reference, allowing teachers to successfully integrate educational technology (Schoepp, 2005, p. 1) into their practices.

The integration of ICTs into teaching and learning is a complex process that is confounded by a number of difficulties, referred to as boundaries or impediments (Schoepp, 2005, p. 1). Researchers have categorised these impediments into extrinsic and intrinsic barriers (Bingimlas, 2009, p. 237). However, what is viewed by researchers as extrinsic and intrinsic barriers to integrating ICTs into classroom pedagogy differ considerably. Ertmer (1999, p. 47), for instance, regards extrinsic barriers as 'first order', pertaining to support, resources and training, while 'second-order' barriers pertain to attitudes, beliefs, practices and resistance as intrinsic barriers. Ertmer (1999, p. 48) sees extrinsic barriers as having to do with organisations rather than individuals, and intrinsic barriers as dealing with educators, administrators and individuals.

Becta (2003) categorises impediments in terms of educator-level barriers, including aspects such as lack of time and confidence, and school-level barriers, such as lack of training and technical support, to mention but a few. We investigate how barriers such as lack of access, resistance to change, lack of time, lack of training and lack of technical support affect the implementation of educational technology in classrooms.

The first educator-level barrier identified by Bingimlas (2009, p. 237) is a contextual factor that relates to the lack of confidence on the part of teachers to implement educational technology. Similarly, Becta (2003) suggests that teachers often feel anxious and lack confidence when having to give a lesson integrating educational technology. Becta (2003) posits that this anxiety is compounded further by teachers having a limited understanding of educational technology, and that their learners often pick up on this. Cox, Preston and Cox (1999) suggest that, where teachers have identified a lack of confidence and consequently remedied this impediment by extending their use of educational technology, improved teaching and learning can be attained.

The next impediment identified by Bingimlas (2009, p. 238) is that of a lack of teacher competence. Many teachers lack the skill and knowledge and consequently are not enthusiastic about integrating educational technology into their classroom practices. A survey carried out in 27 European countries concurs with the claim that a lack of skill on the part of teachers is a constraining factor preventing them from integrating educational technology into their classrooms (Korte, 2006). Korte (2006) also shows that teachers in Denmark choose not to use ICTs due to their lack of ICT skills, rather than for pedagogical reasons.

The last educator-level barrier that Bingimlas (2009, p. 238) identifies is that of resistance to change and negative attitudes. Cox et al. (1999) identify this as a significant barrier towards the effective implementation of educational technology in classrooms. Likewise, Watson (1999) says that teachers have contrasting attitudes when integrating educational technology into their classroom settings. Teachers' attitudes are important, as these will have an impact on what they do in their classrooms (Watson, 1999). Despite the many benefits that educational technology brings to teaching and learning, many teachers still do not use ICTs in their classrooms, as they are unclear about the benefits or are of the opinion that educational technology has no benefits (Korte, 2006). Bingimlas (2009, p. 238) claims that teachers' resistance to educational technology is not necessarily a barrier, but is symptomatic of other factors. These factors include a lack of technical support, teacher expertise or time (Bingimlas, 2009, p. 239). Cox et al. (1999) contend that teachers feel that they have no need to change their successful educational practices and consequently do not use educational technology to augment their practices.

Bingimlas (2009, p. 239) identifies four impediments that make educational technology unattractive to use in classrooms. These are lack of time, lack of effective training, lack of accessibility and lack of technical support. Studies indicate that teachers do not necessarily have a shortfall of competence and confidence, but instead are prevented from using educational technology in their classrooms due to time constraints (Bingimlas, 2009, p. 239). Sicilia (2005, p. 1) reports in his dissertation that most teachers lack the time to plan lessons that integrate technology, explore Internet sites and explore various aspects of educational software. In most South African schools, teachers are required to teach all day and are afforded few non-teaching periods that could be used to plan strategies and ways to integrate educational technology into their classrooms.

The next barrier identified by Bingimlas (2009, p. 239) is the lack of training opportunities for teachers to familiarise themselves with the various forms of educational technology available. Gomes (2005, p. 5) says this lack of training not only entails a lack of digital literacy, but also a lack of pedagogic training in how to use the various educational technologies in the classroom. He suggests that there should be continuous professional development to sustain the appropriate skills and

knowledge. According to Becta (2003), training programmes should not simply train teachers in how to use ICTs, but the training should be pedagogic. This is further supported by Cox et al. (1999), who argue that many training courses focus on teaching teachers basic ICT skills, but do not focus on how teachers can develop the pedagogical aspects of ICTs.

Research indicates that another barrier to implementing ICTs is that of accessibility (Bingimlas, 2009, p. 240). Teachers are often discouraged from integrating educational technology as part of their teaching due to a lack of resources, which includes home access to the Internet (Bingimlas, 2009, p. 240). Accessibility also relates to factors such as the organisation of resources, hardware of a poor quality, inappropriate software, and the fact that large classes have only a few computers to use (Becta, 2003). Infrastructure issues such as a lack of broadband Internet also prevent access to the wealth of resources available on the Internet. Osborne and Hennessy (2003, p. 3) posit that these limitations regarding hardware and software influence teachers' motivation to integrate ICTs into their teaching practice.

Furthermore, Lewis (2003, p. 41) suggests that, without good technical support in the classroom, teachers cannot be expected to integrate ICTs into their classrooms effectively. Technical barriers disrupt the flow of a lesson and teachers therefore are hesitant to integrate ICTs into their pedagogical practices. Technical barriers include aspects such as websites failing to open, being unable to connect to the Internet, printer issues and outdated hardware. Just like a science educator requires a laboratory assistant to conduct practical work in a classroom effectively, effective teaching requires technical support so that teachers can focus primarily on their teaching and not have to address technical issues disrupting the flow of a lesson. Through the identification of impediments such as lack of access, resistance to change, time constraints, limited training and lack of technical support, teachers who have not implemented educational technology as part of their pedagogy can devise a plan to overcome these barriers so as to take advantage of the many benefits educational technology holds.

TOWARDS A TRANSFORMATIVE VIEW OF EDUCATIONAL TECHNOLOGY AND ITS PEDAGOGIC IMPLICATIONS

Traditionally, many educational institutions regard mobile technology as a distraction to students and, at many educational institutions, its use by students is strictly prohibited. Mobile phones are said to encourage texting for non-academic purposes, and for cheating on exams or tests. The fact that these devices have integrated cameras also raises privacy concerns for school management (McHaney, 2011, p. 68). For the case studies described in the next chapter, the students were granted permission to use mobile devices for the duration of the inquiry. Despite the negative perceptions of the use of educational technology, development in the field of mobile technology is increasingly progressive with respect to its educational potential (McHaney, 2011, p. 68). Consequently, there are implications for teachers, as technological

convergence is under way that is seeing all forms of hardware and software being directed towards allowing students opportunities to integrate technology into their everyday lives (Jenkins, 2006, p. 10). This technological convergence refers to the fact that phones that previously only allowed voice calling are now able to act as voice recorders, video players and video recorders, to mention but a few functions. The primary implication for teaching and learning is that students need to be taught how to use the mobile devices in a productive and respectful manner (McHaney, 2011, p. 69). Only then can the plausible benefits of mobile devices outweigh the aforementioned disadvantages.

Smartphones are becoming platforms that enable and inspire millennial students' cognitive skills (McHaney, 2011, p. 69). Livingstone (2009) suggests that many higher education institutions are embracing and taking advantage of mobile phone capabilities such as voice, text messaging, instant messaging, e-mail and Internet to ensure classroom registration, tuition payment, scheduling, advising and accessing other university services for academic purposes. Implications for classroom practices are that these devices can act as interaction devices for polling, and that questions can be posed without any disruption to an educator's lesson (Tremblay, 2010, p. 218). Since these devices have Internet connectivity there are implications for distance learning as well – in other words learning beyond the confines of the school or university. The possibility that students can communicate with their teachers over vast spaces and download course content is indicative of the transformative potential of mobile phones. Here, the transformation of learning refers to the possibility of not being hampered by physical distance to engage critically with textual materials.

Social networking through mobile devices has changed how many students spend their time, as they can access information and resources and have a sphere for continuing interaction (McHaney, 2011, p. 95). Based on the number of students that have already joined the Facebook group that two of us created, we can deduce that almost every student has a Facebook account. A similar scenario exists on university campuses. Consequently, many universities have attempted to integrate Facebook groups as part of their pedagogical and administrative interactions with students, who spend a lot of time in this sphere McHaney (2011, p. 96). McHaney (2011, p. 96) indicates that there has been varied success in this form of implementation of social networking, as students have privacy concerns. These privacy concerns, as mentioned previously, relate primarily to learners '[be]friending' their teachers directly, although students can manage their Facebook profiles in relation to privacy (Aleman & Wartman, 2008, p. 4). Some students may not have problems allowing teachers to see their photos and 'statuses', while others may regard exposing themselves in such a manner to be inappropriate to the professional relationship that should exist in a teacher-student relationship. Furthermore, students often experience feelings of intimidation or obligation that accompany '[be]friending' individuals in authority, such as teachers (McHaney, 2011, p. 96). The teachers that we work with believe that how they present themselves on Facebook often relates to their personal

lives and that it would be inappropriate for students to become familiar with their personal lives, much like it is inappropriate for a teacher to be friends with a student. These privacy concerns can be overcome, however, by not directly befriending students. Instead, the students should be allowed to join Facebook groups, as these groups provide a code of ethics to which members must adhere.

Members of the higher education community have already realised that social networking sites such as Facebook are ideal platforms to liaise with students, as they allow for online portfolios, discussion groups and alumni relationship groups (McHaney, 2011, p. 96). McHaney (2011, p. 96) claims that educational institutions would benefit from using social networking in a non-intrusive manner to take advantage of its technological capability to transform education in terms of improving teaching and learning. Social media can be used to determine the perceptions regarding learning programmes. They also can be used to disseminate useful information via the content-sharing capabilities. Social networking also allows continuous interaction and for individuals to feel part of a connected community (McMillan & Morrison, 2006, p. 73). Students are able to communicate with their fellow students and teachers in this online space and then be more comfortable when they are in direct contact. Social networks such as Facebook therefore help students undergo an easy transition to becoming part of a learning environment (Madge, Mee, Wellens, & Hooley, 2009, p. 141). In this way, Facebook serves as a means to create a community within a classroom (Madge et al., 2009, p. 141). Just like other forms of social media, however, Facebook is not a panacea (Towner & Munoz, 2011, p. 53). Facebook can be regarded as an invaluable tool facilitating education-related communication amongst students and teachers (Towner & Munoz, 2011, p. 53). Establishing pedagogical communities through Facebook is in fact a way in which classroom practices can be transformed from the dominant transmission mode to a more interactive and engaging way of communication. In this way, using Facebook as a pedagogical form of educational technology can contribute towards democratising classroom practices.

Likewise, there are many positive implications of integrating Twitter into students' learning. Student participation in the classroom is regarded as an important factor in the teaching and learning process, although there still are many impediments to this (Rhine & Bailey, 2011, p. 303). Rhine and Bailey (2011, p. 303) hold that this is primarily due to classroom dynamics, such as class size and time constraints, and personal dimensions, such as gender, age and learning preferences. Students often feel unintelligent and shy, and are not willing to participate because of large classroom sizes or being unable to articulate themselves effectively in class (Rhine & Bailey, 2011, p. 306). Social media can break down these barriers by encouraging the collaborative construction of understanding, which ultimately makes education more democratic (Rhine & Bailey, 2011, p. 303), and hence highly transformative. Twitter allows students to engage with the two of us and to respond to follow-up questions, give insights and share resources. The student who is subjugated by dominant, vocal individuals in the classroom often is afforded the opportunity to

make a meaningful contribution to teaching and learning (Chamberlin & Lehmann, 2011). And it is very transformative to include less vocal voices in pedagogical activities. Through the insights of students we can alter our teaching direction so that students are able to obtain a better understanding that may meet their requirements. Teachers and students incorporating social media such as Twitter gain empowering skills that provide opportunities for better civic and educational engagement, with the consequent democratisation of education (Gammon & White, 2011, p. 329).

Educational technology such as YouTube also has the potential to transform teaching and learning. Many students perceive YouTube as a good instructional tool (Burke et al., 2009, p. 6). To that end, YouTube can be seen as an important tool for transforming the way education takes place at the school and university level. Teachers lacking resources to stimulate student participation and interest can simply refer to the wealth of educational video clips on YouTube. For a teacher, experimentation is not always possible. Even though experimentation is regarded as key, for example when teaching science and economics, using YouTube offers students the opportunity at least to view how experiments are conducted by watching videos of real-life examples and demonstrations, thus transforming the way they learn (Burke et al., 2009, p. 6). Given their context, YouTube offers millennial students a new technology that makes learning refreshing, interesting and relatable (Burke et al., 2009, p. 6). Clark and Meyer (2002, p. 1) point out that YouTube has the potential to improve teaching and learning by reducing cognitive loads for students, and that specific videos can be selected to parallel students' learning of literacy. Furthermore, YouTube has the potential to improve teaching through the removal of many superficial texts or graphics (Clark & Meyer, 2002, p. 2). Thus, YouTube can serve as an effective catalyst for and facilitator of discourse and analysis (Clark & Meyer, 2002, p. 2). Burke et al. (2009, p. 6) argue that, based on the wealth of resources on YouTube and the features we mentioned earlier, there is potential to promote discussion and critical thinking – highly transformative practices of teaching and learning.

Duffy (2006, p. 125) says that the incorporation of YouTube into classroom practices can transform education by improving it in the following ways: YouTube can create a learning community that allows students to voice their opinions, and to contribute to and share content. Allowing students to create videos instead of writing reports can be a means to promote visual literacy (Duffy, 2006, p. 125). Duffy (2006, p. 125) suggests that this may serve as a valuable learning exercise. As already mentioned, YouTube can generate discussion amongst students and teachers, which is beneficial because it allows for distinct viewpoints and different perspectives to be voiced (Duffy, 2006, p. 125). For secondary and university education, YouTube videos offer several advantages over other graphic and textual media, as they allow the illustration of concepts concerning motion and the demonstration of sequential processes, and allow teachers to demonstrate pedagogic processes in challenging environments (Misanchuk, Schwier, & Boling, 1996). In addition, YouTube can be used by students as a virtual library (Conway, 2006).

SUMMARY

This chapter has been concerned mainly with clarifying educational technology and showing how educational technology can engender classroom actions that can democratise pedagogical practices, in particular teaching and learning. We have also pointed out that classroom practices can be transformative, and highlighted some of the impediments that teachers and students might encounter in educational technology. Without being oblivious to the stumbling blocks to engaging in educational technology in classrooms with the intent to democratise teaching and learning, we have shown that teachers need to contemplate how educational technology, such as YouTube, Twitter, Facebook and instant messaging, can be used to stimulate critical thinking and collaborative learning. Only then can educational technology transform education positively (Duffy, 2006, p. 126). In the next chapter we focus on the two case studies with the purpose of showing how educational technology can be democratised and become transformative, notwithstanding the challenges (as highlighted in this chapter) we encountered in doing so.

CHAPTER 3

PEDAGOGIC ENCOUNTERS IN EDUCATIONAL TECHNOLOGY

Towards a Democratic Education of Co-Belonging

INTRODUCTION

In this chapter we focus on two examples of the use of educational technology involving the second and third authors. These projects used action research and discourse analysis respectively to examine the pedagogic encounters of students and teachers involved with educational technology. In the main, both projects were geared towards cultivating democratic education within educational technology practices.

CASE 1: ON THE POSSIBILITY OF DEMOCRATIC EDUCATION IN/THROUGH EDUCATIONAL TECHNOLOGY: ACTION RESEARCH AND SCIENCE EDUCATION IN POTENTIALITY

In this case study we describe and report on the application of three action research cycles of inquiry in relation to the teaching and learning of three contentious issues in a grade 10 life sciences classroom in/through educational technology as an instrument of action. The second author used Facebook to teach students, firstly, how to apply scientific content to everyday life, which entailed integrating problem-solving and critical thinking skills ('learning outcome 1'); secondly, how to use scientific inquiry for community participation, which integrated the construction and application of life sciences knowledge ('learning outcome 2'); and thirdly, how to use science education issues for the purpose of achieving social justice, which integrated an understanding of the interrelationship between science, technology, indigenous knowledge, the environment and society ('learning outcome 3') – all learning outcomes of the grade 10 South African life sciences curriculum.

In fact, the second author's primary concern was to use educational technology to teach the 'learning outcomes' or, more specifically, what students are expected to do, and the purposes for learning life sciences as outlined in the current South African school curriculum. This author's purpose for using educational technology to teach the aforementioned 'learning outcomes' in relation to key curriculum issues in life sciences in grade 10, such as evolution, pollution and biotechnologies (including cloning and transgenic organisms), was to create learning opportunities (if possible) that could contribute to democratising science education in a local high

school. Before reporting on three senior phase school science action research cycles of inquiry with a grade 10 life sciences class (including instances of teaching and learning) and showing how democratic education practices are cultivated in/through the application of educational technology, we turn our attention to an analysis of the current curriculum statement for grade 10 life sciences.

An Analysis of the Curriculum and Assessment Policy Statement (CAPS) for Life Sciences

In this section we examine two main developments in educational policy in South Africa: the democratisation of education after 1994, and the curriculum statements following the government's decision to implement an outcomes-based approach to education.

Education under apartheid experienced a crisis that was characterised by unequal educational opportunities for black people in a system that clearly favoured reproduction and memorisation. This implies that the education system was used by the government as an instrument to segregate education. Against this background, the democratic government had an important role to play after 1994 to democratise the schooling system in South Africa. The educational system was in need of expansion in order to meet the demands of a democratic society. These ambitions of the government regarding educational transformation are clearly reflected in the White Paper on Education and Training (WPET), which was introduced in 1995. The government's aim was to abandon the old, established educational dogmas in order to create the necessary space for a new educational system that would enhance critical reflection, dialogue and rationality. In its quest for an educational framework that would address the challenges of equity and redress, the government introduced outcomes-based education (OBE) as a vehicle to address the crisis. Proponents of OBE claim that OBE is more than a mere reform strategy; that it in fact is a 'radical paradigm shift' (Claasen, 1998, p. 36). Of course, we are not in agreement with such an approach to education, as prescribing in advance what students ought to achieve through learning potentially undermines what still can be imagined.

The first and fundamental policy framework of the Ministry of Education was set out in the Ministry's first White Paper on Education and Training. This policy was introduced in February 1995 (Department of Education, 1995, p. 4). The White Paper aims 'to open the doors of learning and culture to all'. It is against this background that the Department of Education put an emphasis on transforming the legacy of the past by building a just and equitable system that provides good-quality education and training to learners, young and old, throughout the country (Department of Education, 1995, p. 11). The policy's primary vision is as follows:

> It should be a goal of education and training policy to enable a democratic, free, equal, just and peaceful society to take root and prosper in our land, on the basis that all South Africans without exception share the same inalienable

> rights, equal citizenship, and common national destiny and that all forms of bias (especially racial, ethnic and gender) are dehumanizing. (Department of Education, 1995, p. 18)

Changing the school curriculum continues to be a high priority for post-apartheid South Africa, and the process recognised the need for a single, national curriculum framework. The 1995 White Paper on Education and Training promoted a vision of a democratic and internationally competitive country with literate, creative and critical citizens (OECD, 2008, p. 169). As has been mentioned, the Department of Education adopted an outcomes-based education approach (OBE), 'borrowed' from competency-based education but inflected with a transformative agenda that has its roots in human rights, social justice, equity and nation building (Chisholm, 2005, p. 96). Curriculum 2005 (C2005) was launched in 1997, overturning the apartheid government's curriculum. C2005 was grounded in OBE principles in so far as 'subjects' were replaced with 'learning areas', each of which had 'range statements' that in turn aimed at 'outcomes' (OECD, 2008, p. 79). The content of the lessons was not prescribed, and the new teaching strategies that accompanied the curriculum were 'learner-centred' (OECD, 2008, p. 80). While many historically disadvantaged schools floundered at implementing the curriculum, advantaged schools achieved greater success (Christie, 1999, p. 12). A Ministerial Committee appointed to review C2005 found that its implementation was

> … confounded by a skewed curriculum structure and design; lack of alignment between curriculum and assessment policy; inadequate orientation, training and development of teachers; learning support materials that are variable in quality, often unavailable and not sufficiently used in classrooms; policy overload and limited transfer of learning into classrooms; shortages of personnel to support and implement C2005; and inadequate recognition of curriculum as the core business of education departments. (Chisholm, 2000, pp. vi–vii)

Following the report, practical adaptations ensued and the resulting change spawned a Revised National Curriculum Statement (RNCS) that placed more emphasis on basic skills, content knowledge and a logical progression from one grade to the next. Along with the values in the Constitution, it emphasised communication, participation, human rights, multilingualism, history, cultural diversity, teachers as role models, and that every citizen must read, count and think (Department of Education, 2002, p. 7). The Revised National Curriculum Statement combined a learner-centred curriculum, requiring critical thought and democratic practice, with an appreciation of the importance of content and support for teachers that resulted gradually in the phase-in of grade 12 in 2008 (OECD, 2008, p. 81). Also, the implementation of the RNCS implied that textbooks had to be published and aligned with the RNCS for the Foundation Phase (grades R to 3), Intermediate Phase (grades 4 to 6), Senior Phase (grades 7 to 9) and Further Education and Training Phase (FET, grades 10 to 12) in all 11 official languages (OECD, 2008, p. 81).

According to the RNCS, the curriculum for grades R to 9 is organised into eight 'learning areas': languages, mathematics, natural sciences, technology, social sciences, arts and culture, life orientation, and economic and management sciences; and curricula were developed for 29 subjects for grades 10 to 12. Learning outcomes were developed for each learning area or subject that spell out what learners will be able to do after having achieved the learning outcomes for the required level (OECD, 2008, p. 170). In addition, learning programmes are developed by teachers, supported by national and regional policy guidelines that include work schedules, exemplars of lesson plans and assessment activities for students. In the Foundation Phase there are three learning programmes: literacy, numeracy, and life skills; languages and mathematics are specified as learning programmes in the Intermediate Phase; and the Senior Phase has eight learning programmes (OECD, 2008, p. 172).

The RNCS holds teachers responsible for initiating students into achieving the learning outcomes by envisioning teachers

> … who are qualified, competent, dedicated and caring and who will be able to fulfil the various roles outlined in the Norms and Standards for Educators of 2000 … [that] see teachers as mediators of learning, interpreters and designers of Learning Programmes and materials, leaders, administrators and managers, scholars, researchers and lifelong learners, community members, citizens and pastors, assessors and learning area/phase specialists. (Department of Education, 2002, p. 3)

Now the chances that all students (even those in rural areas, where material resources are inadequate) achieve the learning outcomes are minimal (OECD, 2008, p. 176). It is in this context that the second author's project can be considered not only as a contribution to creating opportunities for students in a historically disadvantaged school to achieve the learning outcomes developed for the grade 10 life sciences curriculum in the previous RNCS, but also as an opportunity to initiate students into pedagogical activities that have a democratic orientation. This brings us to a discussion of the national curriculum statements for grades 10 to 12 life sciences, with specific reference to what learners should be able to do and the purpose of studying life sciences.

The National Curriculum Statement for grades R to 12 (previously known as the RNCS) was amended (with the amendments coming into effect in January 2012), resulting in a single, comprehensive Curriculum and Assessment Policy Statement (CAPS) for grades R to 12 being developed for each subject to replace subject statements, learning programme guidelines and subject assessment guidelines (Department of Education, 2011, p. 1). The Curriculum Assessment Policy Statement (CAPS), or the new National Curriculum Statement for grades R to 12 of 2012, replaces two curriculum statements referred to earlier, namely the Revised National Curriculum Statement of 2002 and the National Curriculum Statement of 2005. In fact, CAPS serves the purpose of equipping students with the knowledge, skills and values necessary for 'self-fulfilment, and meaningful

participation in society as citizens of a free country' (Department of Education, 2011, p. 2). Consequently, it seems as if CAPS would welcome the democratisation of science education in schools in order to ensure that students are equipped with competencies and skills to function in a democratic society. In this regard, CAPS wants to encourage students to engage in 'active and critical learning' – that is, students must be able to identify and solve problems and make decisions using critical and creative thinking; work effectively as individuals and with others as members of a team; organise and manage themselves and their activities responsibly and effectively; collect, analyse, organise and critically evaluate information; communicate effectively using visual, symbolic and/or language skills in various modes; use science and technology effectively and critically, showing responsibility towards the environment and the health of others; and demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation (Department of Education, 2011, p. 3).

The Department of Education, through CAPS, explicitly dropped the use of learning outcomes and instead talks about what students should be able to do, together with the purposes, in this instance, of studying life sciences. Our understanding of 'purposes of studying life sciences' involves getting to know why students have to study the subject, and in particular encouraging them to think and reflect upon their learning. The three purposes of studying life sciences are given as follows: firstly, the development of scientific knowledge and understanding in order for learners to answer questions about the nature of the living world around them. Students are prepared for economic activity and self-expression, as well as for active participation in a democratic society that values human rights and promotes acting responsibly towards the environment [that is, application of scientific content to everyday life]; secondly, the development of science process skills (scientific investigations) by students that may be used in everyday life, in the community and in the workplace. Students should be encouraged to acquire these skills in an environment that supports creativity, responsibility and growing confidence through investigating, reflecting, synthesising and communicating [that is, scientific inquiry for community]; and thirdly, the development of an understanding of the roles of science in society, which involves promoting science as a human activity as well as understanding the history of science and the relationship between life sciences and other subjects. Students must be taught about the contribution of science to social justice and societal development, as well as the need to use scientific knowledge responsibly in the interests of themselves, of society and of the environment, including understanding decisions that involve ethical issues [that is, science education for social justice] (Department of Education, 2011, p. 11).

But first we shall discuss the Department of Education's use of life sciences in CAPS and point out where the contentious issues the second author introduced fit into the grade 10 life sciences curriculum. This will hopefully give an idea of what students should be able to achieve in relation to grade 10 life sciences content knowledge. According to CAPS, life sciences can be described as 'the scientific

study of living things from molecular level to their interactions with one another and the environment' (Department of Education, 2011, p. 7). As a school subject, life sciences comprises a variety of specialisations, which include biochemistry, biotechnology, microbiology, genetics, zoology, botany, entomology, physiology, anatomy, morphology, taxonomy, environmental studies and sociobiology (Department of Education, 2011, p. 7). And, as has been alluded to earlier, life sciences aims to provide useful knowledge and skills that are needed in everyday living; to expose students to the range and scope of biological studies to stimulate interest in and awareness of possible specialisations; and to provide sufficient background for further studies in one or more of the biological sub-disciplines (Department of Education, 2011, p. 7). Furthermore, the subject is organised along four knowledge strands: life at the molecular, cellular and tissue level (including chemistry of life, cell, mitosis and plant and animal tissues); life processes in plants and animals (including support and transport systems in plants, support systems in animals, and transport systems in mammals); environmental studies (including biosphere to ecosystems); and diversity, change and continuity (including *biodiversity* and classification, and the history of life and earth) (Department of Education, 2011, pp. 7–8). The three contentious issues that were investigated can be categorised under the latter two knowledge strands, namely environmental studies, and diversity, change and continuity. This brings us to a discussion of the context in which the three action research cycles unfolded.

The local school context and the grade 10 life sciences learners. The action research case study happened at a school where the second author was employed. It is a previously disadvantaged school with a rich history of excellent student achievement, despite what can be considered as poor learning conditions, including a lack of proper infrastructure and resources. Nevertheless, the school has become prestigious (in that it produces excellent matriculation results), despite the fact that it attracts students from previously disadvantaged communities. The school is located in the southern suburbs of Cape Town in the Western Cape province of South Africa. The school initially served as a school for the children of farm labourers in the Constantia area whose parents had been displaced by the Group Areas Act. These parents continue to support the school in its endeavour to promote academic excellence (Khanya News, 2011). At the time of conducting the action research initiative, the school had 1,089 students, giving it on average of 30 to 40 students in a classroom.

Technology education began at the school when the school was selected by the Western Cape Education Department to be one of 11 pilot schools to participate in a Khanya Mathematics Project. By way of the Khanya Project and its partner, the DG Murray Trust, it was envisaged that the performance of students taking mathematics and science could be improved through the use of ICTs (Khanya News, 2011). Thus, the Khanya Project opened a new dimension for mathematics education in that the latter could be improved through the integration of ICTs

into the mathematics curriculum at the school. The school now has an increased mathematics enrolment and, in addition, the introduction of computers has aided teachers in the implementation of the curriculum, as well as in their own computer literacy, and hence in their own professional development (Khanya News, 2011). Through the efforts of the school's science teachers, the school has received funding for ICTs and assistance from an organisation called TRAC (Transportation and Civil Engineering). TRAC is a national, non-profit programme aimed at supporting science and technology education in South African secondary schools (TRAC, 2011). TRAC aims to enable students to enter careers in science, technology and engineering. It has assisted the school to ensure that its students can enter these careers by providing equipment such as computers and data loggers, syllabus content, vocational guidance information, and a variety of other material (TRAC, 2011). Through Khanya, the school also forms part of a pilot project in which data loggers are used to conduct experiments in physical science. These data loggers are used to collect and analyse data to encourage more learners to do science (Khanya News, 2011).

The school is also part of the Dinaledi schools project run by the Department of Education. This project is aimed at increasing access to mathematics and science by learners, not only to improve mathematics and science results, but also to increase the competence levels of the teacher who teach these subjects. Through Dinaledi, the school has received funds from the Optima Trust, which is funded by Anglo American in support of the initiative. The Optima Trust has a yearly disbursement of R40 million towards improving mathematics and science education in Dinaledi schools. These funds may be used for learner bursaries, resources in the form of ICTs, or to employ additional educators to improve mathematics and science results. It was agreed by many of the staff members that the best way to improve the educational resources of the school was to improve mathematics and science teaching and learning in the classroom. Subsequently, the school used some of these funds (a small percentage of the R40 million allocated for all Dinaledi schools) to purchase ICTs such as data projectors, white boards, laptops and desktop computers. The school also has an arts and culture focus. Consequently, it was able to benefit from a pilot project of the Western Cape Education Department (WCED) and Apple Computers in February 2008 that resulted in the installation of Apple technology in the school. This technology is used by the students and teachers for music production and composition (Khanya News, 2011). In addition, other ICT resources have been donated to the school by ex-students, as well as by trusts and companies to which teachers and students have written for sponsorship in the form of ICT resources for the school. The Western Cape Education Department (WCED) also arranges training opportunities for educators. The author and some of his fellow educators have been invited to workshops, such as those offered by Thinkquest. Workshops conducted by this organisation are aimed at supporting teachers to assist students in constructing websites so that they might be inspired to think, connect, create and share information (Thinkquest, 2011). Learners work in teams to build innovative and educational websites to share with the world (Thinkquest, 2011).

Staff development activities at the school with regard to the use of ICTs were offered through seminars and training workshops conducted by organisations such as e-Learning schools. Ongoing presentations are run with regard to introducing new technology to teachers and holding discussions about the importance of connecting ICTs to teaching and learning. This provides an opportunity for networking with other educators and discussing real issues associated with the introduction of ICTs into lessons, as well as using ICTs as effective teaching tools. During these sessions, speakers often inspire staff through stories of success and determination, and ways to overcome the many hurdles encountered when integrating ICTs into the classroom and curriculum. The workshops offer a hands-on approach to the use of ICTs, thus equipping educators with practical ideas and skills for the possible uses of ICTs (School, 2011). What the aforementioned discussion indicates is that the teachers at the school are favourably placed to use educational technology in their teaching and to inspire students to use it. It is in this environment that the second and third authors began to use their technological competence to contribute to enhancing teaching and learning in the life sciences and economics. This brings us to a discussion of the grade 10 life sciences class and its students who participated in the project.

The learners. Data on the grade 10 learners were compiled using a questionnaire that was completed by them (the learners). The results of the questionnaire indicated that 18 girls and eight boys (26 learners in total) between the ages of 15 and 16 years participated. By far the majority of the students lived in the southern suburbs of Cape Town, and most were from middle- and working-class families residing in historically disadvantaged communities. The students had been assigned the status of 'high performers' as a result of the excellent grades they had achieved in grade 9. They seemed to be very motivated, critical and focused on doing well. They also supported and assisted one another in their school work, and worked well in groups. Through the questionnaire the second author also could ascertain the ways in which the students accessed the Internet. For the success of the project, all the learners would need affordable and easy Internet access. All the students made use of social media. Twenty-four learners made use of Facebook, and the two who did not have Facebook accounts indicated that they would be willing to set up such accounts. The responses to the questionnaire indicated that these two student had not set up a Facebook account, as they felt that it was not especially useful. All the students were able to access Facebook via their cell phone, at school or at home. The students who already had Facebook indicated that they accessed Facebook on a daily basis in order to communicate with friends or simply for other recreational purposes. The responses to the questionnaire also indicated that the students had been using Facebook for over a year, which would indicate that they were adept at using social media. They were introduced to Facebook predominantly by friends. The second author therefore identified Facebook as the educational technology that would be used in the study.

To establish the students' understanding of democratic practices, the questionnaire posed questions asking whether they liked working in groups, felt that their opinion was valued by others, whether they valued the opinions of others, what a democracy is, and whether they felt that their classroom practices were democratic. Some of the students indicated that they did not like working in groups. These students indicated that, in group activities, some members do not take a task seriously or feel that their opinions are superior to those of other group members. Many of the students indicated that they valued the opinions of other students and felt that their opinions were valued. However, when the students were asked whether they felt that their classroom practices were democratic, many were unsure. This could indicate that the students did not understand what a democratic practice entailed. The students were very eager to learn and had a special interest in doing practical work in the life sciences classroom. They were all in possession of a cell phone and showed a desire to integrate this technology into their learning activities, despite the fact that the school policy did not allow cell phones to be used at school. The school holds a science exhibition every year and these students all performed well in their presentations and artefacts, such as posters and models illustrating various themes in the sciences. These students therefore appeared to be adequately equipped to participate in the three action research cycles of inquiry.

The Facebook group. In 2010, as an in-service teacher at a local high school, the second author was invited by the Western Cape Education Department (WCED) and the South African National Biodiversity Institute (SANBI) to attend workshop sessions on innovative ways to teach the grade 10 life sciences curriculum. The workshop session had a twofold purpose; firstly, it involved teachers presenting innovative teaching strategies to other teachers for teaching a specific topic in the biodiversity section of the national curriculum and, secondly, the intention was to increase awareness of the importance of biodiversity in the local community. It was hoped that what was learnt in these workshops could be implemented in schools. The second author came up with the idea of using a Facebook group, among others, to make the local community aware of the importance of a local wetland area, Zeekoevlei, and the threat posed to it by pollution. The initial assumptions regarding Facebook as a potential teaching tool were confirmed and, since 2010, the second author has encouraged all his students doing life sciences to join the Facebook group, aptly named Mr Waghid's classroom. All his students have taken to the idea that the Facebook group is an extension of what happens in the classroom.

Fortunately it is relatively simple to maintain the Facebook page. Facebook has an easy-to-use user interface, allowing for videos and pictures to be uploaded and for reminders to be sent to members regarding important dates, such as tests and the time discussions will commence. As the students were quite adept at using Facebook, the second author wanted to see how far he could push the confines of the current use of Facebook to teach contentious topics. Preparation for teaching

the contentious topics began with setting up a lesson plan to show how learning aims would be attained, as well as the assessment criteria and media that were to be used. The first action research cycle dealt with the contentious topic of cloning. Many of the students had no idea what cloning entailed, so he posted a video in the Facebook group that served as an introduction to and icebreaker for the topic, as well as questions to direct the discussion. All the students were automatically informed via Facebook notification, e-mail or sms that the first discussion had started once the video and questions had been posted. After the first cycle, the second author felt that the questions were directing the discussion in an 'arborescent' way, and consequently refrained from using questions in the following two cycles to allow the students to pursue the discussion in a more critical and 'rhizomatic' manner. For the second two cycles of the action research, the second author again prepared a lesson plan that included learning aims, but merely posted discussion topics and observed how the discussion unveiled while serving as a moderator.

Action Research Cycles and the Teaching of Contentious Issues

The second author embarked on three cycles of inquiry in order, firstly, to ascertain whether students could be initiated into an understanding that science education could be democratised in/through educational technology; and secondly, to initiate students into democratic practices through a focus on the three 'purposes' of life sciences and what they should be able to do or the learning outcomes that they needed to have acquired on completion of the course (to use the language of the previous National Curriculum Statement) in order to make a claim to the democratisation of science education in a local high school.

Three contentious issues forming part of the curriculum assessment policy statement (CAPS) for grade 10 were selected for the three action research cycles. These issues are considered contentious because there is an overlap between content in the curriculum and the students' understanding of societal issues that are often brought into conflict with their belief and value systems. The aim of introducing these contentious issues into the curriculum is to promote students' critical thinking in relation to their everyday life experiences. The first action cycle dealt with the issue of cloning. Cloning forms part of the first knowledge strand in the CAPS document, which deals with life at the molecular, cellular and tissue levels. Cloning encompasses three main themes, namely therapeutic cloning, used for organ growth; DNA cloning, for the creation of clones using specific, desired DNA; and reproductive cloning, a form of asexual reproduction. This topic is regarded as contentious because certain aspects of the issue contradict various religious beliefs. On the one hand, a particular religious denomination regards life as sacred and does not approve of scientists being able to manipulate the building blocks of life, as if playing God, while, on the other hand, there are belief systems that may not find cloning problematic at all, making this topic highly contentious. The second action research cycle dealt with the issue of global warming. This topic

forms part of environmental studies and looks specifically at the human impact on the environment. There are contrasting viewpoints with regard to global warming. Some see the evidence for global warming as merely being part of a cyclical natural phenomenon, whereas others see it as a sign of impending doom. Those who view global warming as a potential catastrophe propose that we reduce all carbon emissions to zero with immediate effect, which would have huge ramifications for the various industrial sectors of society. People would lose their jobs and would have to find alternative modes of transport to save the environment, making this topic highly contentious. The third action research cycle dealt with the issue of evolution. Evolution forms part of the diversity, change and continuity strand in the CAPS document. Although students do not have to deal with the more difficult concepts of evolution in grade 10, such as human evolution and natural selection, the second author felt it necessary to give students an overview of some of the conceptual ideas relating to the topic that they would encounter in the more advanced grades. In this way, they hopefully would gain a better understanding of the theory of evolution, instead of only seeing examples of evolution as separate entities (as currently in the grade 10 CAPS document). As with the first action research cycle, evolution is contentious because it contradicts the beliefs of different religious denominations. There currently are three viewpoints on evolution. Some scientists regard the theory of evolution to be incompatible with religious scripture, in contrast to the many who consider sacred scripture as fact and evolution as a gross insult to their faith. Others tend to have a more neutral approach, believing evolution and creationism to be able to coexist harmoniously, thus making this area of the curriculum highly contentious.

As alluded to earlier in this chapter, CAPS was devised to allow students to apply critical thinking without being desensitised to advances on a global scale as they engage with the life sciences content. In addition, the second author would be afforded an opportunity to stimulate the students' intellectual ability, knowledge, skills and values to bring about social transformation to address the imbalances of the past. CAPS is also aimed at addressing the issues of human rights, inclusivity, environmental and social justice, indigenous knowledges, inequality, poverty and problem solving. Considering that CAPS is also aimed at democratising students' classroom experiences, the second author deemed it necessary to use educational technology as a means to support the aims of CAPS, as reported on in relation to the three action research cycles discussed below.

The first cycle. At the start of the first action research cycle, the second author had an opinion on the data obtained. As this case study dealt with the democratisation of teaching and learning in a grade 10 science classroom, it was his expectation that the use of educational technology would foster democratic pedagogical action. He expected to observe maximum participation by the students, as well as collaboration and deliberative engagement. However, this expectation was quelled due to various technical issues concerning the use of Facebook. Of the 26 students whom he anticipated would participate in the discussion, only eight students were involved

actively. This was primarily due to login issues, as many of the students' Facebook accounts were dormant and the students could not remember their passwords. Furthermore, many of the students' smartphones were unable to display the content that was posted to the Facebook group, which was detrimental to their participation. In the survey, 19 students had indicated that they owned BlackBerry mobile devices. But as soon as the first student with a BlackBerry contacted him and raised a problem he knew he had encountered the first major stumbling block in using educational technology to contribute to democratising educational practices. As a BlackBerry user he quickly logged on to the Facebook group and, to his dismay, there only was a blank Facebook 'wall' on which he had posted various questions. It was evident that the limitations of the BlackBerry Facebook application used by many of the students were in fact hindering their participation. When using a desktop computer, laptop or tablet, a user can select the recently added 'ask question' option. A question can be posed and all members are notified and invited to respond by adding comments or participating in a poll. The second author had decided to use this 'ask question' option in conjunction with the polling option, instead of the conventional 'post comment' option that many Facebook users are familiar with. The rationale behind this was to ensure that students were able to voice their opinions through the poll if they did not want to post comments. However, this new Facebook option was not compatible with many BlackBerry users' Facebook application. The users' mobile devices were not compatible with the social networking software of Facebook, and hence only eight students participated.

Although the students initially were not able to participate in the discussion, this issue was soon resolved by using the conventional 'post on wall' option. The students started posting comments on the Facebook group wall and a discussion ensued, facilitated by students using desktop computers and mobile devices. Despite overcoming the first technical hurdle, another technical issue confronted the students using mobile devices. They encountered problems loading Facebook comments, which served as the medium for the discussions. One particular Facebook post gave rise to in excess of eighty-one comments, and the consequence was that the students' mobile devices simply did not have the processing power and connection speed to load the ever-growing numbers of comments on one wall post, and they consequently were excluded from the discussion. The second author was hoping to resolve this issue before the second and third cycles began.

Despite the initial technical difficulties encountered by the students, Facebook as an educational technology afforded students the opportunity to participate in the discussion at any time. Nevertheless, the discussion at times became a bit fragmented. Some students were eager to start the discussion, as is evident from a comment such as: 'Sir, when are we going to have the discussion about cloning because I just watched the video and I have many questions?' Other students, however, joined the discussion at different times and the discussion became fragmented, as shown in comments such as:

> Okay, so reading all these comments are going to take forever so I will just post what I think is okay … so this disadvantage to cloning would be that there is a great possibility of death like … uhm … Dolly the sheep who died at a young age because of a disease and it's kind of sucky you know like we were put onto this earth with the necessary elements and stuff and if there is a shortage of anything people can't just clone things because it might lead to lots of deaths … and if something were to go wrong in the process there would like be some serious damage done! So cloning is a no for me because not only is it going against everything god wanted for us it also creates a possibility of lots of diseases developing …

The second author planned to resolve the concern of fragmented discussion in the second cycle.

Despite the initial teething problems that hampered large-scale learner participation in this first action research cycle, technological expertise enabled the second author to adapt quickly and find a solution. The discussion using Facebook as a medium was then able to progress and more students were able to participate. These technical problems, which had not been accounted for, had the potential to adversely affect the democratisation of pedagogical practices, because many students initially were excluded from Facebook discussions on a technical point. The second author wanted to avoid students being excluded because they did not have the technology to participate at all costs. He felt that technical problems would discourage students from using Facebook, and this invariably would impede the potential democratisation of their pedagogical activities.

Analysis of the Facebook observations pointed to technology serving as a medium that promotes societal awareness. This claim can be substantiated by Facebook comments on the use of cloning: 'No, because if the outcome is unknown persons might be putting their lives in danger'. In addition, technology serves as a medium supporting learning, which is confirmed by students posting links to other websites and pictures. The students' societal awareness was further confirmed by Facebook comments such as:

> Well cloning animals for agricultural purposes is a lot different than cloning for personal things such as "I really liked that cat". I mean, for those of you who eat meat, ethics doesn't really come into play. Whether or not that cow or sheep was cloned or naturally conceived the intention for it to be killed for food purposes is still the same.

The Facebook screenshots also highlighted the students' capacity to communicate uninterruptedly. This observation was also confirmed in an interview with a student that corroborated the capacity of educational technology to create a deliberative sphere in which students who traditionally are quiet in class are able to overcome their reluctance to participate. Although the students were not afforded full

anonymity, the educational technology allowed them to participate from their own comfort space, whether at home or at school. Facebook comments such as, 'I am against cloning because, firstly, it's unnatural and it's not safe because it's part of an experiment that could seriously go wrong', do not point to students being subjugated in any way. Rather, many students demonstrated tendencies to make controversial claims, such as 'I believe that god created all things living unless scientists find significant information and evidence proving anything else', without any fear of being confronted or questioned.

The Facebook screenshot analysis also highlighted the students' freedom to question the second author without necessarily experiencing an erosion of the professional boundaries between teacher and student. For example, some screenshot [picture] comments indicate: 'Learners were able to make reasoned claims without fear …'; 'Learners were able to make reasoned claims without being constrained'; and 'Learners began to act critically by posting links supporting their thoughts …'. These statements corroborate the students' freedom to question. The students still recognised the second author's pedagogical authority as teacher and Facebook group moderator, but seemed to be more comfortable to ask questions. A typical classroom scenario would see the teacher as the main source of knowledge transmission, whereas here there was an equalisation of the relationship between the teacher and student in/through educational technology. Because the students were 'online' via their computers and mobile devices, they had access to a wealth of information via the Internet. Yet the second author's role as an instructive and strict teacher was very dominant. This is evident from comments in which the students seemed to expect that he would continue to play an instructional role: 'Couldn't you use cloning to save near extinct animals' and 'Sir, when are we going to have the discussion about cloning because I just watched the video and I have many questions'. These examples show that learning had been democratised to a small extent, because the students took the initiative to do their own research, thereby taking responsibility for their learning and that of their fellow students. It is also evident, however, that some students were unable to adequately filter the wealth of information on the Internet and recognise credible sources. In this regard, students posted comments such as: 'Researchers have found several abnormalities in cloned organisms, particularly in mice. The cloned organism may be born normal and resemble its non-cloned counterpart, but the majority of the time will express changes in its genome later on in life.' Although the validity of such comments may be questioned, the exchange of knowledge amongst students can only be regarded as beneficial to the teaching and learning process. Not only did students have access to a wealth of information from the Internet, YouTube videos and articles, but they also were able to make contact with individuals doing research on the topic of the discussion. By inviting a medical intern to be part of the Facebook discussion, the students were able to tap into an additional information resource that enhanced the legitimacy of the discussions.


facebook
Search for people, places and things
Write a comment...
SK
I'm totally against cloning because firstly it isN'T natUral and secondlY we shouldn'T play the role of the divine GOD:)
Like · Comment · Follow Post · September 26 at 7:01pm via mobile
2 people like this.
Seen by 2
Write a comment...
FW changed the group privacy setting to Secret.
Like · Comment · Unfollow Post · September 26 at 6:07pm
Seen by 2
Write a comment...
LDK
Against its not natural for people and animals to be cloned ,we don't know what could happen to the clones.
Unlike · Comment · Follow Post · September 26 at 5:05pm via mobile
You and like this.
Seen by 2
Write a comment...
NJE
Against cloning because:
*its dangerous
*people and animals should be made naturally, cloning removes the spiritual beauty of it. Like the video says we shouldn't be trying to play God.
On the other hand, test tube babies could be made to donate there organs and save those in need, for medical purposes only.
Full marks please
:)
Like · Comment · Follow Post · September 26 at 11:15am via BlackBerry
Seen by 2
Write a comment...

The second author's comments on the Facebook screenshots also demonstrate the capacity of educational technology to assist students in the construction of personal learning contexts. As the students were able to participate in the discussions from their comfort zones, they were allowed the time and space to articulate comments

that demonstrated their ability to think critically. Despite a few students not demonstrating the skill to filter the wealth of information sources of varying quality, there were indications of students demonstrating critical thinking. Evidence of this is provided by comments such as the following:

> I think cloning is dehumanizing, because like sir commented that what if its organs can save your life? Yeah cool, but hey are you just going to cut up another person for your benefit? So you can live and stuff? That's just mean. If people want to clone why don't they clone things that we lack? Clone food, it will stop poverty? Oh, and uh, what if they do clone a human? And like it doesn't go as planned are they just going to kill that deformed baby? Plus, we can't play God man. That's just my opinion though.

The latter comments illustrate the students' ability to think critically. By opening their ideas to the scrutiny of other students, they could rethink their own ideas in a critical manner. Initial ideas, such as 'Cloning is pointless because it is nearly the same as male and female reproduction. There are other alternatives to cloning regarding the making of babies and not only is it pointless but also it is messing with God's ideas and creations', were later reconstructed by the same student, who commented: 'Fruit and veg is the essential needs of a human's diet so it would need to be cloned so that with the amount of population in the world there is no shortage of it'.

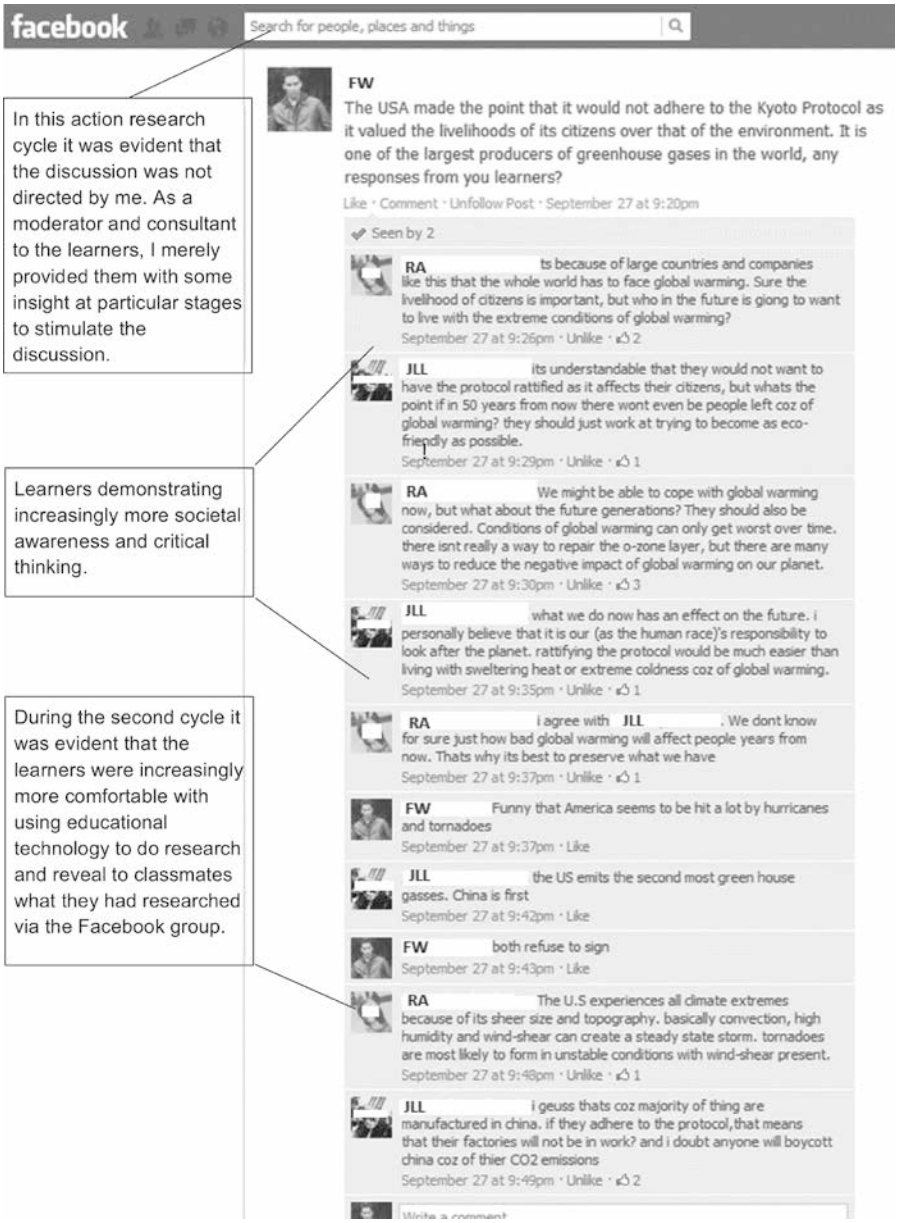
In the initial stages of the Facebook discussion it was the second author's aim to direct the discussion to ensure that the learning aims were being achieved. Questions were posed to direct students towards achieving the learning aims. As a result, the students' chains of thought were very linear. Despite the discussion progressing in a linear manner, there were some students who demonstrated their criticality by directing the discussion along unexpected ways of doing. Students began to research the contentious issue of cloning beyond the confines that the second author had mistakenly placed on them. One student, for example, looked at cloning in terms of religion, supported by comments such as the following:

> Strange fact regarding the ethics of cloning … religious people are against cloning because they say that life begins at conception though … [some] people do not equate life with conception though some do question the wisdom of cloning, … [others] generally find no actual reason to object to cloning … .

Other comments included the following:

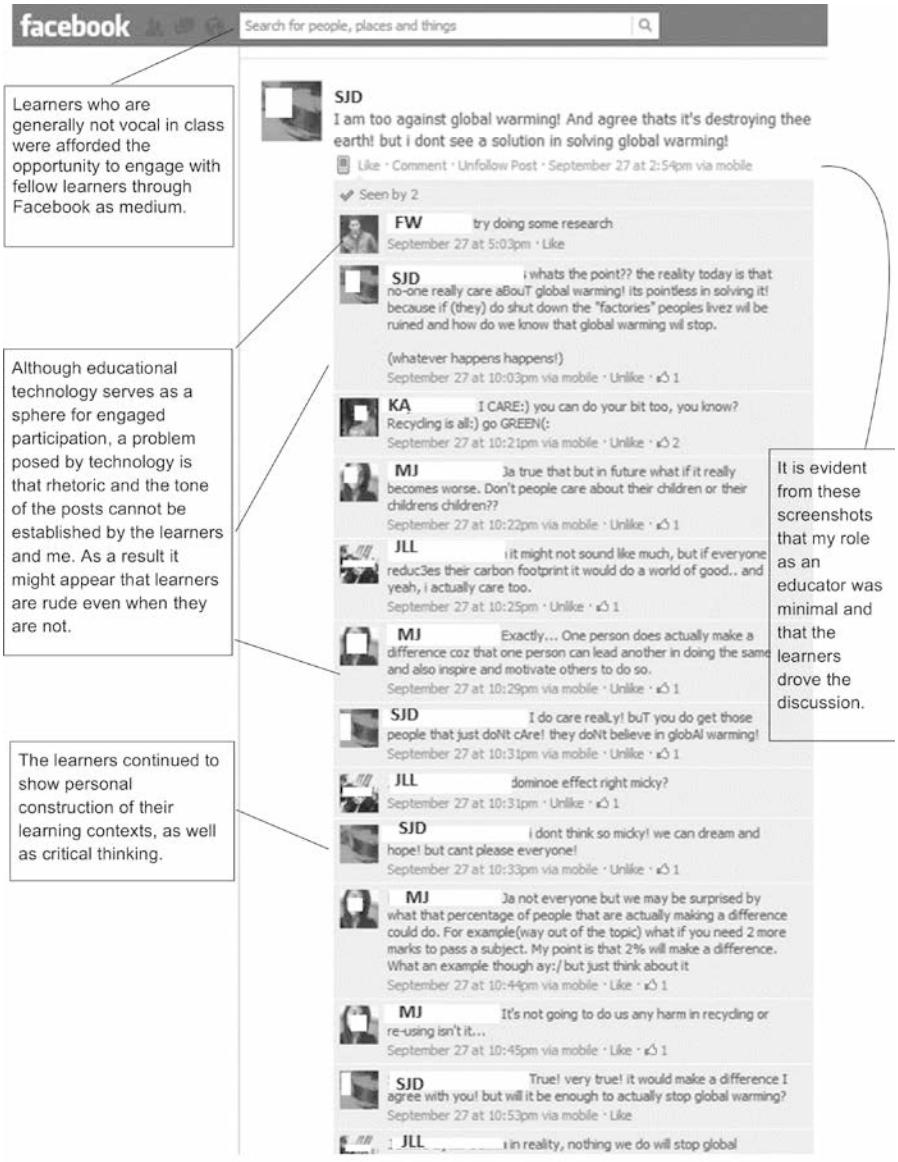
> Perhaps the biggest reason that cloning should never be explored is because of where it may lead society. Cloning is the creating of a creature (in this case a human) through artificial means. If humans could start cloning, their clones would have the exact same DNA as the parent, which makes them look similar. As the idea of creating humans with specific traits is explored, many will get the idea that they can not only create identical looking humans, but also how

they should act. The book *Brave New World* from Aldous Huxley is a good idea of what would happen if humans dabble too much in playing the hand of God. Eventually, people could be bred with others to create perfect traits as if they were animals.



On completion of the first cycle, sufficient evidence had been generated to show that the students' participation on the Facebook discussion 'wall' varied from more participatory to less participatory. Of the twenty-two (out of twenty-six) students who participated more (those who had lots to say) – at least eight – as is evident on the Facebook 'wall', understood the views on cloning better, listened more attentively to others' views on the subject, revised their views in the light of other students' views, and were able to connect views on the subject to everyday life experiences. Those students who participated less (not the four whose names did not come up on the site, but rather those who made brief comments – fourteen students) were mostly constrained by the technical difficulties they encountered when using the Facebook group site, often resulting in frustration and disinterest in learning. Throughout the first cycle the second author played a prominent role, often guiding the students towards deeper (critical) thinking, to the extent that, while some students showed willingness and the ability to summarise ideas, revisit and adapt their earlier views and speak their minds based on the information they or others had acquired, there were still some who did not consider participation in the learning process as necessary (they merely 'logged on' to the site and offered a brief comment or two). This lack of participation often was exacerbated by the technical difficulties they experienced. Thus, although some students demonstrated the ability to think critically, construct personal learning contexts and show a greater societal awareness, the majority of the twenty-six students (fourteen) rather were willing 'onlookers' than engaged participants. What is interesting to note is that a student who seldom spoke in class participated more eagerly (as part of the eight engaged participants) in the Facebook discussion group. This provides evidence that educational technology can stimulate student participation. As the students joined the discussion site at different times, it became evident that those who 'logged on' later often did not have the maturity and autonomy to make independent comments. Therefore, continuous participation would increase learner engagement and hence enhance learning. It is with the latter idea in mind that the students and the second author entered the second cycle of action research. Planning of the second cycle was driven by the second author's observations of (non)activity on the screenshots that indicated that student participation was minimal.

The second cycle. Considering that twenty-two of the twenty-six students showed a sequence of more to less participation (eight engaged participants and fourteen less-engaged participants), with four non-participants, the second cycle of action research was geared towards enhancing engaged participation that could create conditions for student criticality. By the second cycle, the technical issues hampering learner participation had been addressed. This meant that student participation hopefully would be maximised and that the students would be able to participate in the discussion using the form of technology they were comfortable with, whether it be a cellular device, desktop computer or laptop. This situation would prevent their



marginalisation, which, if not addressed, would have hampered the opportunity to democratise science education.

During the cycle it was evident that the students were more adept at and confident in their use of Facebook for learning. They made full use of the Facebook functionalities to help express and substantiate their claims, including uploading

photos, posting bookmarks to websites, posting videos and commenting on peers' posts. As Facebook posts are arranged chronologically, the students could participate at times that suited them. In the first cycle, some students felt overwhelmed by the many comments on a single wall post and pointed out that it would have taken them very long to read all the comments. In this cycle the problem was negated, as there were more wall posts and fewer comments per wall post, in comparison to the eighty-eight comments, for instance, posted on a single wall in the first cycle. In this way the fragmented discussion observed during the first cycle was also averted, as posts were arranged in a more manageable way.

As has been mentioned before, the first cycle was driven in a linear manner by means of various questions being posed. In this cycle the second author wanted to limit the role he played to that of a moderator and/or motivator in order to encourage further research on the part of the students, who would be able to use the technology at their disposal. To this end the students were merely given the discussion topic and the responsibility was placed on them to guide the discussion. The result was that the discussion was directed along different lines that the second author could not have foreseen. Learning was no longer linear, and the discussion was pursued along the lines of social, economic and political facets that came into play when the students addressed the topic of global warming. Although there was enhanced participation in the second cycle and the technical issues had been addressed, the students' interactions could not be described as overwhelmingly democratic. This relates primarily to the fact that the students saw the discussion as a debate, rather than an instance of deliberative action. Many students wanted to impose their viewpoints on others and some were unwilling to listen to their peers. The second author thought that the students ought to be taught skills of deliberation during the third cycle, thus allowing them to be open, willing to listen to others, and even to change their viewpoints in a sphere of mutual respect for one another.

As in the first cycle, each Facebook post served as a forum for engaged participation. However, there were still instances when students made sporadic, generalised statements on posts. These statements were not only sporadic, but also fragmented and, at times, out of context. For example, the author's screenshot comments, '… learners … trying to impose their ideas on each other …'; and '… some learners were still making sporadic generalised posts …', confirm that some of their statements were quite sporadic and fragmented. To address this particular issue, the second author encouraged the students to do further research or referred them to the posts of other students to try to spark these students to show greater interest. Having played a motivational role, the second author was able to create a culture of learning through Facebook as a form of educational technology. The students subsequently demonstrated their ability to construct personal learning contexts. In addition, they showed their ability to filter information sources. Website links to reputable news sources were used to validate many students' viewpoints. Learning was not confined to the discussion on Facebook, but also extended by the students

to the Internet. This demonstrated the students' ability to think critically and not just agree with any information source. The way in which comments on posts are displayed also allowed the students to confer with each other and validate research. The students thus acted critically. The screenshot comments such as 'Learners demonstrating increasingly more societal awareness and critical thinking' and 'The learners continued to show personal construction of their learning contexts, as well as critical thinking' confirm the ability of the learners to think critically. However, a limitation brought to the fore by online spaces for engaging in discussion was that the students were unable to gauge the tone of the discussion. Although some students might have seemed aggressive and in some cases sarcastic, as is evident from the comments, they actually did not act disrespectfully towards one another. The second author's intention was to address this issue in the third cycle, in which the students would be reminded to be careful in their selection of words to ensure that a culture of respectful democratic action could be fostered.

As the discussion progressed it became evident that allowing the students to direct the discussion resulted in the topic of global warming being explored more extensively than the second author had foreseen. The students looked at the topic of global warming on an economic, social and political level, demonstrating their ability to think critically, as confirmed by the screenshot comment, 'There were instances when the learners thought autonomously by coming up with practical suggestions to reduce carbon emissions'. Because of the students' construction of personal learning contexts, the second author's role became less instructional and more motivational. This cycle already managed to highlight the potential of educational technologies to democratise science education. Features such as uploading photos to allow students to converse with each other better, and the fact that students could participate at any time, encouraged democratic learning experiences. Through this educational technology, the students were able to demonstrate critical thinking and engaged participation – that is, they took responsibility for their own learning and simultaneously reduced the second author's role to that of motivator.

In essence, participation during the second cycle appeared more engaged than in the first cycle, primarily because the students did not have to contend with the technical difficulties they encountered previously. They concentrated more on the discussions, as is evident from the comments they posted on the Facebook group site. Their comments appeared randomly as they endeavoured to discover personal learning environments from which to indicate their willing participation and ability to respond to a contentious discussion such as that of global warming. What the second author observed is that the discussions and debates were at times very critical, showing that they understood their learning contexts and were influenced by what other students brought to the discussions. Likewise, an important observation that the second author made during his analysis of the Facebook screenshots in the second cycle was that the students were critical, where criticality involved reasoned and justified thinking. In other words, they expressed their views in a justifiable

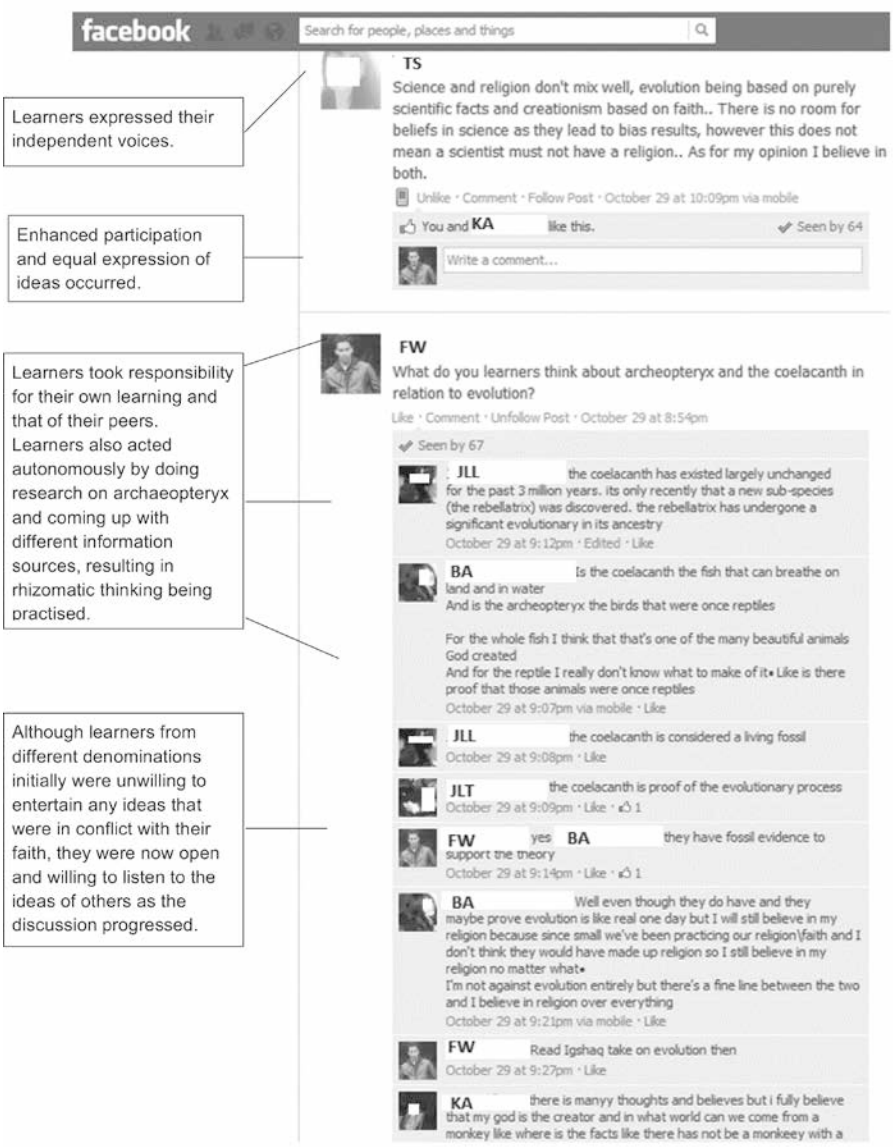
fashion based on the information they found that corroborated their views on the issue at hand. Consequently, the second author's role also became less instructive and more motivational.

The third cycle. Most of the technical issues relating to the use of Facebook had been resolved by the second cycle, thus engendering enhanced student participation. In addition, through the construction of personal learning contexts and the fact that student participation increased tremendously, the students displayed their reasoned ability to think critically by finding justifications for their views on the contentious issue. In the third cycle the second author wanted to ascertain whether the students could also act autonomously and deliberatively, and how their learning would evolve if his role was reduced to that of 'ignorant master'.

By this cycle, the second author had addressed the problems encountered during the previous cycles relating to a lack of student participation, technical difficulties, sporadic comments offered by students and the instructive role he performed. Furthermore, the potential of educational technology to democratise pedagogical practices was fine-tuned, focusing in particular on the sporadic comments made by students and their apparent lack of autonomy. It was the intention to further fine-tune the pedagogical activities in this cycle in order to maximise democratic action. To this end the second author wanted to address the students' lack of the skills required for deliberation. Despite the aforementioned deficiencies, he observed and practised positive action during the first two cycles, such as the promotion of more engaged participation, a focus on the ability of students to construct personal learning contexts, their use of critical thinking, and the fact that his role became increasingly more motivational and less instructional. For example, the screenshot comments, 'My role, reduced from instructor to motivator'; 'I performed a motivational role'; 'Learners took responsibility for their own learning …', corroborate the second author's less instructional and more motivational role. Furthermore, the potential of educational technology (that is, Facebook) to democratise pedagogical practices was confirmed by the ease with which students were able to engage with one another at any time or place, and to utilise features such as uploading photos and videos and posting web links to enhance engagement.

Due to the contentious nature of the topic of evolution, which challenges religious doctrine, it was important for the students to possess the skills necessary for deliberative action, which differs from a debate. A debate is characterised by two opposing points of view held by individuals who try to impose their point of view on others. This is in contrast with deliberation, which is characterised by a willingness to listen to others and an openness to the possibility of changing one's point of view. For this topic it therefore was imperative for the students to show tolerance in the face of their religious beliefs being questioned. A deliberative sphere thus would be more conducive to democratic teaching and learning. To this end, the second author explained the differences between deliberation and debate to the students prior to the third cycle.

As in the second action research cycle, the students demonstrated critical thinking using educational technology as a medium. Facebook afforded the students time to reflect on wall posts and respectfully question one another, which was especially important, as many of the wall posts challenged their beliefs. The students showed a willingness to listen to others and even revised their initial perceptions on the topic of evolution. Critical thinking was also demonstrated in the evidence offered in support of theories of evolution. Screenshot comments such as 'This learner not only demonstrated autonomous learning …'; and '… many learners were able to revise their initial understandings …' confirm the students' willingness to listen, modify their views and think critically. Thus the deliberative sphere, created through educational technology, facilitated the learning process, as the arguments were constructive in nature. Learner autonomy also was observed in this cycle, as their learning transcended what the students initially thought was correct as they began to search the Internet for more credible sources of information that could assist them in the Facebook discussions. This is confirmed by the second author's comment in a screenshot, 'Because the learners acted autonomously by doing their own research, they were able to think differently …'. One student even interviewed a religious leader and ultimately changed her perception of the topic under discussion, as evident in the comment on the screenshot: 'However, through the use of Facebook as a medium of learning, the learners were able to revise their initial viewpoints that saw evolution as a threat to their religious beliefs.' An indication of this autonomy can be observed in students posting links to websites related to research done in the field of evolutionary biology. Educational technology also facilitated rhizomatic thinking. As the students began exploring the Internet they were exposed to different ideas, which led to them thinking beyond the sometimes linear confines of the discussions. This is evident from a comment on a screenshot: 'The learner demonstrated rhizomatic thinking by stating indirectly that viewpoints on the topic of evolution have been dictated by religion …' This gave rise to a constant disruption of the sometimes linear direction of the discussion on a post, and new and different ideas came to the fore. These disruptions also encouraged critical thinking amongst the students, as they had to reflect on these disruptions. As evident from a screenshot comment: '… In this way the disruption served to stimulate the learners' learning beyond the initial confines they (learners) seemed to impose on the discussion.' The disruptions eventually served as catalysts through which most learning took place. The students initially were dogmatic in their views. They had an uncompromising approach to the theory of evolution and rejected the theory in its entirety, primarily due to the fact that part of the theory hypothesises that humans share a common ancestry with modern apes, making it highly contentious. Through deliberation and the disruptions caused by the students, they themselves began to discover that evolutionary biology is a broad field encompassing many different aspects, of which human evolution forms only a small part. The students then developed a more liberal understanding of the theory of evolution and no longer rejected it in its entirety. In some instances, students made comparisons between hypotheses on evolution and their religious



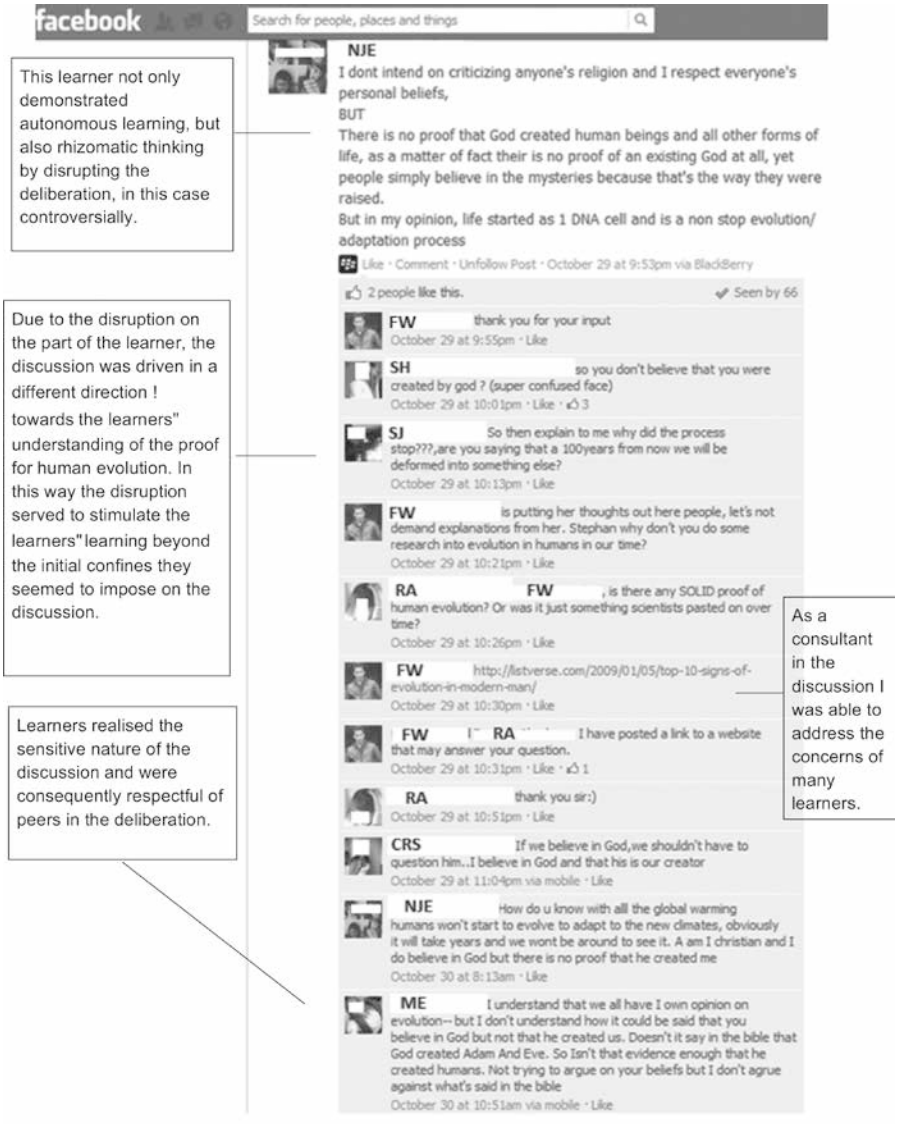
beliefs, as corroborated by a screenshot comment, 'Learner demonstrating critical thinking and not just accepting researchers' hypotheses regarding the theory of evolution'.

An important aspect noted was that there was an equalisation in the relationships between the second author, the students and also the scientists' hypotheses. As the teacher, the second author was no longer considered the sole source of knowledge,

and in this cycle the students consequently posed fewer questions to him. When questions were asked, the students merely consulted with him. To this end the second author was better able to encourage and motivate the students to do further research. Educational technology afforded the students an opportunity to do their own research and to express their independent voices. The second author's role was consequently revised from instructor to motivator. The students also took it upon themselves to assist other students who had joined the discussion late. In addition, the students provided critiques of many scientific hypotheses, as evident from the screenshot comment, 'Learners' willingness to think autonomously so that they can contribute in an informed way'. They no longer saw science as an unchallengeable authority dictating to them what was correct and what was not. This equalisation in the relationships between these different stakeholders demonstrates the potential of educational technology to democratise pedagogical practices.

Unlike the first and second cycles, there was a marked increase in the number of interactions amongst the students. This was achieved primarily through the technical difficulties being addressed and also the fact that the students felt more comfortable using Facebook as a medium for learning. Each initial comment posted on the Facebook wall by the students served as a discussion point for a specific aspect of the discussion topic. In the second cycle there was enhanced participation, but all twenty-eight students still did not participate in the discussion, as some showed a general lack of interest. However, with each post serving as a discussion of a specific aspect, all the students participated in the discussion, as they could comment on a wall post in which they had specific interest. For example, some students looked at modern-day human evolution, while others focused on macro-evolution. All these separate deliberations happened in the Facebook group, as all the students were able to benefit from the offshoots of the initial discussion topic. Much of this information could be garnered from a new Facebook feature, which indicates how many group members have seen the post. In this cycle, student participation was maximised, deliberation was very profound and equal, and there were glimpses of rhizomatic thinking, as pointed out by the screenshot comment, '… the learners were able to demonstrate autonomy and rhizomatic thinking …'.

After having made improvements in cycles one and two to increase learner participation, the second author found that participation and deliberation by the students was definitely enhanced in cycle three. It therefore can be argued that the use of educational technology, in this instance technology-mediated learning with the support of Facebook, contributed to democratising education in a grade 10 life sciences classroom. This is so for the reason that participation and deliberation constitute democratic action. Also, all the students participated with informed voices and without being discouraged by other students' comments. The students deliberated as they justified their viewpoints, and were prepared to listen to the views of others and to adjust their views accordingly. Although many students' views were steeped in dogma, they nevertheless were prepared to listen respectfully to what others had to say. Likewise, by far the majority of students acted autonomously,



having been prepared to wonder about the contentious issue of evolution. There also were moments of rhizomatic learning, as illustrated by the screenshot comment, 'The learner not only demonstrated autonomous learning, but also rhizomatic thinking …'. The second author also acted autonomously, having been prepared to make his voice heard equally with those of the students without having given them instructions, as in the first cycle. Hence, the grade 10 life sciences classroom

was democratised through the use of educational technology. In other words, the moments of rhizomatic or autonomous learning suggest that democratic action was at play in the life sciences classroom. The second author practised his role as teacher equally in relation to the voices of the students, thus confirming that democratic action could not have been far removed from the pedagogical activities in the life sciences classroom. This brings us to a validation of the positive learning experiences as a manifestation that the use of educational technology in the grade 10 life sciences classroom definitely contributed to the democratisation of education.

Validating learners' positive learning experiences. After the completion of the three cycles of inquiry, the second author thought it apposite to interview ten students (out of the total of twenty-six) to ascertain their experiences of using Facebook in the quest to learn about the three contentious issues, namely cloning, global warming and evolution. This form of validation corroborated the comments he observed on Facebook and which he analysed using the screenshots. The interviews he conducted can be considered an additional form of validation. The interviews showed that the students' had positive learning experiences in the use of educational technology in relation to the three contentious issues. Thus, the interviews further validated the legitimacy and positivity of the learning experiences through the use of educational technology, along with the Facebook screenshots.

From the transcriptions of the students' responses to the interview questions, it firstly was evident that educational technology offers the possibility for students to develop their skills in deliberation that is relevant to the study of life sciences. The students seemed to be aware that their participation in the Facebook discussions was central to their learning. As one student remarked, through Facebook 'you could think about the answers, you weren't timed and you could research it [the contentious issues]'. Another student said the following in support of using educational technology: 'I preferred learning in this way because it wasn't like too much notes and too much to learn.' Moreover, as the students navigated through and contributed to the Facebook discussions they felt free to differ with their peers and to make reasoned claims about their support of or disagreement with particular claims regarding contentious matters in life sciences. They felt free to express their views directly, without fear of offending other students. Some of the students remarked the following: 'I think … you conducted the group very well and you took comments off [that is of the screenshot] that hurt people's feelings and it was open and everyone could say how they felt' (I understood that deliberation could not unfold by being prejudiced towards others); 'Yes, I got a chance to hear other people's point of view and opinions'; and '… I have a better understanding now and what other people think and their point[s] of view. On Facebook it is more communication and discussion'. Hence, the use of educational technology enabled the students to participate and deliberate, thus contributing to their positive learning. This view of educational technology, as influencing learning contexts positively, is confirmed by Thorpe (2009, p. 126), who claims that educational technology

offers possibilities for knowledge exchange and positive learning by teachers and students.

Secondly, from the transcripts we could infer that the students used educational technology to construct personal learning environments in relation to their interests and goals in terms of the contentious issues in life sciences. As one student remarked,

> … with global warming I must say I didn't know what it was about, but now that we have discussed it and the learners have said their point[s] of view I understand it way better and the consequences of global warming way better … so yes it has taught me a better awareness and has influenced me because I had no idea and wasn't concerned, but now I am. Also with evolution I learnt to respect what their opinions was [sic] like maybe before I would have said no, creationism. And how can you believe in evolution, but now with both points I have a better understanding.

The aforementioned learner-generated contexts are products of student interactions, as they used the Facebook discussions to co-construct responses to contentious issues in life sciences – a matter of co-belonging. As stated by a student,

> I have developed a lot as a learner … when the teacher speaks everyone must just understand, but I would say with the Facebook thing you get to hear everyone's point of view and see that everybody does have [opinions]. Like when you look around the class you say oh no he doesn't think that, you just judge them … now with Facebook you see that they actually have a point of view and it's good to see what they actually have, and it helps you understand as well.

The fact that students construct personal learning contexts through online discussions is also evident in the works of Barnett (2005) and Thorpe (2009).

Thirdly, from the transcripts it seems that educational technology increased the students' scope of action and expanded their opportunities for experimentation, as the focus moved increasingly to learning, rather than teaching on the part of the second author. As some students remarked:

> … I've learnt a lot about all this stuff and it gave me more like insight into things I didn't know about … I've learnt how some people think, like religion and god and all that stuff;

> … there is no right or wrong answer and that your answer is taken to another deeper level, so when I read the comments what people had to say … took it from both sides, because there was no right or wrong, so also with the evolution, most people said they believe in creationism because of their religion, but there was one or two in evolution because they say science is fact. Now with that I went deeper and I said the bible is fact and has been dated I also made the comment on Facebook that it was dated in the bible of the stories and how

> it was made, but evolution has been in there somewhere, but I'm more for creationism and because of the start of it and scientist have proven all of it; and
>
> I didn't think any other teacher would have done that, like make a Facebook group and say let's everyone start talking about a specific topic. Other teachers would just stand there and talk.

In quite a Deleuzian fashion, the second author established a Facebook group to put the enclosures (regular learner activities) of the life sciences curriculum under siege and offered students opportunities to exercise their intellectual voices autonomously.

Fourthly, the students valued the role the second author performed, namely of providing support and encouragement as they learnt about the contentious issues, rather than enacting the traditional role of transmission teaching. They appreciated the way the second author listened to their views and engaged with them in a relaxed, informal and caring manner, thus aiding them in building their confidence. In a way the students recognised that he wanted to do less teaching and put more emphasis on equalising their relationships – that is, he placed a high value on their points of view and the insights they offered, and had a far less 'teachery' approach (Crossan & Gallacher, 2009, p. 133). This meant that they did not just have to listen to what the teacher had to say in relation to the contentious issues. As confirmed by some students:

> … when you teach you don't only say your point of view is right, you discuss things from both points … I see that. Like when we ask you questions you don't give one point of view … so it's actually a big role because most teachers they only teach from their point of view [which] is right, but through your understanding and what you tell us what we discuss makes us remember things more and that is where life sciences as a subject influences more as well;
>
> You played a good role because you listened to everyone's opinion and didn't take sides and you weren't biased; and
>
> … your type of teaching, it doesn't conform to the norms of other teachers. With other teachers you can't really ask questions over a weekend or something and you are more interactive than most teachers. And your lessons are not as boring as say example an English lesson.

In essence, it can be deduced from the transcripts that the students' experiences while learning about the contentious issues in life sciences were remarkably positive. The explanations offered by the students during the interviews are presented as living standards of judgement whereby students give an account of their positive learning experiences to themselves and to the second author. The students understood what it meant to act critically and autonomously and simultaneously to engage others in deliberation. They became intent on being listened to and to contribute to understanding and reinterpretations of concepts in relation to their

independent thoughts – a matter of searching for living standards of judgement based on their own discoveries through deliberative engagement.

In sum, during the first action research cycle on cloning, the students experienced technical glitches with the Facebook group site, which caused frustration. Consequently, the students' participation (as is evident from the frequency of comments) was minimal and their responses to the contentious issue were not very informed or extensive – only eight students participated meaningfully. Those who participated less (fourteen students) were also constrained by formal examinations, as their preparations led them to be somewhat playful on the Facebook group site. Nevertheless, there was a level of learner participation and it seemed evident that the use of educational technology offered students opportunities to become more participatory. Paradoxically, however, their participation was somewhat restricted. Before the commencement of the second cycle (on global warming), the students and second author concentrated on eliminating the technical deficiencies in order to ensure more participation and inclusiveness. Also, the second author adopted a rhetorical approach to encourage student participation by asking provocative questions that he posted on the site. After completing the second cycle, he deduced from the student discussions posted on the Facebook group site that there was better communication amongst and participation by the students. They seemed to have been more prepared to access information about the content and were involved in small group discussions. In addition, the students took ownership of their learning by constructing personal learning contexts, without necessarily depending overwhelmingly on the teacher's pedagogical authority. It could also be inferred from the discussions that the students performed more searches and actually went beyond what they were expected to do. The students therefore became confident in using Facebook. However, despite the improvements in the technical efficiency of the Facebook group, there still was a lack of engaged participation on the part of all twenty-six students. In preparation for the third cycle, the teacher (second author) posted a worksheet on the Facebook group site that students had to engage with in order to understand the theories on this contentious issue in life sciences, namely evolution. The second author took this initiative because he presumed that a discussion of evolution would trigger several controversial assertions on the part of the students. This worksheet was not meant to be prescriptive, but rather to provide an opportunity for students to engage with and obtain prior knowledge concerning the theoretical debates on evolution. In other words, as a means to foster more learner participation it was appropriate to initiate them into recent debates on the contentious issue. In this way their participation would hopefully be enhanced further. What can be inferred from the discussion on Facebook was that student participation and deliberation definitely were enhanced. In fact, some students, having gained more self-confidence to express their opinions, came up with unexpected ideas (which surprised both the other students and the teacher), showing that their personal learning had been enriched considerably. It seemed as if their learning constituted an 'assemblage' of thoughts on which other students could draw and then develop their

own thoughts. They could only have acted autonomously because they regarded themselves as participants whose opinions mattered to both the other students and to the teacher. What was interesting to note is that the students did not simply build on one another's thoughts in some linear, hierarchical way, but rather came up at any moment with ideas and information to address the contentious life sciences issue. In a way they produced 'offshoots' of thoughts from the very 'vectors of escape' or 'lines of flight' that already existed as they endeavoured to contribute towards constructing an 'assemblage' of personal learning that largely was rhizomatic in form. And this could only have been done on the premise that they contributed to the formation of the 'assemblages' of thought by recognising that they could do so on the basis of a form of 'intellectual equality' that at times was unconstrained by other students' opinions and by the second author's authority as teacher.

Although there were several moments of creative and innovative learning experiences (as observed from the discussions on the Facebook group site), we cannot assert boldly that learning had been consistently and overwhelmingly autonomous, rhizomatic and equal. There were instances, especially during the first cycle, when learning was very much 'arborescent', in the sense that students wanted to contribute systematically to their own understandings of the contentious life science issue, often relying on others' opinions, although not exclusively so. During the second cycle the students were becoming more confident, as their participation gradually increased and they developed the freedom to come up with suggestions and ideas playfully to justify their views on the contentious issue. However, in cycle three there was unrestricted openness that brought a flood of ideas in a quite haphazard and at times chaotic fashion, quite reminiscent of a Deleuzo-Guattarian construction of 'plateaus', and an Agambenian notion of students' learning that remains in potentiality. In fact, even the second author deemed it salient to start thinking differently about how he would report on the analyses of the three cycles of inquiry. And it also was then that his own readings of Deleuze and Guattari, and Rancière came to the fore. In short, the second author's analyses took a significant poststructuralist turn. That is, he became immersed in thinking autonomously and rhizomatically himself. And, simultaneously, he realised that he had an equal voice that could disrupt any form of deliberative engagement. The second author no longer was satisfied with searching for rational meanings in a linear way, but rather was open to unexpected meanings and encounters that could be disruptive in a democratic sense.

CASE 2: ON THE POSSIBILITY OF DEMOCRATIC EDUCATION IN/THROUGH EDUCATIONAL TECHNOLOGY: CRITICAL DISCOURSE ANALYSIS AND ECONOMICS EDUCATION IN POTENTIALITY

In this case study we describe and report on the views on three films in relation to how teaching and learning were guided by educational technology in relation to an education for social justice. The third author analysed films, twenty-five students' comments posted on a Facebook group site (a form of note taking), and two focus

group interviews with ten grade 11 economics students. The main concern of this case study was how learning goals of economics for grade 11 students are related to three underlying aspects of economics education, namely sustainable development, equity (including equality) and economic development, and how they may or may not engender opportunities for social justice. This brings us to some information on the students who participated in the study.

THE POTENTIALITIES OF THE STUDENTS AND DESCRIPTION OF THE FILMS

Data on the grade 11 economics students were compiled using an assignment on education for social justice related to the themes of sustainable development, equity and economic development that was completed by the students. The purpose of the assignment was twofold: Firstly, the third author wanted to establish how the three films contributed to the students' understanding of the three underlying themes; and secondly, the assignment served as a means to ascertain the students' understanding of socially just relations in the classroom. The results of the assignment indicated that there were fifteen females and ten males (twenty-five students in total) aged 16 and 17 years in the class. As in the previous case study, the majority of the students lived in the southern suburbs of Cape Town and came mostly from middle-class families residing in historically disadvantaged communities. The successful completion of the assignment depended on the students' ability to access the Internet and, through the assignment, the third author could ascertain the ways in which they did so. All twenty-five students owned smartphones – twenty BlackBerrys and five Samsung Galaxy smartphones or iPhones. Most of the students opted for the BlackBerry smartphone due to the cost-effective Internet access provided by the various network providers. Also, all of the students had access to Internet at school to access the Facebook group site, and they established individual groups with their peers in order to answer the questions that the third author posed on the Facebook site. These questions were the following: What impact does sustainable development have on a socially just society? What can you as a citizen do to ensure sustainable development? How has the film *An Inconvenient Truth* helped you to better understand sustainable development? What impact does economic development have on a socially just society? How has the film *The Gods Must Be Crazy* helped you to better understand economic development? What can you as a citizen do to ensure economic development? What impact does equity have on a socially just society? What can you as a citizen do to ensure equality in society? and How has the film *Into the Wild* helped you to better understand equity? The students were eager to learn and had a special interest in doing practical activities in the economics classroom. As the school has a policy of 'no cellphone use at school', the third author arranged with the students that they only would use their smartphones in the classroom and in the computer laboratory, where they worked for pedagogical purposes.

An Inconvenient Truth

The film *An Inconvenient Truth*, produced and narrated by former US vice-president Al Gore, calls attention to the dangers faced by society in relation to climate change, for which he suggests urgent action by a global society to address the phenomenon of global warming. The film has provided a slide show on climate change by Al Gore to audiences worldwide for the past fifteen years. He highlights the fact that the way in which the present society handles agricultural, industrial, transportation and housing tasks only exacerbates the phenomenon of global warming. The film is particularly important because it emphasises the theme of sustainable development by educating the youth to think critically about sustaining the environment for use by the next generation.

Into the Wild

The film *Into the Wild* takes the audience into the life of Chris McCandless – a university graduate from a wealthy household – in his search for greater equity. He found himself in a situation where all facets of life were favourably present: his family adored him, he was financially fortunate, and possessed an education that opened a world of opportunities for him. As he entered society he acknowledged that inequity was rife in his immediate environment. He became contemptuous of his parents' inclinations with regard to materiality, as they lived an easy and comfortable life and disregarded the needs of those who are poverty stricken. Chris's ethical and moral desire for equity led him to sheltering himself from modern society, a society in which morally objectionable behaviour negatively affects nations across the globe and, as a result, he ventured into the wilderness. The film is particularly important because it educates us as individuals on our responsibility to strive towards equity regardless of our status.

The Gods Must Be Crazy

The film *The Gods Must Be Crazy* provides an apt example of a pre-modern and a modern economy and how economic development has shifted between the two economies. The film illustrates the distinguishing characteristics of Bushmen and modern society through the interactions between members of each of these very distinct cultures. Modern society is very different from the simple, contented and tranquil world of Bushman culture, with the former being incredibly fast paced and technologically advanced, in comparison with the Bushmen's ways of living. The film is successful in painting a clear picture of the world in which people of different cultures come to see the world through their very different sets of eyes – a world in which individual cultures are unique and distinctive and a world in which we, as individuals, ought to embrace our differences as human beings and see the great strength that comes with diversity. The film is particularly important because it

educates and informs us to recognise and attend to the diverse needs of all individuals in society, which is important if we hope to achieve a socially just society.

Analysis of Films in Relation to Education for Social Justice

In today's society we often are confronted with challenges pertaining to social injustice. People are still discriminated against in one way or another, whether economically, religiously, racially, politically or culturally. When one looks at the current South African education system, one finds a flawed system in which there still are many privileged schools, which often are funded by the education department due to the 'better' academic performance of their students than that of students in formerly underprivileged schools. The simultaneous undermining of poorer schools' inadequate achievements as not worthy of financial support begs one to question whether social justice can be achieved, considering that the underfunding of poorer schools will exacerbate their academic underperformance. This form of social injustice is reinforced by unequal, discriminatory school policies, with a constant enrolment of students at certain rich and advantaged schools based on class, while the poor are left to attend schools with inadequate financial and educational resources. As a former economics teacher, the third author was confronted with the question of what he was doing as an individual to ensure that the issue of social injustice was dealt with inside and outside the classroom. What made him realise that a study of social injustice was important to his own professional growth as a former teacher was that students are our future and that they, as individuals, ought to be educated about the issue of social justice so that they too could play a role in shaping a more equitable, inclusive, just and democratic society. With the transition of students from early childhood to young adulthood we are confronted with individuals whose lifestyles and behaviours are constantly adapting to an ever-changing, fast-paced environment, and as teachers we too need to change and adapt by adopting dynamic methodologies and pedagogies of teaching, such as using educational technology. Through the teaching resources at his disposal, the third author was able to showcase three very important films to students in a grade 11 economics class, namely *An Inconvenient Truth*, *Into the Wild*, and *The Gods Must Be Crazy*.

The three underlying themes explored in the films, namely sustainable development, equity and economic development respectively, are correspondingly important in the pursuit of a socially just society. The films have taught us that we are not impervious to the implications of our own negligent doings with regard to the physical and fiscal environment. It is evident that human nature initiates many different actions and, as a society, it is our responsibility to try to filter out detrimental engagements, as they only will serve to worsen the current, undesirable position of the world economy. It becomes more of an economic issue than a moral issue when we are left with conflicting thoughts on economic change and performance than that of preserving the environment. We ought to be mature enough in our own understanding of the need for transformation in the way in which we satisfy our

needs and wants. Education serves as a catalyst for change, and through the social transformation and change that we find ourselves shifted towards, education is the most effective tool to educate the youth of today on the issue of social justice. We now offer a discourse analysis of the three films from the perspectives of both the third author and the students.

The Teacher's Discourse Analysis of the Films

An Inconvenient Truth. In the film *An Inconvenient Truth*, viewers are introduced to beautiful visuals of a flowing river, with background sounds of birds, tree frogs and animals. The narrator is quite descriptive of this setting, depicting it as one of contentment, peace and serenity. As individuals living in a fast-paced and modern society, we often are unaware of our beautiful surroundings – that is, the natural environment, and so the narrator uses this setting as a reminder of what we, as humankind, have and for what we should in fact be thankful. The narrator is a former vice-president of the USA, namely Al Gore. We are introduced to him and his audience, who are concerned with the main theme of global warming. His actions and gestures suggest him to be a serious individual, but also humorous at times, where he exposes his audience to amusing videos and images throughout the film. He also provides a personal account of what led to him become involved in politics, and how his persona led him to pursue his examination of global warming as caused by humankind. Environmental exploitation, global warming and the destruction of the environment as caused by human action are often compelling, and cannot be ignored, and through moral persuasion and an obligation to do what is good for society – that which seems to be often ignored by the political elite. Al Gore's interest in educating society about its inevitable destruction is driven by his own concern about what future generations will actually be left with, and so he is driven by a moral obligation to do what is right for society. We are living in a world in which globalisation and competition seem to be the driving forces of many Western countries, in which political greed often results in the rich benefiting from material resources, leaving the poor to an environment in which resources are becoming destroyed. In the film the narrator is quite descriptive of events leading to environmental deterioration, and he reiterates that, as current and future leaders in society, we need to act morally in our doings in order to ensure that an environment is left for the future. It becomes not so much a political issue, but more of a moral issue, if we allow the effects of globalisation to drive our decisions, whilst leaving the environment to become degraded due to the overconsumption of natural resources and to overproduction.

In the film, viewers are provided with numerous images of the effects of global warming on the environment, from melting icebergs and mountains where ice was once found, to other forms of natural disasters. We are shown images of the destruction left behind by hurricane Katrina in the United States, and images of excessive heat in many parts of the world. The tone of the narrator is that of concern

for our own doings, namely what we as individuals are doing and not doing to resolve this issue of global warming, and what we as a global society are doing to ensure environmental sustainability. Viewers are shown tables and graphs of how the United States contributes the most to global warming, while in some parts of the world countries have already adopted environmental standards and laws to try to resolve this phenomenon. Later on in the film, viewers are introduced to an image of a scientist observing a set of scales that holds the globe on one side and a stack of gold bars on the other, and the narrator uses this to depict the choices of his audience – that is, either we think only of wealth and of human riches, or we think of the planet as the most important factor. The narrator uses this film to convey his message on environmental sustainability, and states that, unless global leaders do not allow the impact of globalisation to cloud their judgements on the deterioration of the environment, we may not have a sustainable environment in which to live in the future.

What we infer from the film is that globalisation perpetuated through a global community that becomes more familiar with its capacity to control natural resources often results in others being marginalised. Societal injustice happens as a consequence of globalisation, as people want to exercise their power over others – a situation that often results in others being excluded unjustly from equally sharing the benefits of natural resources. Global competition and political greed often result in exploitation – a matter of social injustice making its way into the relations amongst people. Thus, it is evident from the film that societal injustice happens as a consequence of political greed and corrupt bureaucrats, because people want to exercise their power over others politically – a situation that often results in others being marginalised from equally sharing the benefits of material wealth and thus satisfying their needs. Consequently, a matter of social injustice makes its way into the relations amongst people.

Into the Wild. In the film *Into the Wild* we are introduced to beautiful landscapes filled with endless snow, icy cold rivers and mountains covered in trees. The narrator is a young man, Christopher McCandless, who has spent a little more than 100 days in ‘the wild’. We are taken back to Christopher’s life prior to his journey to Alaska. Having graduated from Emory University and having a family who love him, he had privileges that few could claim. In the film we are introduced to the McCandless’s, a wealthy household in the Washington DC area, whose riches Christopher would later give up – an act incomprehensible to any individual in society who is struggling to make ends meet. For Christopher, material wealth and riches are an illusion of power; later in the film, viewers are shown how he burns money. His parents’ actions and gestures suggest them to be judgmental and often encouraging of individuals to be concerned primarily with material wealth and riches. The viewers are also shown Christopher’s argument against materialism and his disdain of society’s love of materialism. In the film, viewers are shown the wealthy aspect of the McCandless household, but what is also depicted in the film is their inability to show contentment

as a family. This is also evident in today's modern society, where we find a minority elitist group failing to reach contentment with what material resources they possess, while others are left in a cycle of poverty, struggling to make ends meet – although yet, at times, contented. Christopher, being as carefree as he is, eventually decides to break away from society, leaving all his material wealth behind in search of contentment and a deeper sense of meaning. Later in the film, viewers are shown Christopher living in isolation from society in the midst of the Alaskan wilderness, with nothing more than some basic supplies, having to provide for himself by hunting game and living out of a bus with nothing more than a few blankets and fire to keep him warm. He keeps a diary of his time in the wilderness, of his thoughts and also his reasons for leaving society. Simply put, he wanted to experience an equitable lifestyle.

At times, viewers are shown instances of his desire to return home, and he eventually decides that nature is only a refuge for a short period of time and that true happiness can only really be shared with others. In 1992, his body was found partially decomposed in the bus he inhabited, together with his diary and the meagre supplies from which he lived. Many individuals living in poverty struggle to survive in a society in which the balance of equity favours the rich and wealthy. The narrator uses this film to convey his views on inequity in society and states that, as individuals, we ought to promote equal sharing and eradicate the issue of global poverty. We also cannot allow greed and wealth to cloud our judgments on ensuring a socially just society. The pertinent message, delivered in a very strong tone by the narrator, is that inequity would persist in society if people are not prepared to give up some of the excess material wealth they possess and put themselves in the shoes of the vulnerable and marginalised poor, like Christopher McCandless did. Only when he experienced what it means to live in poverty did he become more serious about changing the unjust world in which we live.

The Gods Must Be Crazy. In the film *The Gods Must Be Crazy*, the narrator introduces the viewers to the Kalahari Desert as a beautiful landscape without people in sight, and as an area often described as the most treacherous desert in the world. In my opinion, the narrator describes the landscape very well, as he explains the Bushmen to be contented people living in a land free from crime, punishment, violence, laws, police, judges and rulers. He describes an environment in which there are short rainy seasons, dry land and uneaten blonde grass. One also is introduced to the language of this indigenous community, consisting mainly of clicking sounds, and their gestures (as shown in the film) intimate that they shake their heads when in agreement with a particular aspect or situation. The narrator describes the Bushmen's empathy towards animals as sincere and as an expression of gratitude to the gods for providing them and their tribe with a form of sustenance. What distinguishes these indigenous people from the rest of the world is their apparent unwillingness to take ownership, and this becomes a problem later on in the film, when the community is introduced to a gift from the gods – a Coke bottle

that falls from the sky. One also is introduced to modern society as a fast-paced, technologically advanced environment that is suited to humankind's needs. Images are shown of built cities, vehicles, machinery and so forth. What is interesting to note is that the narrator describes humankind as discontented with work, often self-creating the environment and re-adapting every hour of the day to suit his or her needs. The narrator is quite descriptive of the nature of the Bushmen, describing their actions and gestures as consciously pertinent to their surroundings. He goes on to describe the Bushmen's assumption that aeroplanes are 'noisy birds that would fly without flapping their wings'. When one is first introduced to Xi, a Bushman – in particular when he discovers the Coke bottle early on in the film – his actions suggest that he is in awe of this gift from the gods. Later in the film, unfamiliar emotions start to arise in the Bushman community due to this gift, and one can see that feelings of anger, jealousy, hate and violence are aroused in the community. When Xi comes into contact with modern people, the narrator describes the Bushman's assumption of them being of the gods.

The narrator is quite descriptive of the nature of both of these societies in relation to the Bushmen's actions, gestures and language. The enthusiasm about something different and challenging in the form of the sudden appearance of a Coke bottle from the sky, which constantly confronts the indigenous community with the new and unexpected (even perhaps odd), confirms how traditional, indigenous (pre-modern) society is significantly different from modern society. But when the Bushmen are confronted with something different, which they thought was a gift from the gods, the human desire for control and power over material resources, even at the expense of harmonious and just living, becomes quite evident. Economic advancement, through the exploitation of the ownership of a material resource, brings a once dignified Bushman community into conflict because of the community's desire to gain unrestricted control over a material resource, even at the expense of societal harmony and the exclusion of the other in their own community. What I infer from the film is that economic development taking place through an indigenous community becoming more familiar with its capacity to control material resources often results in the marginalisation of others, who might have similar aspirations to gain control (greedily) of materiality. Conflict invariably arises and societal injustice happens as a consequence of people wanting to exercise their power over others by excluding them unjustly from equally sharing the benefits of material resources – that is, they want to control and manipulate material resources at the expense of not giving due recognition to desert, that is the reward that has to go to all citizens as a result of economic development. Competition and greed often result in confrontation and exploitation – a matter of social injustice making its way into the relations amongst people because their right to desert is denied.

Therefore, in sum, what can be learnt from the aforementioned analysis of the three films is the following: firstly, people need to become more intent on securing a sustainable environment for others and should embark on actions that would curtail environmental degradation – a matter of avoiding actions that can cause

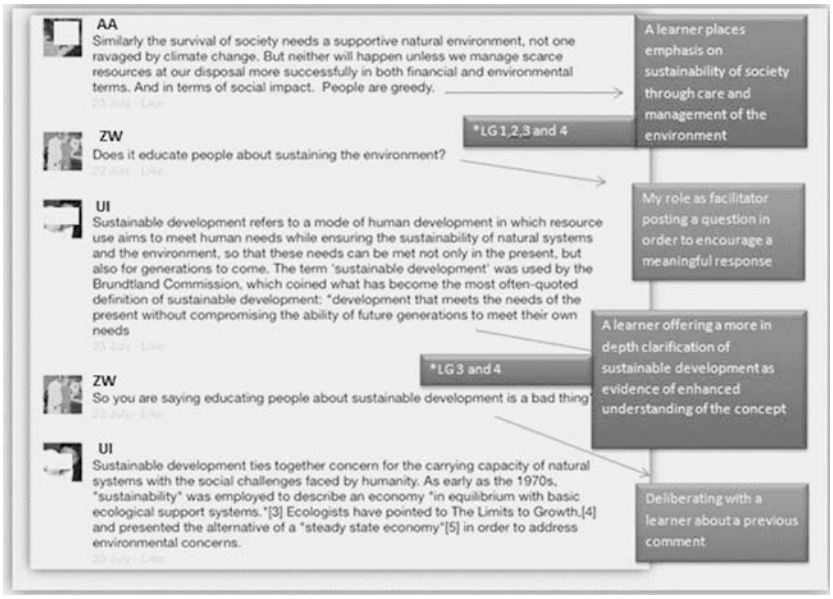
environmental destruction that is quite harmful to the living conditions of future human beings – in other words, humanity should be attentive to the needs of others; secondly, people need to become conscious thereof that marginalising others in the name of competition and greed only exacerbates social injustices – that is, economic development has to be considered as desert for all citizens and not just for a minority who oppress others in society; and thirdly, people need to put themselves equitably in the shoes of those who suffer vulnerabilities and then endeavour to change an unjust situation.

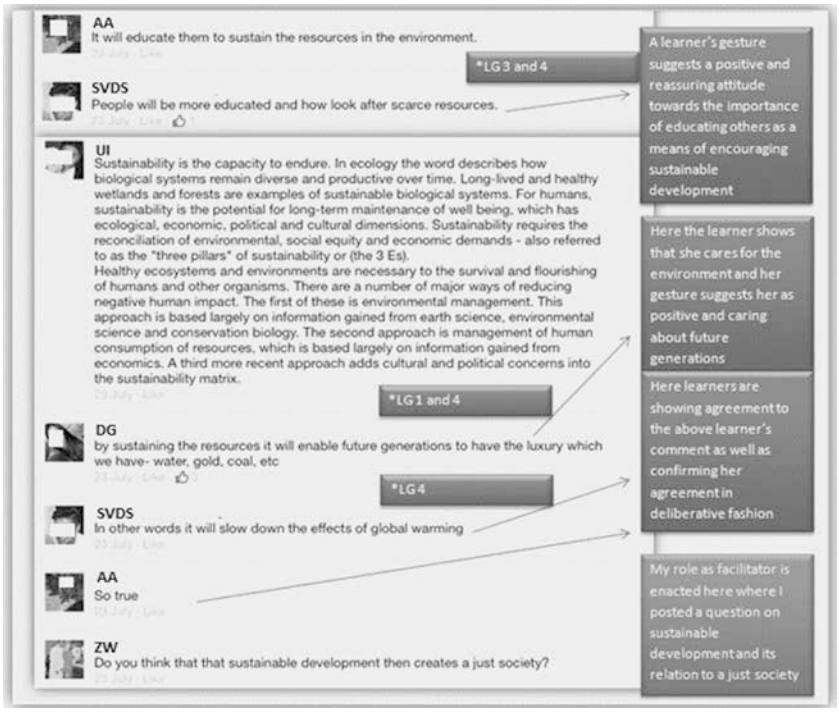
Discourse Analysis of Learners' Perspectives on Economic Development, Sustainability and Equity in Relation to Social Justice

Considering that the third author wanted to find out whether the students had acquired some of the learning goals of the grade 11 economics curriculum, including how they had been initiated into an education for social justice focusing on need, desert and equality, the objective was to analyse their discussions amongst themselves on the Facebook group site. The third author analysed three sets of screenshots of comments posted by the students. These analyses relate to the views of the learners on the three films: *An Inconvenient Truth, Into the Wild,* and *The Gods Must Be Crazy*. These three films are linked to the topics of sustainable development, equity and economic development respectively.

Discourse analysis of screenshots of discussion on sustainable development (*Film 1:* An Inconvenient Truth). The views of the students on sustainable development were expressed in relation to the needs of people in society, as confirmed by student RL and student RI (refer to screenshots below). These students did not hesitate to claim that what people need is often accompanied by greed – that is, the more they have, the more they want, often denying others their need. Moreover, the students made concerted efforts to find out what sustainable development means. Student UI (refer to screenshot below) was of the view that the concept implies that people in society have to cater for the needs of the present generations without compromising what future generations can experience. In other words, the environment and natural resources of society are not just to be used by present generations, but people should actually try to prevent the depletion of resources, which would leave future generations in a quandary about how to sustain their lives.

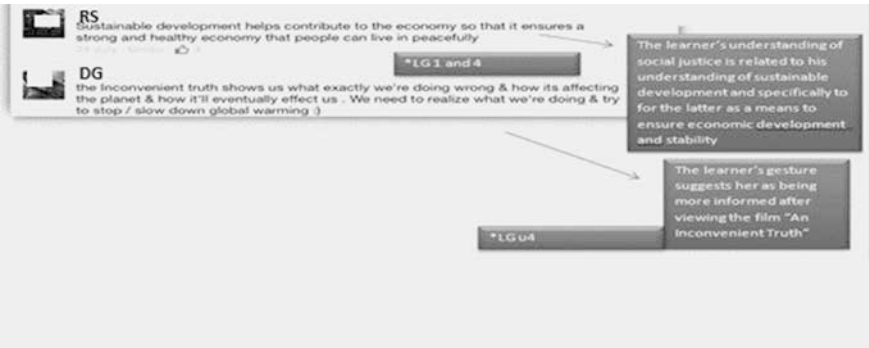
Likewise, as confirmed by student SVDS (refer to screenshot below), the film *An Inconvenient Truth* teaches students to care for the environment and the material resources that possibly could contribute to a better place of living. As student DG (refer to screenshot below) confirmed, future generations have a right to have access to material resources and people should not exploit resources to such an extent that future generations are left with few resources to sustain themselves and the


AA
Similarly the survival of society needs a supportive natural environment, not one ravaged by climate change. But neither will happen unless we manage scarce resources at our disposal more successfully in both financial and environmental terms. And in terms of social impact. People are greedy.
A learner places emphasis on sustainability of society through care and management of the environment
*LG 1,2,3 and 4
ZW
Does it educate people about sustaining the environment?
My role as facilitator posting a question in order to encourage a meaningful response
UI
Sustainable development refers to a mode of human development in which resource use aims to meet human needs while ensuring the sustainability of natural systems and the environment, so that these needs can be met not only in the present, but also for generations to come. The term 'sustainable development' was used by the Brundtland Commission, which coined what has become the most often-quoted definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs
A learner offering a more in depth clarification of sustainable development as evidence of enhanced understanding of the concept
*LG 3 and 4
ZW
So you are saying educating people about sustainable development is a bad thing
UI
Sustainable development ties together concern for the carrying capacity of natural systems with the social challenges faced by humanity. As early as the 1970s, "sustainability" was employed to describe an economy "in equilibrium with basic ecological support systems."[3] Ecologists have pointed to The Limits to Growth,[4] and presented the alternative of a "steady state economy"[5] in order to address environmental concerns.
Deliberating with a learner about a previous comment


AA
It will educate them to sustain the resources in the environment.
A learner's gesture suggests a positive and reassuring attitude towards the importance of educating others as a means of encouraging sustainable development
*LG 3 and 4
SVDS
People will be more educated and how look after scarce resources.
UI
Sustainability is the capacity to endure. In ecology the word describes how biological systems remain diverse and productive over time. Long-lived and healthy wetlands and forests are examples of sustainable biological systems. For humans, sustainability is the potential for long-term maintenance of well being, which has ecological, economic, political and cultural dimensions. Sustainability requires the reconciliation of environmental, social equity and economic demands - also referred to as the "three pillars" of sustainability or (the 3 Es).
Healthy ecosystems and environments are necessary to the survival and flourishing of humans and other organisms. There are a number of major ways of reducing negative human impact. The first of these is environmental management. This approach is based largely on information gained from earth science, environmental science and conservation biology. The second approach is management of human consumption of resources, which is based largely on information gained from economics. A third more recent approach adds cultural and political concerns into the sustainability matrix.
Here the learner shows that she cares for the environment and her gesture suggests her as positive and caring about future generations
*LG 1 and 4
DG
by sustaining the resources it will enable future generations to have the luxury which we have- water, gold, coal, etc
Here learners are showing agreement to the above learner's comment as well as confirming her agreement in deliberative fashion
*LG 4
SVDS
In other words it will slow down the effects of global warming
AA
So true
My role as facilitator is enacted here where I posted a question on sustainable development and its relation to a just society
ZW
Do you think that that sustainable development then creates a just society?

environment. In other words, an unsustainable environment would have devastating consequences, such as global warming.

Student RS (refer to screenshot below) contends that sustainable development can contribute to a healthy economy and a just society. This claim results in student DG asserting that humans should do their utmost to prevent an unsustainable environment, and hence to campaign against actions, especially those by corporate elites and government, which accelerate global warming and harm the environment. People will suffer if sustainable development is not going to remain important for society.

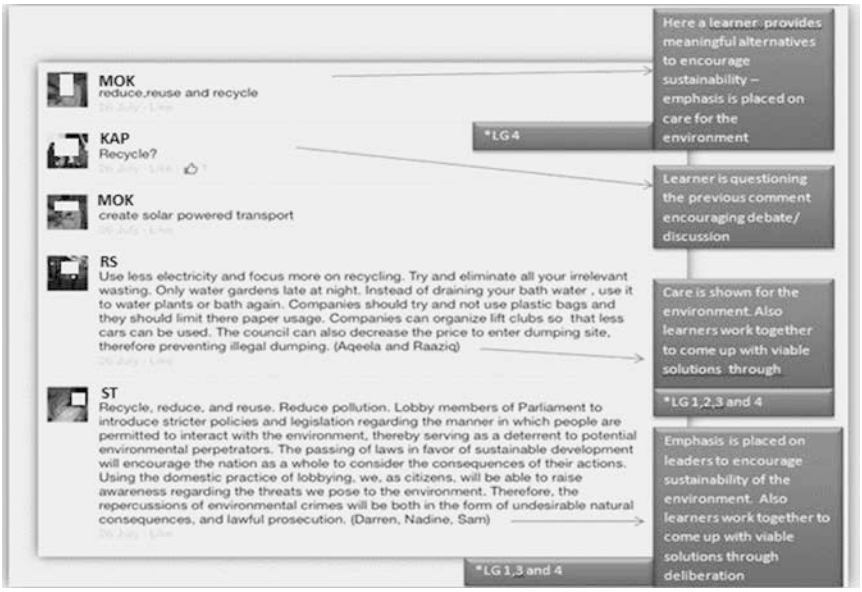


In this regard, student PH came up with ways in which citizens can contribute towards cultivating a sustainable environment (refer to screenshot below). By implication, the students not only acquired knowledge about sustainable development, but developed an interest in finding out how the negative and harmful effects of unsustainability can be counteracted. Student CP (refer to screenshot below) suggests that unsustainable development can be resolved through collective efforts on the part of people – a matter of using deliberation to attend to unsustainable development.

In quite an impressive way, student ST (refer to screenshot below) came up with practical steps to prevent unsustainable development that she derived from her analysis of the film. Here, she and other students suggest that those who act irresponsibly should be subjected to prosecution by the law, thus making the call for sustainable development a highly political one.

In sum, the students were conscientised about the negative and harmful effects of unsustainable development. Their understanding of the concept was richly informed through an analysis of the film. And the students had indeed acquired knowledge and skills about an education for social justice. In essence, the students not only acquired knowledge of the concept of sustainable development, but also came up with strategies for how unsustainable development could be combated. This is a clear indication that the film (a form of visual literacy) assisted students in their learning. They also developed the skills to come up with solutions for how unsustainable development can be addressed and remedied. Their learning was definitely enhanced and their enthusiasm for the subject economics increased, as they had acquired some of the learning goals associated with learning economics. In other words, their sense of social justice also was enhanced. As confirmed by another student (ST):

> I have become more aware through educational skills and organisations within society and I also think that all citizens have an important role to play in improving the standard of living in society. I have learnt that education is the key to improving the standard of living of people because without it they won't have access to basic needs and also they won't be able to provide for their future. In my opinion I think that education [for social justice] is the wealth of a successful nation.

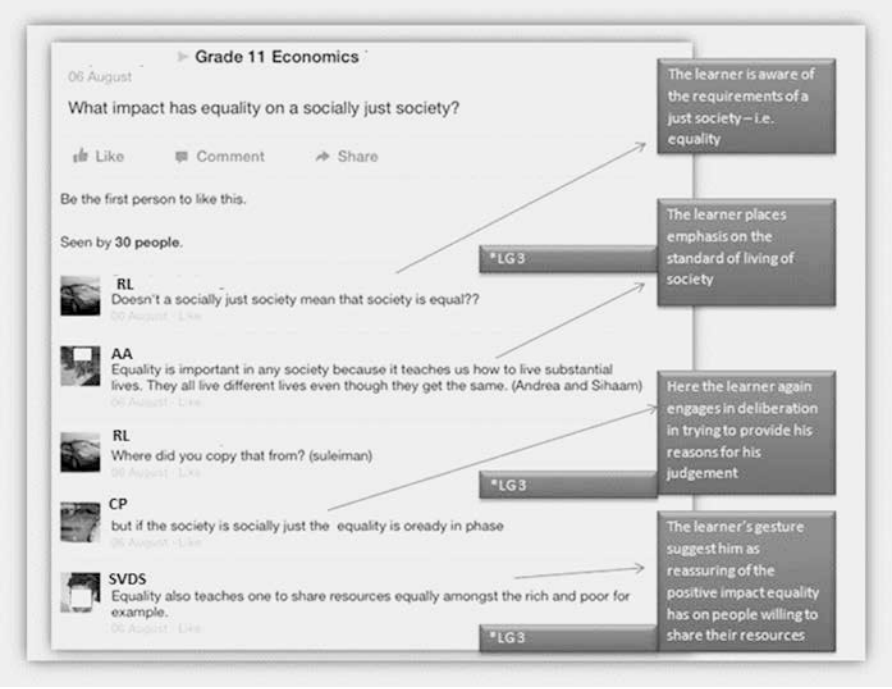


Discourse analysis of screenshots of discussion on equity (*Film 2:* Into the wild). Analysing the students' views on the film Into the Wild, the third author found that their critical awareness of equity had been enhanced. They learnt and offered perspectives on the importance of equity – a key feature of social justice. We now offer an account of how the issue of equity (including equality) as an element of social justice was highlighted in the learners' discussions on the Facebook group site. Equity was one of the key elements mentioned in the Facebook group discussions and, based on analysis, it seems as if the students had become more aware of the impact of an inequitable society from having assessed the wellbeing of individuals residing in poor areas of the country. It is evident from the screenshots analysed that there is a great deal of inequity in society and that, as individuals, we ought to educate others on these disparities in wealth, in terms of which people are classed according to their wealth. What can also be deduced from the screenshots is that the students placed emphasis on the moral obligation of society to help others who are struggling to improve their living conditions. As individuals we are confronted with the choice of whether to make a meaningful contribution to the development of society, or whether to allow individual, immoral greed to persuade us to ignore a society comprised of poor people failing to make ends meet.

After viewing the film *Into the Wild* the students demonstrated acute awareness of the level of inequity that exists, where we have a minority of rich individuals with countless resources at their disposal, enjoying life and taking advantage of their wealth, and a vast majority of society struggling to cope within an endless cycle of poverty and with minimal to no resources at their disposal. What also should be noted is that the students showed a greater sense of responsibility towards the poor, and of the fact that, as individuals, we ought to be grateful for what we have in life rather to allowing greed and corruption to entice us to gain in profits and to advance the marginalisation of others. What also was mentioned by the students was that equity as an element of social justice means that there should be no form of discrimination or prejudice in society, and that people are respected and recognised irrespective of their race, religion, culture or class. Not every student agreed with the notion of social justice. One student in particular voiced his opinion that its attainment was more of a myth due to the discrepancy in wealth that still exists in society today, with minimal to no change in efforts to try to ensure the more equitable distribution and use of resources by all citizens.

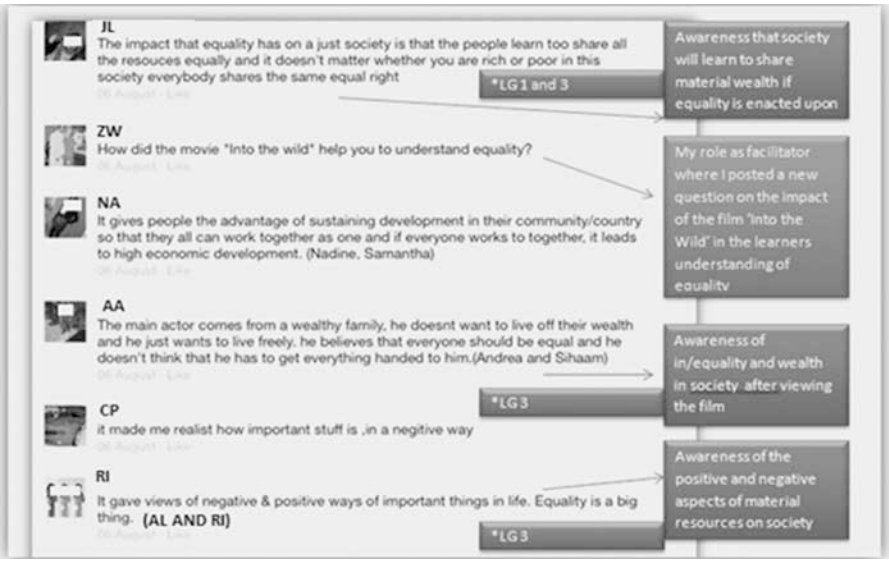
From an analysis of the Facebook screenshots dealing with the issue of equity, it is deduced that the students engaged in deliberative encounters. In the screenshot below one can clearly see that the students worked together and engaged deliberatively, posing questions and justifying points of view on the basis of a reasonable proffering on the part of some students. In a way, the students expressed their equal intelligence on the basis that they could speak their minds. They were not interrupted or hindered by other students in saying what they wanted to say. And they articulated themselves confidently as a result of having written down their points of

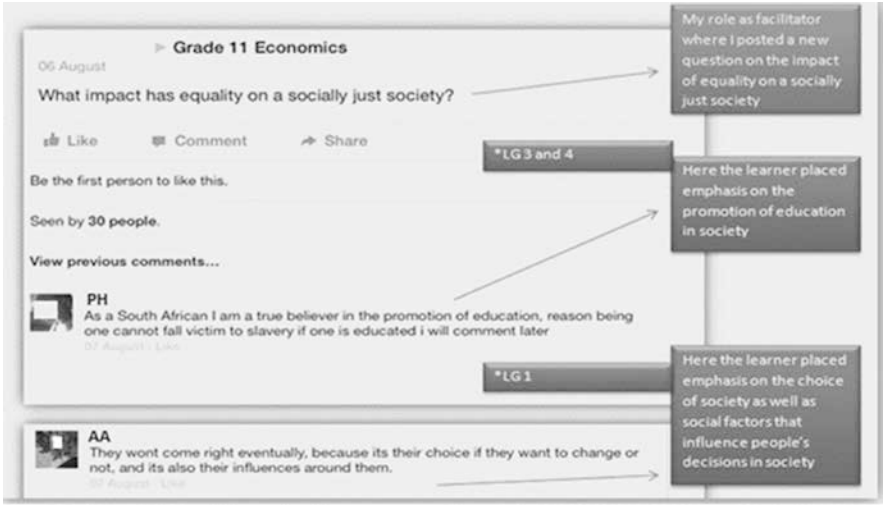
view on inequitable lifestyles based on informed voices. They could equally make a point about the societal inequity that prevails. As remarked by student SVDS (in screenshot below), the students understood '[that] equality [meaning equity] teaches one to share resources equally amongst the rich and poor for example'; and '[that equity teaches us to] treat all people the same …' (student RB, in screenshot below). Moreover, what should be noted is that the students were critically aware of the need for reconstruction, growth and development, which are integral to addressing the issue of inequity in a society. The students also were critical in analysing the practices, values and attitudes pertaining to the economics curriculum. Likewise, the students emphasised the need to be treated equitably. In the screenshot below one clearly can see that the students emphasised the importance of equity in overcoming issues of discrimination in society. What also should be noted in the screenshots is that the students emphasised the importance of actions, processes and structures in society that advance equitable redress – that is, people intent on seeing that societal equity will work towards bringing about such change (student AA in the screenshot below). The film *Into the Wild* played an integral part in shaping their views on what is required by them as individuals to aid in the equitable change that society so desperately needs to undergo. The point is that the students' awareness of the need for societal equity as a desired goal is evident.



Furthermore, what should be noted in reference to student KAP and student JM (in screenshot below) is that the students developed a critical awareness of societal inequities that can only be addressed, they argue, through fairness and the equitable distribution of material resources. In critically analysing the inequities of the past and present, specifically relating to issues such as wealth and poverty, the students emphasised the importance of getting to understand the policies, practices and actions that can contribute towards eradicating societal inequities. This was an indication that they had familiarised themselves with the importance of the learning goal of economic pursuits in Economics. Likewise, and quite importantly, students such as student JL and student AA (in screenshot below) expressed a serious concern to care for equality – an instance of equity. In student JL's words, '[in] a just society … people learn to share all the resources equally and it doesn't matter whether you are rich or poor …' – that is, the significance of working collaboratively towards an equitable society in which resources are shared equally and appreciated by all citizens is an important dimension of an education for social justice.

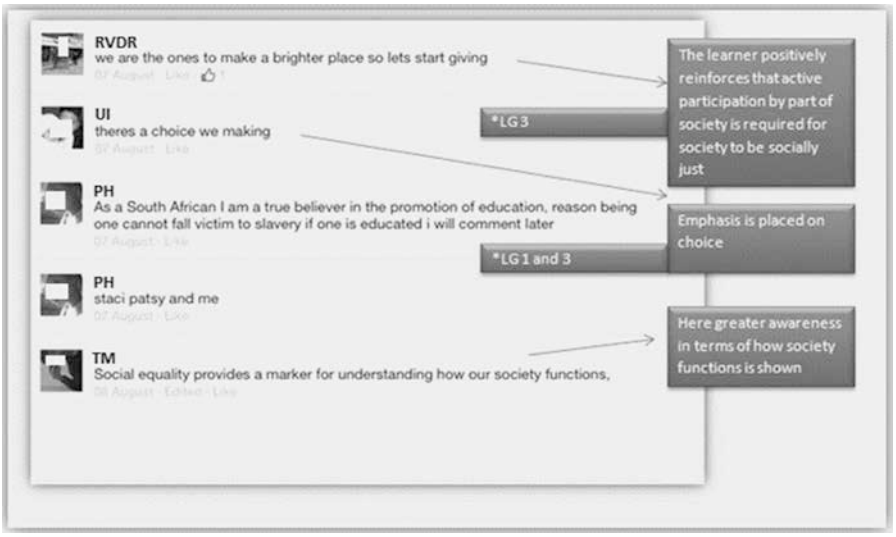
Hence it seems evident that the learning goals of the grade 11 economics curriculum are connected to articulating the importance of equity on the basis that people in society need to be encouraged to share resources equally. The students' optimism in the pursuit of an equitable society in which the exclusion and marginalisation of the underprivileged are wished away is clearly evident in the remark of student RVDR (in screenshot below) that only human agency can adequately address societal inequities.





In essence, the students' analyses of *Into the Wild* all point towards the importance of cooperatively working together to eradicate societal inequities, as is evident in the comments of student ST (in screenshot below). In other words, an education for social justice through equity is only possible if human beings realise that the potential of cooperation and equal participation in developing a just and inclusive democracy is an important pedagogical imperative, particularly if the students were to play some role in contributing to classroom change, which hopefully could spill over into a desire to bring about change in society. Similarly, the students (with reference to student CP in the screenshot below) also acknowledged that the role the teacher played in facilitating discussion along the side, without influencing the main debates, showed that he treated them as equals – that is, he recognised their equal ability to speak their minds and to come to some speech about societal (in)equity. Hence, the students' analyses of *Into the Wild*, their critical awareness and the skills they used in coming to terms with societal inequities suggest that they engaged in an education for social justice for two reasons: Firstly, they developed an understanding of the negative effects of societal inequities; and secondly, they showed a need to want to contribute towards the eradication of such inequities – a key aspect of the learning goals of the economics curriculum. The students developed a critical awareness of '… contemporary economic, political and social issues around the world … I can also influence people to start groups to fight for social justice and to lead to peace and combat global warming and so forth' (student AD). Another student contended that 'the aims and designated goals of the new economics curriculum was [sic] to present the information in a manner that would allow students to form their own analytical and critical opinions about these issues … now when I hear of these issues

I am able to contribute relevant information whether in the classroom or outside' (student DG) – a verification that some of the learning goals of economics had been acquired in relation to an education for social justice. In other words, learning about an education for social justice through equity was an important milestone for the students, as confirmed by student RVDR: 'In my opinion learning about social justice in education is important because it makes everyone aware. It also educates others about equality; respect for one another in a socially just environment'.

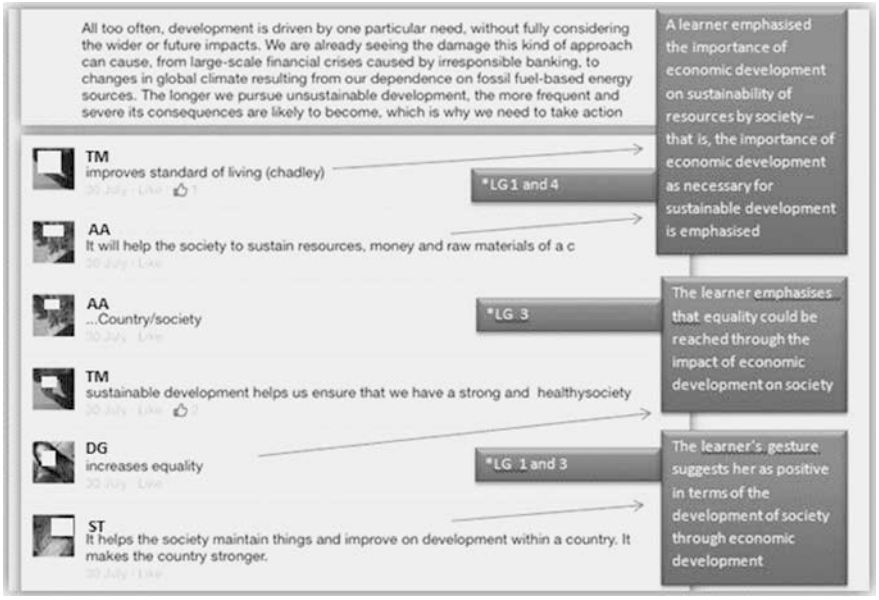


In sum, an exposition of equity, as is evident from the Facebook screenshots, offers opportunities for thinking (on the part of students) more critically about education for social justice. The students' responses to the question the third author posed in the Facebook group discussion regarding the impact of equity on a socially just society were positive. Firstly, the students were aware of what is required for a just society, where equity (including equality) is the cornerstone of democracy and is necessary to overcome the injustices of the past perpetrated by the apartheid government's policies and practices. A society in which students from diverse backgrounds are able to receive an equal education and in which there is no disparity in material resources at schools and universities is one in which social justice is cultivated. What further should be noted is that learner autonomy and critical thinking were identified as important for the students' reasoning; secondly, equity teaches us as citizens to live substantial lives, with resources being shared equally among members of a society in which there is no greed or discrimination that may hinder sustainable and economic development. Also, the students were deliberative in their reasoning as they offered their group responses and listened to the questions and reasons posed by other students; thirdly, equity should be

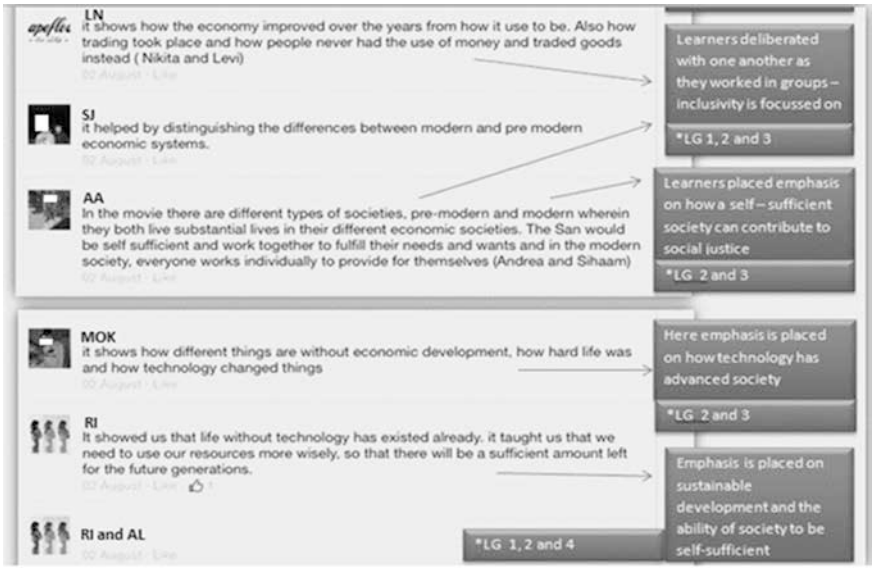
implemented at grassroots level so that the way of thinking is shaped towards a more equal and just way of thinking. We are living in a dynamic society in which we constantly are faced with issues of discrimination and prejudice and, as a society, we ought to alter our ways of thinking to ensure that we live in a climate of social justice; and fourthly, emphasis was placed on education in overcoming the injustices that exist in society today. The state needs to improve education by building capacity for improved and quality education so that there is both skilled and qualified human capital as well as material resources at schools and universities. An education for a social justice approach requires the active participation of both society and the state in addressing the disparity in wealth that exists in society. Here, emphasis was placed on inclusivity. In essence, it can be inferred from the Facebook screenshots of the comments on equity that the students envisaged the cultivation of an education for social justice on the basis of stronger deliberation, criticality and inclusivity. In this way, they would autonomously enact much-needed pedagogic relations on the basis of equally respecting others' points of view. This they showed both through an awareness of how social justice should function, and through their equal encounters on Facebook – a kind of equality through which they could express their respective points of view. It therefore would not be unreasonable to claim that doing an analysis of the film *Into the Wild* afforded the students an opportunity both to think about social justice in their communities, and to engage with one another equally through pedagogic encounters in which they expressed their points of view. In a way, the students had to some extent internalised equality – an instance of equity and an important facet of an education for social justice.

Discourse analysis of screenshots of discussion on economic development (*Film 3:* The Gods Must Be Crazy). While analysing the students' views on the film The Gods Must Be Crazy, the third author found that their awareness of economic development had been enhanced. They learnt and offered perspectives on the importance of desert (reward) – a key feature of social justice. The students became cognisant of the fact that economic development contributes to improving people's standard of living and their productivity and efficiency, as stated by student ST (in screenshot below): 'It helps society to maintain things [such as standard of living] and improve on development within a country. It makes the country stronger [such as to produce more and equitably distributing its resources]'. Economic development would thus enhance desert (reward) for all people in society – a matter of achieving social justice.

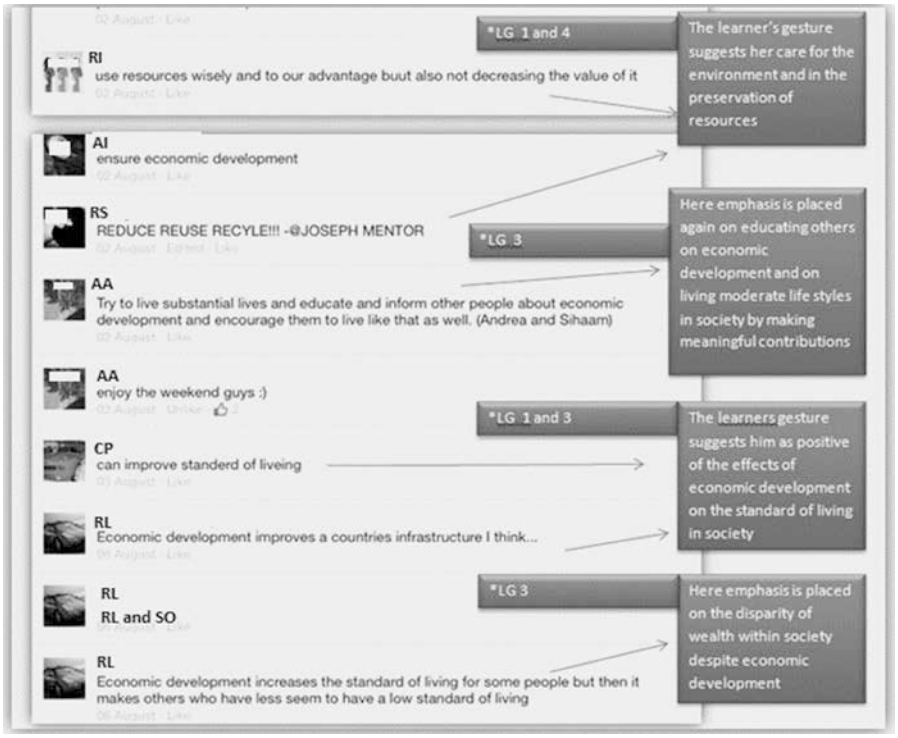
The students' critical awareness and understanding of economic development also increased in the sense that they could distinguish between pre-modern and modern societies on the basis that the former relied on people working together, whereas excessive individualism seems to be dominant in the latter – often resulting in a skewed allocation of desert; the haves want more profit through greed, and those who are marginalised seem to be excluded on the grounds of competition and the success of the former. In this regard, student AA (in screenshot below) remarked:



In the movie there are different types of societies, pre-modern and modern wherein they [people in different societies] both live substantial lives in the different economic societies. The San [considered as pre-modern people] would be self-sufficient working together to fulfil their needs and in the modern society everyone works individually to provide for themselves.



In addition to advocating that economic development has the asset of improving the living standards of people, the students also emphasised the importance of living modestly in terms of using resources and of addressing disparities and inequities in society. Student CP (in screenshot below) had the view that resources should be used to improve people's lives, whereas student RL (in screenshot below) advocated for the sharing of resources on an equitable basis, aimed especially at improving the lives of the less advantaged – that is, a clear vindication that the students had acquired some knowledge of economic development, and also had developed the skills to question and come up with suggestions on how contemporary challenges relating to resources could be attended to in terms of their equitable distribution amongst all people in society.



What caught the attention most during the analysis of the Facebook screenshots dealing with the issues of economic development was that the students' capacities to engage in deliberative encounters and to express their points of view autonomously, to the extent that they made informed suggestions, were most profound. Student JL (in screenshot below) stated that resources should be used and shared 'more wisely' – that is, equitably, and quite importantly, they (the students) expressed a serious concern for caring for resources.

Based on the aforementioned views of students in relation to economic development, it seems evident that some of the learning goals of the grade 11 economics curriculum had been practised in relation to articulating the importance of desert through an awareness of some of the goals of economic development. The fact that the students' understanding, skills, critical awareness and knowledge were enhanced in relation to processes, standards of living and the relevant distribution of resources is a manifestation that they had learnt to be responsive to an issue of social justice – that is, economic development. This claim is evinced by student LN's comment:

> I have become more [aware] of the living standards once I have seen the conditions poor people are living in. In order for living standards of people to improve, poverty needs to decrease in order for more residents to receive employment. Also through improving the of quality education by developing new universities, training colleges and so forth would subsequently improve employment. This improvement would result in people earning a decent wage or salary so that they would be able to provide for their basic needs.

In sum, the students offered insightful, deeply informed and responsible views on how economic development, with its emphasis on desert, can justly improve the living conditions of all citizens in society. The students not only showed a positive inclination to eradicating societal inequities, especially the unequal allocation of material resources and the obsession with greed and individualism, but also enacted a level of social justice in their deliberations with one another – that is, they shared

ideas, improved on one another's points of view, and even suggested responsible ways in which the lives of all people in society could be improved. In this way, the students were initiated into an education for social justice through the teaching and learning of economic development.

In sum, it has been shown that, through a discourse analysis of films, supported by asking probing questions on Facebook, the third author has provided sufficient evidence that suggests that an education for social justice can be taught and learnt in a school classroom in relation to the learning goals of economics: Firstly, an analysis of *An Inconvenient Truth* in relation to grade 11 economics learning goals indicated that people's need for control over resources can become too excessive, often resulting in exclusion and the inequitable treatment of especially vulnerable people in developing societies. Consequently, an education for social justice should not prejudice less powerful communities or put sustainable development at risk by inequitably distributing resources amongst people; secondly, an analysis of the film *Into the Wild* intimates that people should be afforded equality of opportunity in order to make sure that societal inequities are addressed; and thirdly, an analysis of *The Gods Must Be Crazy* vindicates the importance of economic development in ensuring the equitable distribution of resources in order to be responsive to the requirements of desert. So, inasmuch as an education for social justice was attended to through teaching and learning, it was made even more profound when the pedagogic encounters between the students and teacher took the forms of deliberation, inclusion, equal expressiveness, and an inclination towards social change – all aspects of an education for social justice.

In both case studies, students presented themselves through their comments on Facebook as learners who co-belong without any condition of belonging. Although they felt included in the pedagogic relations amongst themselves and their teacher, their inclusion was not conditional upon them agreeing to engender socially just relations. Rather, their pedagogic encounters occurred on the grounds that they wanted to come to speech through disrupting the forms of engagement within Facebook. And only by doing so could they draw unexpected and at times unimaginable conclusions about what constitutes both democratic education and its concomitant link with an education for social justice. Through embarking on different 'lines of flight' they could conjure up 'assemblages' of meaning that not only extended their forms of deliberation on the group sites, but also their understandings of an education for social justice. What has become quite evident from their engagement with educational technology is that they became situated within the discourse of educational technology and were not necessarily provoked to come to speech through technology. The pedagogic encounters through educational technology often culminated in deliberations, risk taking, disruption and the quest for the unimaginable that is yet to come – a matter of educational technology remaining in potentiality. This approach to educational technology is tantamount to engaging

in educational practices, unlike being technically driven by the mere ‘machinic’ understanding of technology that invariably has a bias towards instrumentalist thinking. It is to a closer examination of the implications of practicing educational technology that we, as encumbered beings, now turn our attention to the democratic potentiality of the practice.

CHAPTER 4

DEMOCRATIC EDUCATION IN POTENTIALITY

Towards an Expansive View of Risk Taking in Pedagogic Encounters

INTRODUCTION

As has been argued for thus far, democratic education has some connection with encouraging students to engage in dialogical relationships, engendering social justice practices aimed at eliminating the exclusion and marginalisation of students, and stimulating students to solve problems and to make pedagogic breakthroughs. We have found the aforementioned practices to be in consonance with an enhancement of student participation, collaboration and deliberation as they (the students) endeavoured (within educational technology as a practice) to find justifiable explanations for and understandings of educational issues. The dialogical relations the learners established through the Facebook discussions are very much in line with Habermas's view that democratic relations between people are constituted by virtues of self-determination or self-realisation and rational discourse (Habermas, 1997, p. 39). For Habermas, cultivating a rational discourse is about empowering people to decide on the rules and manner of their learning together in a self-determined way, thereby producing cooperative life practices 'centred in conscious political will-formation' (Habermas, 1997, p. 41). As confirmed by a student of life sciences: 'I mean [during] interval my group and I would sit down and talk about it [contentious issues] and ask for their opinions and insight into these topics.' The latter is a clear manifestation of the informed participation and enhanced deliberation that emanated from the case studies. For instance, in the first case, throughout the second and third cycles of inquiry, participation and engagement by the students and the teacher became very intense. Their debates and discussions (as is evident from the analysis of cycle two) and deliberations (with reference to the analysis of cycle three) confirm that the use of educational technology engendered opportunities for pedagogical activities to become democratised, as democratic action can be linked to deliberative engagement, which occurred particularly during the third cycle.

LEARNERS CONSTRUCT PERSONAL LEARNING CONTEXTS

It is evident that the practice of educational technology afforded the students an opportunity to construct personal learning contexts. The students posted impressive charts and diagrams that they had acquired in their Internet searches to construct their personal learning contexts as they endeavoured to make sense of and

debate and deliberate on educational issues. Such a notion of learning, by which students construct personal learning contexts, concurs with Deleuze's (1992, p. 3) understanding that, in 'societies of control', as opposed to 'disciplinary societies', people use 'new weapons' as they endeavour to enlarge their scope of action, that is their learning. In 'disciplinary societies', institutions like factories, prisons, nuclear families, hospitals and schools and universities function as enclosures that subject individuals to mechanical regimes and rhythms of control that are not always visible to those regulated by procedures of democracy, equal rights and justice (Deleuze, 1992, p. 4). In 'societies of control', people (students) never cease to learn as they take responsibility for their own learning and whose learning in educational technology is 'continuous and without limit' (Deleuze, 1992, p. 6). They learn by seeing things and making decisions for themselves, without being constrained by enclosure, for example by a teacher's view only. The fact that they constructed personal learning contexts shows that the students were not confined to specific enclosures within which they were subjected to surveillance, reward and punishment in the form of prescribed and closed lesson plans, tests and assessments. Rather, as is evident from the Facebook discussions and analyses, their learning was highly personal, contextualised and relevant to their own investigations as they endeavoured to construct and co-construct responses based on their own choices made through the use of the Internet and the discussions on Facebook. In other words, the personal learning contexts they constructed came about as a result of their own desires, or what Deleuze refers to as 'a production of desire' (Morss, 2000, p. 197). In our view, the students took control out of a desire to do so, without necessarily being disciplined or regulated to do so by the demands of prescribed curricula and the pedagogic authority of teachers. Although their teachers encouraged them to participate, as soon as they became familiar with the topic of investigation through their 'online' searches the students felt comfortable and inspired to continue participating on their own, without having been coerced to do so further. As aptly put by a life sciences student,

> Sir I think like sir played like a big role not many teachers do this like open learning into social learning which is like nice so I think sir has made like a mark in that there are other ways of being taught and I think sir has played a big role compared to other teachers that will speak to us like till like after matric.

Thus, the pedagogic opportunities that educational technology afforded the students in constructing their personal learning contexts corroborate the argument that the practice of educational technology enhanced democratic education.

LEARNING AS INITIATION INTO INDIVIDUAL AUTONOMY

By far one of the most poignant observations in the case studies was the self-determining way in which the students, both individually and as a group, became involved in solving problems in relation to pedagogic matters. In a way, the

students took responsibility for their own learning because of their desire to learn and their willingness to cooperate with others in shaping their ideas within the practice of educational technology. Simply put, they 'trusted the responsibility to decide for themselves' (Krejsler, 2004, p. 496). The students autonomously showed a keenness to learn more and to 'surf out' into spaces relating to pedagogic matters that genuinely excited and interested them. In other words, the students entered 'spaces of reflection and wondering' in the practice of educational technology (Krejsler, 2004, p. 499). This happened only after they had displayed the ability to think critically and to extend meanings when explicating curricular issues. Initially they seized the pedagogic spaces to think and act critically, which later stimulated their interest in acting autonomously. Through the enlargement of the students' autonomy, the third author's my role became more that of a consultant, guide, mentor, motivator or moderator. In other words, through ongoing dialogue with the students, the third author as teacher teachers offered regular guidance as they navigated the web in search of ideas that might substantiate their knowledge claims, eventually leading them to acquiring more autonomy. For instance, after having completed the first two cycles in the life sciences case study, they did research on the contentious issues and posted this on the Facebook group page. By being exposed to educational technology the students were constantly subjected to the temptation to 'surf out' into spaces on the Internet that interested and excited them in relation to constructing explanations for curricular concerns. In a way, their autonomy as students had been enlarged, giving rise to 'a self-deforming cast that will continuously change from one moment to the other, or like a sieve whose mesh will transmute from point to point' (Deleuze, 1992, p. 4). The latter kind of autonomy was confirmed by a student: 'Now I don't … have to ask someone first. I only started scrutinising once I knew what the topic was about.'

In addition, the analysis of the Facebook screenshots in the economics case study indicates that the students were prepared to act autonomously on the basis that they could come up with something in relation to understanding societal issues better. They showed evidence of having developed a critical understanding and awareness of sustainable development, economic development and equity, on the basis of which they were more informed of the social injustices that permeate the lives of human agents. The fact that they acted autonomously encouraged them, after their exposure to the three films, to search for information on how to interpret, see beyond the point at times, and come up with novel ways to challenge wrongs in society, whether these be hunger, poverty, inequality or privilege. In a way, they acquired a better understanding of the learning goals by demonstrating the knowledge they acquired, their critical understanding, their analytical skills, and their awareness of the inadequate living conditions of people and the urgency to address societal oppressions. An economics student SW remarked:

> My knowledge has vastly improved … I have learnt that even though we are on the right track we still have a long way to go … I think that the redress

> programmes that are in place are a good start but putting methods into place is not going to [be] sufficient. The hard work comes where you have to actually like go out there and fulfil what you started …

Clearly, student SW (like others) has developed a critical awareness of societal injustices, but equally acknowledges that awareness is insufficient if one wants to see real change in society. At least the classroom activities enhanced his autonomy so that he became critically aware of the injustices that need to be eradicated. Another student, SO, stated the following:

> … my knowledge of the economy, society and the markets has improved to the extent where I can now not only see and notice the changes in the economy and the current economic situations but I can also understand what the causes and consequences are. I have also learnt about these effects on everyday life.

Hence, the autonomous self as site of pedagogical struggle emerged as a major finding, as evidenced by the students' comments in relation to an education for social justice. The students not only realised the need for change, but also developed a critical awareness that enabled them to contribute towards change in their society. In this regard, cultivating in students a critical awareness in relation to the curriculum is a practice that resonates with Ryan and Ryan's (2013, pp. 245–246) notion of reflective learning that seeks to actively develop students' capacities to improving their pedagogic encounters (with teachers). Likewise, Gough (2009, pp. 271, 277) argues that economics education is not only about how humans survive in productive interaction with their environment, but is also aimed at enhancing their autonomy.

EQUALISING DELIBERATIVE PEDAGOGIC RELATIONSHIPS

Equal democratic relationships (following Rancière) depend on the contributions of those people (in this instance, students) who have no power in the social order, but who can disrupt modes of action to make things happen. To our mind, the students' contributions to the understanding of curricular matters (as corroborated by their insightful and critical contributions to the Facebook discussions) are a vindication of their capacity to speak their minds. They have shown that they possess an equal ability to speak, think and act in their efforts to create a learning environment in which they and others can adjust their views about education. Through their Facebook interventions they verified their 'intellectual equality' (Rancière, 1992, p. 59) to speak, understand, share and construct their opinions in collaboration with other students. Within the practice of educational technology, students were emancipated; more specifically, their learning was democratised in the sense that '[t]he process of emancipation is the verification of the equality of any speaking being with other speaking being[s]' (Rancière, 1992, p. 59). As

confirmed by a student: 'I think in a critical [and autonomous] way…I didn't just accept what others said, I stuck what I had to say and I didn't let criticism phase [i.e. faze] me.'

Considering that the goals of the pedagogic encounters are aimed at the cultivation of deliberation, inclusivity and equality, it can be claimed that the students engaged deliberatively – they listened to the views of one another and endeavoured to improve on their understandings of one another's points of view. For instance, in the economics case study, students tried to avoid dismissing one another's, at times, ill-informed views on sustainable development, economic development and equity as irrelevant, and always sought to find a way to engage the other constructively. The students also allowed one another sufficient time and opportunity to justify their points of view, without becoming hostile or impatient towards one another. Even the most ill-conceived views were not undermined so as to avoid being dismissive of one another. In offering their views on the films, the students considered themselves as equal co-learners as they endeavoured to enhance their critical awareness of social injustices. The fact that an education for social justice took root in the classroom is evidenced by student RVDR's comments: 'In my opinion learning about social justice in education is important because it makes everyone aware. It also educates others about equality; respect for one another in a socially just environment. It also facilitates a change towards a greater democracy within society.' Student CLP stated the following:

> … since I started economics [and through interpreting three films] … I began to reason things in a very different way. I started thinking about how things would affect others than just me. That would affect other peoples' lives and what I could do to make things better for other people and if I make life better for myself how would it affect someone else's life. Would it make it better or worse?

The desire to contribute towards improving someone else's impoverished social conditions on the basis of a deliberative exchange of ideas clearly weighed heavily on the students' minds, as is evident from their comments. On the basis of their exposure to the poor standards of living of others, the students became more aware that the only way to address the impoverished experiences of others would be along the lines of co-belonging in community with others – that is, inclusivity was realised as a way to attend to societal injustices. In this regard, it is worthwhile referring to Gough (2009, p. 281), who posits that education (for social justice) in relation to economics uniquely contributes to human wellbeing that is 'developmental, inclusive and democratic'.

BECOMING RHIZOMATIC IN THEIR THINKING

What emanated from the analysis of the student discussions and comments on the Facebook sites is that the students seem to have become agents of rhizomatic

thinking. In a Deleuzo-Guattarian fashion, explains Le Grange (2011, p. 745), rhizomatic thinking

> not only enables students to understand how phenomena/constructs become stabilized or normalised in society but also enables them to ascertain … what the vectors of escape are … [where] best can become worst and worst has the potential to become best through a process called deterritorialisation.

Vectors of escape, or lines of flight (a Deleuzo-Guattarian metaphor), refer to the multiple possibilities in which students constructed knowledge through Internet searches on curricular matters. Like the offshoots of a rhizome that forge links with other rhizomes, the students' thoughts were scattered and then scrambled together to form new assemblages of knowledge. When offering justifications for their views on curricular issues, the students happened to find themselves in 'deterritorialised' knowledge spaces where they departed from 'fixed' ideas, for instance about creationism, to produce new 'reterritorialised' knowledge through the rupturing of their 'old' thoughts (Le Grange, 2011, p. 747). In other words, their understandings of the contentious issues had been subjected constantly to what Le Grange (2011, p. 747) refers to as a 'rupturing or exploding into lines of flight', shifting the way in which they previously thought about the issues. Hence, their learning was influenced rhizomatically. In a way, practising educational technology offered the students an opportunity to go on a voyage on which they were challenged to bring into controversy their previous understandings of knowledge and never be quite sure what they would come up with. That is, the students' views on the curricular issues emerged as deterritorialised lines of flight that did not cease, 'but [branched] out and [produced] multiple series and rhizomatic connections' in becoming reterritorialised vectors of escape (Deleuze & Guattari, 1987, p. 15). As noted by a student: 'Facebook [is] definitely a new way of teaching and learning and it definitely helps us analyse everyone's viewpoints and what they believe and how they were taught in different ways in relation to how they analyse the topic.'

Moreover, in relation to the economics case study, the students' views of their critical understandings and awareness of sustainable development, economic development and equity in relation to the films are most poignantly summarised in the following comments by students:

> I have become more aware through educational skills and organisations within society [about injustices] and I also think that all citizens have an important role to play in improving the standard of living [of people] in society. I have learnt that education is the key to improving the standard of living of people because without it they won't have access to basic needs and also they won't be able to provide for their future … (student ST);

> Thanks to doing economics with you sir I am now more aware of the contemporary, economic, political and social issues around the world. Through your teachings I have learnt about sustainable development, globalisation and

> so forth. By learning about all these new and interesting things I can inform others of what is happening around the world. I can also influence people to start groups to fight for social justice and to lead to peace and combat global warming and so forth (student AD); and

> Mr. Waghid I think that one of the aims and designated goals of the new economics curriculum was to present the information in a manner that would allow students to form their own analytical and critical opinions about these issues. To a certain extent I think that the [economics] department has been successful in this respect, because now when I hear of these issues I am able to contribute relevant information whether in the classroom or outside (student DG).

What is evident from the aforementioned comments is that the students had developed an awareness and understanding of social injustices that need to be eradicated. They knew that they needed to disrupt the social inequalities, inequities, exclusion and oppressions that undermine the quest towards sustainable development, economic development and equity. They can be said to have acquired a sense of disruptiveness. In other words, they learnt to disrupt social injustices as a means to bring about change in both their classrooms (including the curriculum) and in society. In a way, the students internalised an opposition to privilege, oppression, exclusion and inequity. They became disruptive agents of change.

Furthermore, when the third author began with the case study on economics education, which focuses in particular on an analysis of film to discover students' understandings of an education for social justice, he had in mind initiating them into the learning goals of the economics grade 11 curriculum. He initially thought that the students would be too dependent on him and even find it too demanding to analyse films. To our surprise, he played a far lesser instructional role as a teacher in comparison with what we thought would be necessary. So, in a way, the teacher summoned the students to use their intelligence and to come to reason about the aforementioned issues. And they did – quite astonishingly we might add. In summoning them to use their own intelligence the teacher took a slightly different approach to teaching. He became less of a master educator who had to tell students things they were not aware of. Rather, he adopted the role of 'ignorant' teacher – a term we have borrowed from the French poststructuralist thinker, Jacques Rancière (1991) – who invited students to use their 'intellectual equality' to produce their own understandings of contemporary economic issues. The students did not just rely on the teacher's explanations and comments, but rather came up with their own independent, and at times collaborative, understandings of economic issues. They were reminded that they could come up with their own ways of seeing things and did not have to wait for the teacher's explanations. As student SA remarked: 'As an economics student we don't take things as it is, we ask questions and do research on economic issues. So economics has helped me analyse our country's economic

status and with my economics knowledge I can also understand it.' The third author (like the second author) therefore became more of an 'ignorant' (Rancière, 1991, p. 12) teacher who did not claim to know the answers to everything or that only his explanations were authentic.

DEMOCRATIC EDUCATION IN POTENTIALITY: CULTIVATING AN EXPANSIVE VIEW OF RISK TAKING

What can be inferred from the aforementioned is that educational technology is a practice within which students and teachers cultivate pedagogic encounters characterised by a central concern for risk taking. When students and teachers take risks they do so as deliberative beings who engage with one another; act as disruptive agents with the possibility that they can see things anew; and (re)construct and deconstruct meanings on the basis that multiple lines of flight can be pursued to produce assemblages of learning. Thus, in a pedagogic encounter where such risk taking is engendered, students and teachers remain in potentiality and can come up with whatever new and unimagined possibility. To our mind, such pedagogic encounters are constituted by an expansive form of risk taking. And, considering that their risk taking is deliberative, disruptive and in potentiality, it can be claimed that the encounter is underscored by a form of democratic education that remains in becoming (Agamben, 1999) – that is, the pedagogic encounter remains in a state of potentiality where nothing is final and complete. By implication, pedagogic encounters that are expansively democratic are constituted by actions that are profoundly deliberative, disruptive and rhizomatic. In the next chapter, we examine what the implications are for educational institutions such as universities and schools that endeavour to practice an educational technology through which human agents enact their pedagogic relations as situated beings unconstrained by the condition of belonging to this or that group, department, subject discipline or faculty.

CHAPTER 5

ON THE POTENTIALITIES OF PRACTISING EDUCATIONAL TECHNOLOGY IN EDUCATIONAL INSTITUTIONS

Expanding Risk Taking in Pedagogic Encounters

INTRODUCTION

Practising educational technology can engender in students a desire for learning, where desire refers to an autonomous and affirmative force that influences students' pedagogic (relational) encounters with other students and teachers (Zembylas, 2007, p. 334). For Deleuze and Guattari (1983, p. 28), desire is not restricted to a feeling or emotion such as pleasure or fantasy in dreams, but is a force that radicalises students into becoming deeply connected to other students in an assemblage that constitutes them. The practice of educational technology engenders possibilities for a critical understanding of knowledge and a desire to connect such an understanding of knowledge to wondering about what confronts students in relation to other students and teachers. As aptly put by Deleuze (1994, p. 192), cultivating in students a productive desire to learn (with educational technology we would add) means 'composing the singular points of one's own body or one's own language with those of another share or element, which tears us apart but also propels us in a hitherto unknown and unheard-of world of problems'. The students in the case studies disagreed as they endeavoured to justify their understandings of curricular issues, while they simultaneously were stimulated to wonder in search of unknown and unheard-of justifications for the issues that confronted them. In a way, they acquired (and hopefully would acquire) a productive desire to learn, that is to experience pleasure, engage with other students and take risks (Zembylas, 2007, p. 331), if curricular subjects were to be taught within the practice of educational technology. Consequently, it is advised that educational technology be practised so that students acquire a productive desire that will enable them to enjoy themselves, experience an assemblage of learning, and take risks in relation to their learning. Put simply, cultivating a productive desire for learning within educational technology can engender democratic spaces in classrooms in which students become deeply connected to one another.

ENHANCING RHIZOMATIC THINKING

By using educational technology, universities and schools should encourage students to become rhizomatic in their thinking. Rhizomatic thinking would not

only promote autonomous learning, but also propel learning into open, unrestricted assemblages that take students elsewhere than where they were before they learnt from within educational technology. In other words, learning would not be linear, and the students will never take a one-dimensional or unidirectional path to come up with a credible response to issues that confront them. Rather, in a Deleuzo-Guattarian way they would explore diverse possibilities to construct and co-construct assemblages of learning, where assemblages refer to 'provisional linkages of elements, fragments, flows, of disparate status and substance' (Grosz, 1995, p. 15). Following such a rhizomatic view of thinking, students would become disruptive agents in desired spaces of democratisation.

PRIVILEGING TRUST AND HUMOUR

In educational technology, teachers should become more concerned about privileging trust for themselves and for students if they hope to respond to the needs of students in their situated contexts. Ball (2000, p. 17) avers that the trust that traditionally underpinned pedagogic relations has been replaced by competition, to the extent that there now is a shift from an emphasis on collaborative work to a performative culture of producing only winners and losers in learning contexts. This performative culture in learning contexts (such as in universities and schools) has adversely affected learning, so that even humour, which can rupture competitiveness, has been eroded from pedagogic activities, such as in the classroom (Thompson, 2010, p. 8). Drawing on a Deleuzo-Guattarian view of humour, Thompson (2010, p. 9) argues that 'rueful humor' can be used as a strategy to 'dedividualize' competitive relations amongst students, as it can be rhizomatic – that is, 'it [humor] bubbles along through landscapes, throwing up connections and possibilities that are fluid and creative' (Deleuze & Guattari, 1987). In educational technology, pedagogic relations between students and teachers can bring the 'new weapons' of trust and humour back into the classroom in order to disrupt the performative culture of learning, and in turn can promote the critical and autonomous reflection that Deleuze and Guattari saw as possible in learning contexts.

DEMOCRATISING OR EQUALISING CLASSROOMS

The case studies in this book have confirmed the success of preparing students in classrooms for participation in democratic practices, and have shown that a classroom in which educational technology is practised is (and should be encouraged to be) a 'site of the symbolic visibility of equality and its actual negotiation' (Rancière, 1995, p. 55). When a classroom is regarded as a site of equality, the role of the teacher should be that of 'ignorant master' and 'amateur'. Following Rancière, Masschelein and Simons (2011, p. 162) point out that an amateur teacher does not only inform her students about the discipline, but also can inspire them to be 'present'. The teacher thus assumes that students are equal

in the sense that they are able to make sense of what the teacher 'puts on the table' (Masschelein & Simons, 2011, p. 163). In other words, a teacher as 'ignorant master' and 'amateur' does not consider himself or herself as the only authority who understands subject matter, but believes that students are equally able to do so and also generate ideas that confirm both their understanding and knowledge of the subject. This is what we have found to be the case in our analyses of students' comments on the Facebook sites. Students are afforded equal opportunities (chances) to become attentive to curricular knowledge and to make learning within educational technology possible and exciting. To this end, a classroom is a site where democratic moments can arise, such as when teachers and students 'are exposed to each other as equals in relation to a book, a text, a thing' (Masschelein & Simons, 2011, p. 164). Put simply, a classroom where educational technology is practised is a place where there is a possibility for movement within the restricted confines of a prescribed curriculum – that is, 'it is a place where knowledge and practices can be released and set free … a sphere in which something [learning] is in play' (Masschelein & Simons, 2011, p. 158).

ESTABLISHING INCLUSIVE SOCIAL JUSTICE INTERVENTIONS

Although we have attempted to show through the second case study that an education for social justice can assist in getting students to achieve the learning goals of the curriculum, we realised that the entire institution, including the teachers, students, parents and administrators, ought to be committed to a liberatory form of education. In other words, the entire institutional community ought to be willing to teach and learn about the integration of an education for social justice. Such a view of inclusive social justice education is shared by Carlisle, Jackson and George (2006, p. 61), for whom an education for social justice ought to engage students 'at their own level of understanding and actively seek connections with the communities in which their students live'. Inclusive social justice education has also been linked to student achievement (Carlisle et al., 2006). Therefore, in order for an education for social justice to take root in universities and schools, such an education has to become part of an inclusive initiative involving all relevant stakeholders.

ENHANCING SOCIALLY JUST TEACHING AND LEARNING

Very much in line with the thoughts of Lingard and Mills (2013, p. 233), the case studies in this book hold that teaching and learning, commensurate with an education for social justice can create an enabling condition for policies and practices that require substantive democratic and social change. Policy production would be enhanced if pedagogy within educational technology is attuned to the achievement of social justice and teachers are orientated towards the cultivation of such a form of education – that is, education for social justice through sustainable development, economic development and equity. In the words of Lingard and

Mills (2013, p. 233), '[s]ocially just pedagogies require well educated teachers who know the research literature, but mediate it through a careful reading of the demands and specificities of their students, classes, locale, and place and space of nation and globe'. And although the social justice initiative in the second case study has its limitations, such as the teacher having contrived many things to involve the students – for example, having made them do an assignment on education for social justice – the responses and participation of the students was overwhelmingly positive in relation to bringing social justice issues to the classroom.

Unlike the major study of Enterline, Cohran-Smith, Ludlow and Mitescu (2008, p. 267), which focuses on teaching teacher educators how to teach for social justice, this book offers a way in which teachers can initiate themselves into a discourse on education technology for social justice. In other words, learning to teach for social justice can be done with in-service teachers if they hold themselves accountable for the quality of students they prepare for society. Of course, learning to teach is a complex matter and ought to be constructed as a legitimate outcome of formal teacher education (Enterline et al., 2008, p. 267). However, teachers in service ought to orient themselves – especially in post-apartheid South Africa, where inequities and social injustices are still rife – towards learning to teach for social justice if their students were to challenge the inequities of institutions and society (Zeichner, 2005). Learning about social justice does not happen on its own. Teachers, in conjunction with students, ought to take the initiative in this regard.

Although the case studies reported on can be considered as a momentary disruption of the performative pedagogic activities in the form of assessments, examinations and high achievements into which students are initiated throughout most of their primary, secondary and higher education, it would not be entirely correct to assume that they would now become transformative agents that wish to break away from the traditional expectations of their education. Most of the students in the case studies acknowledged that their experiences were very positive. However, whether their learning would remain rhizomatic remains to be seen. In other words, this study offered a temporary rupture in the order of their learning, but it cannot be used as some form of generalisation that the same would be the case in their future learning. The students are still dictated to by a prescribed curriculum, authoritarian teachers, and an overwhelmingly disciplinary educational context. Following Deleuze and Guattari's (1987) position on societies of control, however, which they assert are made possible through new media (like Facebook), students are least likely to resist how they are controlled by new media – that is, they embrace it without resistance. But their immersion in Facebook simultaneously 'also [makes] top-down communication and the structures associated with it, if not impossible, then at least increasingly difficult' (Conley, 2009, p. 40). In other words, students are likely to remain controlled by current instances of pedagogical domination, such as examinations and assessments, but by engaging with educational technology (with its new forms of control) to support their learning, they, and teachers, will at least be connected in many ways to a continued possibility of escape. As confirmed

by Conley (2009, p. 43), educational technology can enable learners 'to occupy time and space in novel ways … [to] resist the dominant strategies creatively and to experiment with myriad rhizomatic connections'.

In addition, having bombarded the Facebook group site with endless comments, the students actually overloaded the site with a plethora of information and ideas that did not always invite favourable responses from other students. Not all the students were happy to go through all the comments on the Facebook group site, and they often were discouraged by the sheer volume of information on the site, which at times seemed trivial and unrelated to the curricular issues that were under investigation. Furthermore, anonymity could not always be maintained, as the Facebook screen shots reveal the identities and photographs of the participants. This can be an ethical dilemma, as the identities of participants are instantly revealed. However, with the establishment of trust and mutual understanding amongst teachers and students, the dilemma of disclosing participants' identities can be circumvented through an agreement not to open the Facebook site to the broader public.

SUMMARY

Educational technology opens up many possibilities for students and teachers to engage deliberatively and autonomously as equals in the learning and teaching process. In educational technology, teaching and learning can become profoundly participatory and engaging, autonomous and rhizomatic, and equal and amateurish. Engaging in educational technology can become democratic, as educational technology creates possibilities to bring students and teachers into a pedagogic space of play and attentiveness. In essence, educational technology invariably has the potential to democratise pedagogic encounters. This is so because educational technology offers creative and unprecedented possibilities for teaching and learning in the classroom – that is, possibilities that can further enhance educational research for social justice. However, what is evident from the notion of educational technology examined in the book thus far is that it is a practice with a political and, by implication, democratic potential to rhizomatise, disrupt and co-habituate pedagogic activities in classrooms at educational institutions. This can happen because educational technology not only has the potential to engender opportunities for socially just action, but also because it is inherently connected to the practice of risk taking. Simply put, educational technology can cultivate risk taking that draws pedagogic relations towards the realm of democratic action. This brings us to the next chapter, in which we look more closely at the notion of democratic educational technology as a risk-taking pedagogic opportunity for socially just action.

CHAPTER 6

EDUCATIONAL TECHNOLOGY AND SOCIALLY JUST PEDAGOGIC ENCOUNTERS

INTRODUCTION

In this chapter we tease out in more detail the notion of an education for social justice as a plausible justification for the practice of democratic educational technology that can risk-fully be enacted. Put differently, practising educational technology is itself a democratic endeavour that can be deliberative, disruptive, and rhizomatic – thus, remaining in potentiality. Education, or ways of engaging one another in the Aristotelian sense, has always been connected with the achievement of something morally worthwhile (Roland Martin, 2013). By implication it would not be inappropriate to connect education with the attainment of social justice – that is, a condition considered as morally worthwhile for society. This is so because justice cannot be considered as something harmful to society. A particular theory of education for social justice can be associated with the ideas of Jane Roland Martin (2013), who proposes education for social justice as an encounter. A theory of education as an encounter is concerned with both cultural transmission and individual learning (Roland Martin, 2013, p. 7). Whereas past philosophies of education tended to view an encounter as one dimensional, with an individual being seen as coming into contact with an external entity that changes the individual, Roland Martin (2013, p. 9) holds the view that an encounter involves both an individual changing the entities with which he or she comes into contact, and simultaneously being changed by the entities through the cultural exchanges that unfold. Thus one finds that twentieth-century British philosopher Michael Oakeshott's view on education is concerned with the world into which we as individuals are initiated, which is composed of skills, languages, practices and manners of activity out of which 'things' are generated (Roland Martin, 2013, p. 9). That is, the entities in which individuals are initiated change the individuals, and simultaneously the individuals themselves are changed by the entities – a matter of cultural exchanges that occur between individuals and other entities (Roland Martin, 2013, p. 9). Consequently, educational technology as an encounter unfolds when we interact with our cultural understandings with other entities more specifically other individuals. When the cultural perspective is missing, then a significant portion of the educational process is lost as well (Roland Martin, 2013, p. 9).

Moreover, Roland Martin's theory of education holds that education only occurs if there is an encounter between an individual and a culture in which one or more of the individual's capacities and one or more items of a culture's stock become yoked

(or attached) together (Roland Martin, 2013, p. 17). In essence, whenever capacities and stock meet and become attached to one another, then education occurs. In agreement with such a view of education, we contend that education for social justice should always be considered as an encounter amongst individuals, groups and/or other entities. This means that individuals and others bring to the encounter their capacities (for learning) and cultural understandings and, in turn, together shape the particular encounter. And when the aim of education is to achieve social justice, the capacities and cultural stock of individuals should invariably be geared towards attaining social justice. Hence, education for social justice has a better chance of being realised if treated as an encounter, on the basis that an encounter would be attached to both the capacities that individuals bring to change entities and their cultural stock. The change process that an individual undergoes when his or her capacities and cultural stock become yoked together is what is called learning (Roland Martin, 2013, p. 19). Now that we have explained education for social justice as an encounter, we need to expound more specifically on this notion of education for social justice.

Any attempt at expounding on education for social justice requires some further explanations of education and social justice respectively. We specifically examine the concepts education and social justice separately, because education for something (in this instance, social justice) implies that one understands what education is meant for. Therefore, looking at social justice would give one some idea of the intended aims of education. Previously we argued that education ought to be considered as an encounter. This encounter, we now posit, has to be aimed at achieving social justice. So, what does social justice involve? Crudely put, when one discusses the concept of social justice in particular, and argues that some policy or some state of affairs is socially unjust, we are claiming that a person, or category of persons, enjoys fewer advantages than that person or category of persons ought to enjoy in society (Miller, 2003, p. 1). Social justice is regarded as an aspect of distributive justice, where the latter, according to the philosopher Aristotle, is concerned with the fair distribution of benefits among the members of various associations (Miller, 2003, p. 2). The allocation of valued goods (money and commodities, property, jobs and offices, education, medical care, child benefits and child care, honours and prizes, personal security, housing, transportation, and leisure opportunities), and that of devalued goods (military service, degrading or hard work, and care for the elderly) depends on the workings of the major social institutions (Miller, 2003, p. 7). Also, as individuals we should be careful not to take the term ‘distributed’ within a literal context, but rather should look at Rawls’s ‘basic structure of society’, which is concerned more with the ways in which a range of social institutions and practices together influence the shares of resources available to different people (Miller, 2003, p. 11). There is no doubt that the state is the primary institution whose policies and practices contribute to social justice or injustice, since the state has a major influence on the shares going to each person by enacting property laws, setting taxes, organising the provision of health care and so forth (Miller, 2003, p. 11). However, the state itself would be

largely impotent if not for the collaboration of other major institutions and agencies (Miller, 2003, p. 12).

Central to any theory of justice will be an account of the basic rights of citizens, such as freedom of speech and movement, in terms of which people are empowered to deliberate and express their feelings with others in debates and discussions pertaining to particular topics at hand. One of the most contested and inextricable issues arising in debates about freedom is whether and when a lack of resources constitutes a constraint on freedom (Miller, 2003, p. 13). The issue of school fees poses a great challenge for many learners from disadvantaged backgrounds, and thus compels us to question how freedom could in fact be attained. Iris Young's rendition of social justice centrally requires 'the elimination of institutionalized domination and oppression', and distributive issues should be tackled from that perspective (Miller, 2003, p. 15). In this regard, concerns for personal autonomy and personal development are instrumental if people are to be empowered and make their own decisions. Power needs to be decentralised so as to allow people to make their own decisions in the pursuit of social justice. According to Miller, for society to be just it must comply with the principles of need, desert and equality, while institutional structures should ensure that an adequate share of social resources are set aside for individuals on the basis of need (Miller, 2003, p. 247). Social justice thus requires that the allocating agencies be set up in such a way that vital needs such as food, medical resources and housing become the criteria for distributing the various resources for each of the specific needs (Miller, 2003, p. 247). A main issue in social justice is economic desert, that is how people are rewarded for the work that they perform to encompass productive activities such as innovation, management and labour (Miller, 2003, p. 248). The reward for performance should serve as an incentive for the working class to improve productivity and efficiency. However, we find that certain rich and affluent schools are able to reward their teachers based on their performance academically and in terms of extramural activities, whereas schools in more disadvantaged communities are not able to offer the same reward due to a lack of resources. This gives rise to the question how social justice can be achieved in relation to economic desert within the context of resources available to affluent schools, and the lack of resources available to poor, disadvantaged schools. A third element of social justice is equality, in terms of which democratic citizens must be treated equally, enjoying their legal, political and social rights (Miller, 2003, p. 250). In essence, in order for social justice to be achieved, citizens must be treated equally, public policy should be geared towards meeting the intrinsic needs of every member of society, and the economy should be constrained and framed in such a way that the income and other work-related benefits people receive correspond to their respective deserts (Miller, 2003, p. 250). As teachers we need to constantly instil the underlying principles of social justice in our students to ensure that our future youth are able to enjoy a world in which economic, social and political boundaries no longer coincide, and in which people are given the freedom to be responsible and democratic citizens. Hence, if social justice were to be considered the desired outcome of education,

then educational technology has to be responsive to need, desert and equality – all aspects that make up social justice. Now that we have examined the notion of education for social justice, we shall next explore some instances in which education for social justice can be realised. These instances involve the following: sustainable development, economic development and equity.

INSTANCES OF EDUCATION FOR SOCIAL JUSTICE

Education for social justice is an encounter, as it involves both the capacities and cultural stock of people (individuals and groups) to enhance their responsiveness to need, desert and equality. Attending to people's need(s) and desert (rewards) and engaging them equally are considered to be ways in which social justice can be realised. We have identified three major instances in the literature in which the realisation of education for social justice along the lines of need, desert and equality seems to play a prominent role. These instances are the following: sustainable development, economic development, and equity. We shall now discuss the realisation of social justice in each of the aforementioned instances.

Education for Social Justice through Sustainable Development

The issue of sustainability in education as an instance of social justice has been argued for widely: Fien (2002, p. 143) holds the view that sustainable development can contribute to harnessing more informed understandings of 'principles of the Earth Charter' – environmental protection, human rights, equitable human development and peace – in relation to the achievement of justice through education; Stables (2002, p. 53) claims that sustainable development is a notion of (environmental) education that brings human reflexivity to a just dialogue with the environment; and Sauvé (2005, p. 30) posits that sustainable development makes explicit concerns for human development, the maintenance of life and the cultivation of social equity. In line with these views, we want to look more closely at the notion of sustainable development as an instance of social justice education.

Sustainable development (SD) is defined as measures put in place to meet the developmental needs of present generations without jeopardising or compromising the ability of future generations to meet their own developmental needs (GHK, 2008, p. 7). Also, SD does not focus solely on environmental issues, but broadly captures the different dimensions of development (Bonnett, 1999, p. 313; GHK, 2008, p. 7; Gough, 2006, p. 50). Moreover, education for sustainable development is regarded as a lifelong process, from early childhood to higher education, in which values, lifestyles and attitudes are established from an early age. It is considered a 'life-wide' process in which learning takes place, and subsequently where we as individuals take on different roles in society (Hargreaves, 2007, p. 223; UN, in GHK, 2008, p. 6). Furthermore, education is a prerequisite for promoting behavioural changes and for providing all citizens with the competencies required to achieve sustainable

development, where success in revising unsustainable trends depends largely on high-quality education (GHK, 2008, p. 6). Education and training should contribute to all three spheres of sustainable development, namely the social, economic and environmental spheres (GHK, 2008, p. 6; Lawson, 2005, p. 135).

In addition, social sustainability is concerned with building sustainable and harmonious communities and includes a compilation of actions and efforts to promote development that does not compromise or deplete the stock of human and social resources, but rather contributes to the enhancement of their potential (GHK, 2008, p. 10). A selection of thematic issues relating to the social pillar of sustainable development includes: health, community cohesion, social equity, demography, management of migration and cultural diversity, equal opportunities, flexicurity, and the development of human and capital skill (GHK, 2008, p. 11). The term economic sustainability is defined as the way to achieving economic growth whilst respecting environmental limits, discovering new measures and developing new methods of minimising environmental degradation, and conserving and preserving natural resources effectively and efficiently (GHK, 2008, p. 9; Scott & Gough, 2003, p. 12).

Sustainable businesses are seen as pillars of the economic sphere, and these businesses are constantly adapting their practices to the use of renewable resources and to acting in a socially responsible manner to protect the environment (GHK, 2008, p. 9; Scott & Gough, 2003, p. 16). A selection of thematic issues relating to the economic pillar of sustainable development include the following: sustainable consumption, sustainable production, corporate social responsibility (CSR), urban and local development, sustainable tourism, integration of environmental concerns in business decision making, and sustainable trade (GHK, 2008, p. 10). The goal of environmental sustainability is to minimise degradation of the environment and to reverse the process that leads to environmental degradation. The EU Sustainable Development Strategy (SDS), adopted in 2001, and the 6th Environmental Action Programme (6th EAP) identified a selection of thematic issues that often refer to the environmental pillar of sustainable development, including the following: climatic change issues, reduction of greenhouse gas emissions, biodiversity, energy efficiency, development of clean technology; conservation and management of natural resources, waste management, reduction of pollution, and sustainable transport (GHK, 2008, p. 9).

Since its international launch in New York on 1 March 2005, the United Nations (UN) Decade of Education for Sustainable Development (DESD) has made considerable progress in terms of concrete activities and actions on the ground, where progress has been made in both institutional and programmatic areas at the international, regional and national levels (Wals, 2009, p. 4). While the roots of ESD (Education for Sustainable Development) can be traced back to the early 1970s, its first flowering occurred at the United Nations Conference on Environment and Development (UNCED), also known as the Earth Summit, held in Rio de Janeiro in 1992 (Elliot, 2013, p. 17; Wals, 2009, p. 7). The UNCED resulted in a landmark

publication agenda called Agenda 21, which provides a comprehensive plan of action to be taken globally, nationally and locally by UN agencies, governments and major organisations (NGOs, CSOs and networks) to reduce the human impact on the environment (Wals, 2009, p. 7). Chapter 36 of Agenda 21, on education, training and public awareness, for which UNESCO was designated as task manager, identifies four overarching goals, namely promoting and improving the quality of education, reorienting the curricula, raising public awareness of the concept of sustainable development, and training the workforce (Elliot, 2013, p. 16; Gough, 2006, p. 51; Wals, 2009, p. 7). The rationale for Education for Sustainable Development is to build a global society in which everyone has the opportunity to benefit from education and to learn the values, lifestyles and behaviour required for a sustainable future and for positive societal transformation (United Nations Development Programme [UNDP], 2011, p. 1). And, considering that societal transformation is a desired goal of sustainable development, one can safely claim that sustainable development is a way in which social justice manifests in society, considering the latter's insistence that societal transformation should ensue. In line with such a view of societal transformation, Bell (1997, p. 3) avers that such transformation cannot be delinked from an education for social justice. Such an education insists that students play an active role in their own learning, and that they collaborate with teachers to establish empowering, democratic and critical educational environments. In addition, Bell (1997, p. 3) highlights the importance of sustainable development as an instance of education for social justice by arguing that the goal of such an education 'is [the] full and equal participation of all groups in a society that is mutually shaped to meet their needs'. And, considering that the issue of need is constitutive of social justice, education through sustainable development 'should be democratic, participatory, inclusive and affirming of human agency and human capacities for working collaboratively to create change' (Bell, 1997, p. 3).

Moreover, through the promotion and improvement of the quality of education, the aim is to refocus lifelong education on the acquisition of the knowledge, skills and values needed by all citizens to improve their quality of life (Elliot, 2013, p. 23; Wals, 2009, p. 7). Education, from pre-school to university, must be rethought and reformed to be a vehicle of the knowledge, thought, patterns and values needed to build a sustainable world (Elliot, 2013, p. 25; Wals, 2009, p. 7). Also, by means of public awareness of the concept of sustainable development the development of enlightened, active and responsible citizens locally, nationally and internationally, and in training the work force will hopefully ensue that could gear citizens to adopting sustainable modes of production and consumption (Elliot, 2013, p. 27; Wals, 2009, p. 7). These overarching goals have been re-emphasised in the DESD in the context of sustainable development by emphasising the role of education and learning. The vision of the DESD is to see that every citizen in society benefits from education and learns the values, behaviours and lifestyles required for positive societal transformation and a sustainable future (Wals, 2009, p. 8). This vision of the DESD has been translated into four objectives, namely facilitating networks,

linkages, exchange and interaction among stakeholders in education for sustainable development (ESD); fostering increased quality of teaching and learning in ESD; aiding countries in progressing towards and attaining the Millennium Development Goals (MDGs); and providing countries with new opportunities to incorporate ESD into education reforms (Wals, 2009, p. 8). Bearing in mind that ESD is geared towards cultivating an active, enlightened (reasonable) and responsible citizenry, education for social justice would be possible because activeness, reasonableness and responsibility are plausible and sustainable human encounters.

The implementation of the DESD by the United Nations called for a number of actions to be implemented in order to realise this vision. These actions included catalysing new partnerships with the private sector, media and youth groups; sharing good education for sustainable development practices; linking member states that have developed or have the desire to develop ESD curricula, policies and research; and establishing an agenda for ESD research and a framework for monitoring and evaluating the decade (Elliot, 2013, p. 29; Wals, 2009, p. 8). Despite the challenges of sustainable development and the call for ESD from a global perspective, there is a general understanding that the concept 'unsustainability' is deeply rooted in local histories and in political and cultural traditions. Regional strategies for the development and implementation of ESD have been developed in each of the UN-defined regions, namely sub-Saharan Africa, Asia and the Pacific, Latin America and the Caribbean, Europe and North America, and the Arab states (Wals, 2009, p. 17).

Africa is the poorest of the UN-defined regions and is constantly faced with challenges to achieving a sustainable environment. The African states need to recognise that human development is closely linked to health and wellbeing, education and living standards, and when one looks at the overall performance of Africa the continent has not been progressing successfully in any of the three critical dimensions of achieving a better quality of life (Dincer & Rozen, 2013, p. 19; Wals, 2009, p. 17). Changing social structures, vulnerability to climate change, lack of nutrition and the impact of the HIV and AIDS pandemic continue to pose a threat to African states, and the institutional capacity to face these challenges is quite limited (Dincer & Rozen, 2013, p. 21; Wals, 2009, p. 17). The majority of Africans from rural areas are dependent on the use of natural resources for sustaining their livelihoods; the degradation and loss of these natural resources reduces the livelihood of these African communities and prevents sustainable development (Dincer & Rozen, 2013, p. 22; Wals, 2009, p. 17). Another challenge faced by African states is the major capacity gap, which presents a significant obstacle to achieving sustainable development in Africa (Wals, 2009, p. 17). By implication, African states need to re-orientate education towards sustainable development by boosting the quality and efficiency of human capacity development initiatives, such as education, training, community development and public awareness programmes, to address governance efficacy and the importance of education in development and poverty alleviation (Jickling & Wals, 2008, p. 4; Wals, 2009, p. 17). The issue that needs to be addressed

is education in terms of quality, and not only quantity – ensuring that as many students as possible are enrolled at schools and universities – as the latter would mean very little if students are not provided with quality education. ESD also has the potential to contribute significantly to the quality of educational programmes, and this needs to be explored proactively in Africa (Jickling & Wals, 2008, p. 5; Wals, 2009, p. 17). One way of enhancing the quality of education is by improving relationships between teachers and students.

Schools and universities are seen as the key institutions that can develop capacities in a structured environment to help address a wide range of socio-economic issues, such as poverty, health, environmental sustainability, climate change, biodiversity, peace and conflict (Jickling & Wals, 2008, p. 7; Wals, 2009, p. 48). In this regard, our argument in and about educational technology in this book, focusing on cultivating improved teaching and learning, is quite salient. Sustainable development (SD) needs to be addressed in curricula, and at the same time to be seen as an integrative, cross-cultural theme that could bring together many of the underlying issues that schools already face (Gough & Scott, 2007, p. 14; Wals, 2009, p. 49). What needs to be noted is that key themes such as the Millennium Development Goals (MDGs), disaster prevention and corporate social responsibility (CSR) are emphasised less in the present school curricula of certain African countries. This is quite alarming, since these particular themes play a fundamental role in the attainment of SD. Rich, developed countries tend to be less perturbed about addressing SD in their curricula, whereas poorer, developing countries appear to stress the socio-cultural dimension of SD, which include topics such as peace, citizenship, ethics, equality, poverty reduction and cultural diversity (Gough & Scott, 2007, p. 16; Wals, 2009, p. 49). The latter themes are relevant in cultivating awareness through curricular activities in and about sustainable development, and hence more specifically about education for social justice.

In those countries that include ESD in teacher education and professional development, ESD is addressed mainly through existing subjects and occasionally in cross-curriculum approaches in primary and secondary institutions (Lotz-Sisitka, 2006, p. 12; Wals, 2009, p. 50). Analyses of those countries that adopt an ESD approach show that professional development practices also are increasingly common in higher and vocational education, where the measures adopted range from national seminars on ESD, training workshops, regional seminars and the production of guides to the piloting of projects and refresher courses (Gough, 2006, p. 48; Wals, 2009, p. 50). However, these activities depend on the existence of teacher training institutes and universities offering training courses, as well as the participation of teachers in postgraduate courses covering some aspects of ESD (Lotz-Sisitka, 2006, p. 14; Wals, 2009, p. 50). The rise of ESD in education is leading to innovation in teaching and learning, where teachers are adopting new methodologies and pedagogies to entice students to adopt a critical understanding of ESD in society.

In essence, in this book we are concerned primarily with ESD (within educational technology) as an instance of education for social justice that connects with cultivating

pedagogical activities aimed at making students and teachers aware of some of the socio-cultural dimensions of SD, in particular emphasising the importance of human coexistence through peace, citizenship, ethics, equality, poverty reduction and cultural diversity. As aptly put by Bell (1997, p. 4), education for social justice cannot be blind to the equitable distribution of resources (a matter of addressing need) and student empowerment in the service of sustainable social change – a view supported by Schreuder, Reddy and Le Grange (2002, p. 133) and Gough (2006, p. 49). This brings us to a discussion of economic development as an instance of education for social justice.

Education for Social Justice through Economic Development

Development can be regarded as 'a process of improving people's lives' (Kabuya, 2011, p. 2). In sub-Saharan Africa, development should involve 'the ability to meet basic needs and to sustain economic growth, alleviation of poverty, creation of wealth, and economic freedom … a change in living standards, quality of life, women's status and a change of people's attitude to work' (Kabuya, 2011, p. 2). Considering the aforementioned, economic development (in Africa) has to be a measure for gauging the economic wellbeing of the population and ought to reflect the economic output (for example agricultural and industrial), infrastructure (for example power and transportation facilities), physical health and level of education, and cultural, political, legal and economic differences in governance (Kabuya, 2011, p. 2). Bearing in mind that economic development has to do with the economic wellbeing, output, infrastructure, health, education, political and cultural aspects of people's lives, development also depends on how well the aforementioned are managed. In other words, economic development depends on 'good governance' (Kabuya, 2011, p. 2). Moreover, literature on development abounds and the following view on development stands out: Development is economic development, and the latter is equated with economic growth. Development is considered as 'good change' in the realm of ecology, economics and all spheres of societal, political and cultural life (Chambers, in Ngowi, 2009, p. 260). Other views include the following: Seers (in Ngowi, 2009, p. 260) posits that economic development means creating conditions in which to realise human potential, reduce poverty and social inequalities, and create employment opportunities; secondly, Todaro (in Ngowi, 2009, p. 260) views economic development as bringing about major changes in social structures and national institutions, accelerating growth, reducing inequality and eradicating poverty; thirdly, Zdeck (in Ngowi, 2009, p. 261) views economic development as creating jobs and assets, establishing an investment climate in distressed communities, and providing access to quality education, social services and decent housing; fourthly, Ngowi (2009, p. 260) views economic development as a dynamic and fluid process that involves growth and change in relation to improved performance of the factors of production and production techniques. For this book, our interest is in economic development as a process of improving the

living conditions of people (such as better housing, health care, education and job opportunities), protecting the environment and people, and enhancing the political and social wellbeing of people. Thus, economic development can be considered as an instance of an education for social justice.

Educational technology and the quality of schools and universities can be linked widely to development, in terms of which the impact of secondary and higher education on the economy can be based on the quality of teachers. Aspects such as student performance – creativity, the ability to work in teams, or personality traits – should be the focus of attention, particularly where using basic cognitive skills that can ensure economic returns as the monetary reward needs to be affirmed by teachers (Hanushek, 2004, p. 59; Hanushek & Woesmann, 2008, p. 607), That is, teachers need to emphasise to students that their performance in learning, in addition to having a meritocratic end, should also be geared towards enhancing their economic status. The underlying idea of economists on the economic outcomes of human capital is that individuals make investment decisions in themselves through education, from which the accumulated skills that are relevant for the labour market over time represent an important facet of human capital development (Hanushek, 2004, p. 60; Hanushek & Woesmann, 2008, p. 609). In the same way that a firm's investment in physical capital reaps returns in the form of income, so does the investment in human capital hopefully return future economic benefits (Hanushek, 2004, p. 60; Hanushek & Woesmann, 2008, p. 611). It is commonly presumed that formal education is one of several important contributors to the skills of an individual and to human capital, and that parents and public officials are seen as trustees of their children in setting many aspects of their investment paths (Hanushek, 2004, p. 61). Schools and universities undoubtedly have a special place in society because they are most directly affected by public policies and thus are seen as havens for the growth of the future leaders of society (Hanushek, 2004, p. 61; Hanushek & Woesmann, 2008, p. 613). The point is that, without education (and we would add, educational technology), economic development is just not possible in the modern age.

The future incomes of people also are related to their past investments, and do not only amount to their income while at school, or in their first job, but rather their income over the course of their life (Hanushek, 2004, p. 61). Research has shown that quality of life (such as having employment, housing and medical care) is directly related to individuals' earnings, productivity and economic growth (Hanushek, 2004, p. 62; Hanushek & Woesmann, 2008, p. 615). In other words, the quality of the labour market is closely related to individual productivity and earnings. There also is substantial evidence that learners who perform well at school tend to achieve at higher education levels (Hanushek, 2004, p. 62). Thus, education is directly linked to economic development, and so should the practice of educational technology be. It is economic growth that determines how much improvement will occur in the overall living standards of a society. The education of each individual furthermore has the possibility of making others better off, and in essence a more educated society may contribute to higher levels of invention

and higher rates of productivity through improved production methods, and may give rise to the rapid introduction of new technologies to accelerate economic development (Hanushek, 2004, pp. 62–63).

In the main, student performance at schools and universities can engender considerable benefits for society. Therefore, improvements in local institutions will yield direct benefits for local economies, as local economies benefit greatly from a more educated labour force, leading to higher local growth (Hanushek, 2004, p. 69). With enhanced economic gains, many educational institutions could become more self-sufficient in providing better education for students, as sufficient economic resources will be available to cover the expenditure at these institutions. There also is evidence that suggests that improvement in the quality of the teaching force is central to any overall improvements, including learning. However, improving the quality of the teacher force, in Africa for instance, would certainly require a new set of incentives relating to hiring, retention and remuneration (Hanushek, 2004, p. 70).

Education is widely accepted as a leading discourse for promoting economic growth, and educational technology is particularly important for a continent such as Africa, where economic growth is essential if the continent is to overcome the vicious cycle of poverty (Bloom, Canning, & Chan, 2006, p. 1). For decades, development agencies have neglected tertiary education as a means to improve economic growth and mitigate poverty in favour of primary and secondary education (Bloom et al., 2006, p. 1). Enrolment rates in higher education in sub-Saharan Africa are by far the lowest in the world, with the gross enrolment ratio in the region standing at only 5% (Bloom et al., 2006, p. 1). From 1985 to 1989, 17% of the World Bank's worldwide education sector spending was on higher education, but from 1995 to 1999, the proportion allotted to higher education declined to 7% (Bloom et al., 2006, p. 1). However, recent evidence suggests that higher education is a determinant as well as a result of income, and can produce public and private benefits, such as greater tax revenue and increased savings and investment, and may lead to a more entrepreneurial and civil society (Bloom et al., 2006, p. 1). Higher education also can improve a nation's health, reduce population growth, improve technology and strengthen governance (Bloom et al., 2006, p. 1).

The importance of advanced education has begun to be recognised by the international development community, while a few African states also have begun to introduce innovative policies to strengthen tertiary education systems (Bloom et al., 2006, p. 15). Tertiary education can help economies to keep up or catch up with more technologically advanced societies, in which higher education graduates are more likely to be aware of and better able to use new technologies (Bloom et al., 2006, p. 15). These higher education graduates are more likely to develop new tools and skills themselves, and their knowledge also can improve the skills and understanding of non-graduate co-workers and entrepreneurship, which may lead to job creation (Bloom et al., 2006, p. 15). Tertiary education could benefit economies by producing qualified teachers who can enhance the quality of primary and secondary education

systems; training physicians and other health workers to improve society's health, raising productivity and work; nurturing governance and leadership skills to provide countries with the talented individuals needed to establish a policy environment favourable for growth; setting up robust and fair legal and political institutions and developing a culture of job and business creation; and addressing environmental problems and improving security against internal and external threats (Bloom et al., 2006, p. 16). Research shows that, in sub-Saharan Africa, the current production level is about 23% below its production possibility frontier, and that a one-year increase in the tertiary education stock in the region would raise the GDP per capita by 12.2% (Bloom et al., 2006, p. 1). The growth rate of GDP per capita would rise by 0.24 percentage points in the first year as a result of convergence on a higher education state (Bloom et al., 2006, p. 1).

In recent years, the World Bank and major donor governments have begun to reconsider their exclusive focus on primary education and are now placing greater emphasis on secondary and tertiary education in an effort to achieve higher economic growth and to eradicate poverty. There are signs of progress that suggest that sub-Saharan African states have put measures in place to strengthen tertiary education systems, but this progress is limited in comparison with that in other world regions (Bloom et al., 2006, p. 1). Higher education may benefit individuals as well as societies through the democratic development of informed citizens and through the promotion of social inclusion and cohesion. It is through non-monetary societal gains that it becomes apparent that there are lower rates of crime, greater and more informed civic participation and improved performance across a host of socio-economic measures in societies in which there are high proportions of university graduates (Malaza, 2013, p. 1). There also is increasing evidence that suggests that universities in Africa are seen as training grounds for democratic citizenship (Malaza, 2013, p. 1). High participation rates in higher education seem to be linked to greater productivity of workers, which translates into improved outputs and outcomes for the knowledge economy (Malaza, 2013, p. 1). High levels of education are associated with a country's innovative capacity and the development of many key technologies (Malaza, 2013, p. 1). Therefore, to ensure that learners gain access to higher education institutions, secondary education should provide a stronger learner clientele that can enter these institutions. The possibility for economic development in societies then will be far greater than without students who never gain access to the higher education level.

Research has shown that rich, resourced nations devote inadequate attention to expenditure on public education, and this inadvertently has resulted in poor enrolment in schools and universities (Gylfason, 2001, p. 850). Consequently we find that the OPEC countries send 57% of their youth to secondary schooling compared to 64% in the world as a whole, and on average spend a mere 4% of their gross national product (GNP) on education, compared with nearly 5% in the rest of the world (Gylfason, 2001, p. 851). Education stimulates economic growth and improves the lives of people through increased labour-force efficiency,

democracy, good governance and improved health, and by enhancing equality (Gylfason, 2001, p. 851). Public expenditure on education varies a great deal from country to country, and in the 1990s we find that countries such as Haiti, Indonesia, Myanmar, Nigeria and Sudan spent as little as 1% of their GNP on education, whereas others (Namibia, Botswana and Jordan) spent between 8% and 10% of their GNP on education (Gylfason, 2001, p. 852). What needs to be taken seriously is that public expenditure on education may be supply led and of mediocre quality, failing to ensure efficiency, equality and growth, compared to private expenditure on education, which is demand led and thus perhaps likely to be of a higher quality (Gylfason, 2001, p. 851). Likewise, research has confirmed that workers leaving primary industries such as agriculture, fisheries, forestry or mining generally have limited labour market education to offer new employers in other industries, with exceptions in modern agriculture and high-tech oil-drilling operations (Gylfason, 2001, p. 856). We thus find a shortage of highly skilled labour and capital in these primary industries, reinforcing the need for investment in educational technology and training as an engine for growth, as improved education – such as educational technology – would shift the comparative advantage away from primary production towards manufacturing and services, thereby accelerating learning and growth (Gylfason, 2001, p. 856). It is evident from the literature that countries rich in natural resources are also at risk. Firstly, too many people become locked in low-skill, intensive natural resource-based industries, failing to enhance their education, as well as their children's education and earning power (Gylfason, 2001, p. 858). Secondly, authorities and other inhabitants of resource-rich countries become overconfident and therefore tend to underrate and overlook the need for quality education and good economic policies (Gylfason, 2001, p. 856). What we have shown is that economic development at a sustained level is intertwined with education for social justice on the grounds that the former (economic development) is linked to improving both the capacities and skills of people (including taking into account their cultural stock). On the one hand, education for social justice in relation to economic development has in mind what bel hooks (2003) refers to as enhancing the cognitive abilities of students to attend to social inequities by becoming more critical and self-reflective, say within educational technology. On the other hand, hooks (2003) intimates that, through their criticality and self-reflexivity, students can become effective change agents in the classroom and in their communities, specifically in relation to the issues of privilege and dominance, which, as we have argued, often work against the desert (equitable distribution of wealth and resources) people should enjoy collectively. She argues that, unless privilege and dominance are critically reflected on so as to prevent all people in society from receiving their desert, oppression and marginalisation would persist (hooks, 2003). Hence an education for social justice in the form of economic development aims to cultivate critical awareness and capacities in students and teachers to know that an abuse of privilege and dominance will perpetuate social injustices.

CHAPTER 6

EDUCATION FOR SOCIAL JUSTICE THROUGH EQUITY

As we have shown throughout this book, democracy and education are intricately linked with social thought and practice, as democracy, in all of its contemporary and historic forms, has played an important role in shaping public education (Kurth-Schai & Green, 2008, p. 1). Historically, education and democracy have evolved in response to rapid urbanisation, globalisation, cultural diversity and economic growth (Kurth-Schai & Green, 2008, p. 1). Through the dynamic prowess of educational technology, teachers have been able to adopt new methodologies of teaching, in relation to which the Internet has been an important medium for both teachers and learners, allowing for ease of communication between the parties or for interactive and creative lessons in class. If one looks at the American democracy, and specifically at deep democracy as an embodiment of American society in its fullest capacity, it (deep democracy) advocates both social and civic life (Kurth-Schai & Green, 2008, p. 3). Public education grounded in deep democratic principles and values provides direct experience along with the practices of collective engagement, in which young, democratic citizens are to enact complex processes of teaching and learning that would lead to deliberative competence, inclusive participation and social imagination in social transformation (Kurth-Schai & Green, 2008, p. 3). A classroom that encourages democratic principles and values would allow students to deliberate with their peers, teachers, parents and other members of society, which is important for inclusion, and hence for social justice in education (Glass, 2009, p. 10).

A deep democracy is radically social, compellingly aesthetic and persistently exploratory, criteria that are inherent in a good society and are long-standing aspirations for a social order that supports the establishment of justice (Kurth-Schai & Green, 2008, p. 5). Politics and education, at all levels, involve dominant elites and special interest groups and, with an overreliance on these established patterns, only supports isolation and exclusion, structures a narrowed discourse and establishes forms of opposition in schools, universities and society (Kurth-Schai & Green, 2008, p. 5). The state needs to distance itself from these dominate elites and special interest groups so as to ensure a more democratic education system, free from isolation and exclusion. Developing a deeper set of democratic processes through the broad engagement of school-age, youth, adult citizen and disadvantaged groups to support border crossings between disparate positions and expectations would expand the number of active participants across their lifespan and at all stages of social enquiry, decision making and implementation (Kurth-Schai & Green, 2008, p. 6). Deep democracy requires persistent collaboration in teaching and learning to support principled risk taking, maintain openness and yield adaptive responses, as deep social inquiry requires creativity, vision and deliberation over caution, constraint and convenience of closure (Kurth-Schai & Green, 2008, p. 6). The fulfilment of deep democracy's transformative purpose requires continuing innovation in civic education, which must emphasise pedagogies that support movement beyond the illusions of convenience, convergence, certainty

and control (Kurth-Schai & Green, 2008, p. 7) – a matter of enhancing education for social justice, as democratic education is a matter of pursuing an encounter. Teachers need to adopt pedagogies that encourage students to be active participants in the classroom, thus empowering these democratic citizens and preparing them for their roles in society (Dewey, in Glass, 2009, p. 11).

Civic education for a deeper democracy should also engage a diverse set of pedagogies that must extend collective wisdom concerning significant social issues; expand possibilities for thought and action beyond those initially brought by individuals; enrich relationships by increasing the number and variety of meaningful connections among diverse participants; and enhance capacities for continued engagement in civic learning and public life that narrow the gap between democratic aspirations and real-world accomplishments (Kurth-Schai & Green, 2008, p. 7). A more inclusive, aesthetically and exploratory informed public education broadens opportunities for richer experiences of a democratic life (Kurth-Schai & Green, 2008, p. 7). Thus a more inclusive education encourages greater equity and hence social justice in society, so that every participant in the education system has an equal right to quality education.

There is a general – and impossible and undesirable statement – that the aim of public policy cannot and should not be equality in terms of which everyone is the same or achieves the same outcomes (Levin, 2003, p. 5). A commitment to equity should rather be attributable to quality in terms of education in order to bridge the gap in terms of the quality of education between more affluent schools and poorer schools. Thus, if students coming from poorer schools are provided with the same quality of education as that provided in richer schools, then the opportunity for a more just society can exist. Learning is seen as vital to countries' economic development and, more importantly, to their social cohesion and quality of life (Levin, 2003, p. 5). The average amount of education and, more importantly, the distribution of education across the population, are of the utmost importance to any nation (Levin, 2003, p. 5). Equity in education is important for several reasons. Firstly, it is a human right for all citizens to have a reasonable opportunity to develop their capacities and to participate fully in society (Levin, 2003, p. 5). If learners are given the opportunity to better themselves through quality education, it paves the way for them to create opportunities for themselves in the workplace as responsible and democratic citizens. Secondly, insofar as opportunity is not distributed fairly there will be an underutilisation of talent (Levin, 2003, p. 5). Societies bear the brunt of this, as these individuals are not able to develop their skills and abilities. As a result, societies lose many teachers, doctors, scientists and other professionals. Thirdly, high levels of education are associated with positive outcomes, such as improved employment and earnings, but also health, longevity, civic participation and so on (Dearden, Reed, & Van Reenen, in Levin, 2003, p. 5). Fourthly, social cohesion or trust is itself an important factor supporting successful countries (Levin, 2003, p. 5).

Based on the literature there are two underlying dimensions of equity. The first dimension deals with whether the overall levels of provision are sufficient and of the right kind, where the specific nature of these concerns varies with the level of education and with the life stage of the learners (Levin, 2003, p. 7). When looking at schooling in particular, universal access is provided, but inherent concerns exist about equality in education, and in particular the provision of special education or the distinction between general and vocational education (Levin, 2003, p. 7). The transition from education to work, and the overall availability of work for young people and their relative wages, are of the greatest concern (Levin, 2003, p. 7). We find many graduates unable to find work because of a shortage of jobs, particularly in South Africa. The minimal wages offered to young recruits at the grassroots level begs the question whether there is equity in the distribution of income among individuals in the workplace.

The second dimension is concerned with the participation and success of learners from particular ethnic groups (indigenous people and immigrants) that have tended to experience lower levels of participation and success in all areas of education (Levin, 2003, p. 7). Family socio-economic status remains the strongest predictor of educational attainment, and attention is particularly needed in the most disadvantaged segments of society (Levin, 2003, p. 7). During the regime of the apartheid government, many black individuals were marginalised, as they were not allowed to gain access to affluent high schools. Up to today we still find this level of marginalisation in terms of education, where students from poor and disadvantaged areas are unable to gain access to richer schools because of not being able to meet the high demands of these schools in terms of the exorbitant school fees charged. The state needs to address this concern so as to ensure that society is more equitable and just. Gender represents an equity dimension that is significantly different from the other two dimensions, because female achievement has equalled or surpassed that of males in many areas of education and in many countries (Levin, 2003, p. 7). However, gender equity remains of great concern, as women are still disadvantaged in the labour market and are still unequally represented in many areas of study and in many occupations (Levin, 2003, p. 7).

The state needs to address the issue of gender equality to ensure that there is equity in the labour market. Historically there have been two main approaches to addressing equity in education. The first approach focuses on what is called ‘equality of opportunity’, where access to education is critical and where it is the responsibility of the state to provide opportunities to participate (Levin, 2003, p. 8). The second approach is concerned with equity in the results of education, such as graduation and access to employment (Levin, 2003, p. 8). However, providing the same opportunity is not enough, because different people will need different kinds of opportunities and some people will need more support in order to be successful (Levin, 2003, p. 8). The state therefore needs to deal with the issue of when the outcomes of education are in fact inequitable. There is great concern about the marginal impact of money in terms of whether or how much more money would

make a noticeable difference to education (Levin, 2003, p. 10). There are both empirical and theoretical reasons underpinning the fact that the input of additional resources is more likely to produce diminishing marginal returns (Levin, 2003, p. 10). That is, once a certain level of education is being provided, simply spending more would be unlikely to lead to equivalent or greater returns in outcomes (Levin, 2003, p. 10). The classic economic question of efficiency thus gives rise to the question of what kinds of inputs are more likely to produce the most value in terms of outcomes (Levin, 2003, p. 10). The question that needs to be asked is whether resources are best allocated to particular levels of education, or to education itself as opposed to other social purposes (Levin, 2003, p. 10). It also is important that a consideration of equity in education not jump to the conclusion that the necessary strategies all involve extensions of educational practices, or that they all lie within the education system itself (Levin, 2003, p. 10).

Countries need to address equity in education through a range of policy measures aimed at three goals: encouraging individual participation; changing the way institutions provide education; and changing the broader social and economic conditions that affect participation and success (Levin, 2003, p. 10). Teacher Horace Mann, who greatly influenced public education and schooling in the United States, foresaw public education as 'the great equaliser' (Nieto, in Mwonga, 2005, p. 3). Public education within democratic principles fosters equal access as an important principle, in terms of which individuals from different races, cultures, religions, social classes and ethnicity have equal access to schools, universities and other educational institutions (Mwonga, 2005, p. 3). However, as is evident in society, public schools have failed to provide an equitable education for many students as a result of the prevailing discrimination that exists in the structure of schools, the curriculum, and the interactions among teachers and learners (Nieto, in Mwonga, 2005, p. 3). A lack of equitable education seems to be based on the notion that students of different races, cultures, religions, social classes and ethnicity are inferior to a culture of mainly white, European, Anglo-Saxon, middle- to upper middle-class males (Mwonga, 2005, p. 3).

Multicultural education, as an educational alternative and strategy, recognises and attempts to reform the inequalities that exist in societies (Mwonga, 2005, p. 4). It is a form of democratic citizenship education that recognises the plurality of society, and attempts to bring historically marginalised groups to the forefront of public education to further develop active democratic citizens (Mwonga, 2005, p. 4). Multicultural education serves as education for social justice, in which students are developed into future democratic citizens by allowing them to learn how to think within an inclusive and expansive environment, critically analysing learned information, and turning that knowledge into action (Nieto, in Mwonga, 2005, p. 7). Multicultural education as a tool for social justice and social change works within three broad categories: the transformation of the self, by allowing for individual awareness through teaching and learning; the transformation of schools and schooling; and lastly the transformation of society, further creating justice and

social change (Mwonga, 2005, p. 7). Hence multicultural education recognises that the democratic principles of an equitable education for all attend to the diverse perspectives within education to create a just society.

Now if an education for social justice through equity aims at producing a more just society, then, in the words of Hackman (2005, p. 103), such an education for equity should 'become part of lived practice in the classroom'. This implies that students should be taught 'that their rights as citizens in this society carry responsibilities – of participation, voice, and protest – so that this can actually become a society of, by, and for *all* of its citizens' (Hackman, 2005, p. 106, italics in original). In other words, classroom activities should not only create a space for students to deliberate about contemporary issues such as diversity and democratisation, but also a space where they learn to make a consistent commitment to self-reflection and personal interrogation in order to 'enact [equitable] social change and growth' (Hackman, 2005, p. 107).

SUMMARY

In this chapter we have argued that education for social justice is an encounter, as it invokes both the capacities and cultural stock of individuals and groups. Considering that social justice is inextricably connected to need, desert and equality, it seems plausible to claim that education for social justice ought to be responsive to the aforementioned demands. We have shown how education for social justice seems to manifest in instances such as sustainable development, economic development and equity (not at the expense of equality but rather as a shift in focus from striving towards equity in an equal manner). And, drawing on the seminal works of Bell, hooks and Hackman, it seems that cultivating equal participation (through deliberation, self-reflexivity and openness), contesting dominance and privilege, and developing a critical understanding and awareness to enact social change are the ingredients to engender an education for social justice in and beyond the classroom. Inasmuch as our focus on cultivating an education for social justice has been confined to issues of sustainable development, economic development and equity, we by no means intimate that educational technology has no role to play at all. On the contrary, we have made the argument that all forms of education, especially nowadays on the African continent, should be geared towards the cultivation of social justice, and that one way of extending this position is to make the case for educational technology as a practice that can further extend social justice issues into the realm of education. This is so because educational technology (like democratic education for that matter) has the potential to cultivate pedagogic encounters inspired by deliberation, disruption, rhizomatism. In this way, like educational technology, an education for social justice potentially remains in becoming.

REFERENCES

Agamben, G. (1999). *Potentialities: Collected essays in philosophy* (D. Heller-Roazen, Trans.). Stanford, CA: Stanford University Press.

Agamben, G. (2009). *The coming community: Theory out of bounds* (M. Hardt, Trans.). Minneapolis, MN: University of Minnesota Press.

Aleman, A. M., & Wartman, K. L. (2008). *Online social networking on campus: Understanding what matters in student culture*. New York, NY: Routledge.

Alvermann, D. (2000). Researching libraries, literacies and lives: A rhizo-analysis. In E. St. Pierre (Ed.), *Working the ruins: Feminist poststructural theory and methods in education* (pp. 118–132). New York, NY: Routledge.

Ball, S. (2000). Performativities and fabrications in the education economy: Towards a performative society. *Australian Educational Researcher, 27*(2), 1–23.

Barnett, R. C. (2005). *Engaging the curriculum in higher education*. Maidenhead: Open University Press.

Beaudoin, M. (2002). Learning or lurking? Tracking the 'invisible' online student. *The Internet and Higher Education, 5*(2), 147–155.

Becta, B. E. (2003). *Primary schools – ICT and standards*. Retrieved from http://www.becta.org.uk

Bell, L. A. (1997). Theoretical foundations for social justice education. In M. Adams, L. Bell, & P. Griffin (Eds.), *Teaching for diversity and social justice: A sourcebook* (pp. 3–15). New York, NY: Routledge.

Biesta, G. (1999). *Sporadic democracy: Education, democracy and the question of inclusion*. Retrieved April 10, 2011, from http://www.philosophy-of-education.org/conferences/pdfs

Biesta, G. (2009). Sporadic democracy: Education, democracy and the question of inclusion. In M. Katz, S. Verducci, & G. Biesta (Eds.), *Education, democracy and the moral life* (pp. 101–112). Washington, DC: Springer.

Bingimlas, K. A. (2009). Barriers to successful integration of ICT in teaching and learning environments: A review of the literature. *Eurasia Journal of Mathematics, Science and Technology Education, 5*(3), 235–245.

Bloom, D., Canning, D., & Chan, K. (2006). *Higher education and economic development in Africa*. Dakar: World Bank Africa Region.

Bonnett, M. (1999). Education for sustainable development: A coherent philosophy for environmental education. *Cambridge Journal of Education, 29*(3), 313–324.

Burke, S., Snyder, S., & Rager, R. C. (2009). An assessment of faculty usage of YouTube as a teaching resource. *The Internet Journal Health Sciences and Practice, 7*(1), 1–9.

Callan, E. (1997). *Creating citizens: Political education and liberal democracy*. Oxford: Oxford University Press.

Carlisle, L. R., Jackson, B. W., & George, A. (2006). Principles of social justice education: The social justice education in schools project. *Excellence & Education, 39*, 55–64.

Chamberlin, L., & Lehmann, K. (2011). Twitter in higher education. *Educating Educators with Social Media, 1*(1), 375–391.

Chisholm, L. (2000). *A South African curriculum for the twenty-first century: Report of the Review Committee on Curriculum 2005*. Pretoria: Department of Education.

Chisholm, L. (2005). The politics of curriculum review and revision in South Africa in regional context. *Journal of Comparative Education, 35*(1), 79–100.

Christie, P. (1999). OBE and the unfolding policy trajectories: Lessons to be learned. In J. Jansen & P. Christie (Eds.), *Studies in outcomes-based education in South Africa* (pp. 4–20). Kenwyn: Juta.

Claasen, C. (1998). Outcomes-based education: Some insights from complexity theory. *South African Journal of Education, 12*(2), 34–39.

Clark, R. C., & Meyer, R. E. (2002). *e-Learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. San Francisco, CA: Jossey-Bass.

Conley, V. A. (2009). Of rhizomes, smooth space, war machines and new media. In M. Poster & D. Savat (Eds.), *Deleuze and new technology* (pp. 32–44). Edinburgh: Edinburgh University Press.

Conway, S. (2006). *YouTube and the cultural studies classroom.* Retrieved from http://www.insidehighered.com/views/2006/11/13/conway

Cox, M., Preston, C., & Cox, K. (1999). *What factors support or prevent teachers from using ICT in their classrooms?* British Annual Research Association Annual Conference, Leeds University, Leeds.

Crossan, B., & Gallacher, J. (2009). The boundaries are different out here: Learning relationships in community-based further education. In R. B. Edwards (Ed.), *Rethinking contexts for learning and teaching: Communities, activities and networks* (pp. 133–146). London: Routledge.

Deleuze, G. (1992). Postscript on the societies of control. *October, 59*, 3–7.

Deleuze, G. (1994). *Difference and repetition* (P. Patton, Trans.). New York, NY: Columbia University Press.

Deleuze, G., & Guattari, F. (1983). *Anti-Oedipus: Capitalism and schizophrenia*. Minneapolis, MN: University of Minnesota Press.

Deleuze, G., & Guattari, F. (1987). *A thousand plateaus: Capitalism and schizophrenia* (B. Massumi, Trans.). Minneapolis, MN: University of Minnesota Press.

Department of Education. (1995). *White paper on education and training*. Pretoria: Government Printers.

Department of Education. (2002). *Revised national curriculum statements R-9 (Schools): Overview*. Pretoria: Department of Education.

Department of Education. (2011). *Curriculum and assessment policy statement: Life sciences – Grades 10, 11 and 12*. Pretoria: Department of Education.

Derrida, J. (2004). *Eyes of the university: Right to philosophy 2* (J. Plug and others, Trans.). Stanford, CA: Stanford University Press.

Dewey, J. (1916/1966). *Democracy and education*. New York, NY: The Free Press.

Dincer, E., & Rozen, M. A. (2013). *Exergy: Energy, environment and sustainable development*. Oxford & Amsterdam: Elsevier Limited.

Dryzek, J. S. (2000). *Deliberative democracy and beyond*. Oxford: Oxford University Press.

Duffy, P. (2006). Engaging the YouTube Google-eyed generation: Strategies for using Web 2.0 in teaching and learning. *The Electronic Journal of e-Learning, 6*(2), 119–130.

Elliot, J. A. (2013). *An introduction to sustainable development*. London & New York, NY: Routledge.

Enterline, S., Cohran-Smith, M., Ludlow, L. H., & Mitescu, E. (2008). Learning to teach for social justice: Measuring change in the beliefs of teacher candidates. *The New Educator, 4*, 267–290.

Ertmer, P. (1999). Addressing first- and second-order barriers to change: Strategies for technology integration. *Educational Technology Research and Development, 47*(4), 47–61.

Fien, J. (2002). Advancing sustainability in higher education: Issues and opportunities for research. *Higher Education Policy*, *15*, 143–152.

Gammon, M. A., & White, J. (2011). (Social) media literacy: Challenges and opportunities for higher education. In C. Wankle (Ed.), *Educating educators* (pp. 329–345). New York, NY: Emerald Group Publishing Limited.

Garrison, D. R., & Anderson, T. (2003). e-*Learning in the 21st century*. London & New York, NY: RoutledgeFalmer.

GHK, Danish Technology & Technopolis. (2008). *Inventory of innovative practices in education for sustainable development: Order 31*. Copenhagen: Technopolis, GHK.

Glass, R. D. (2009). Education and the ethics of democratic citizenship. In M. S. Katz, S. Verducci, & G. Biesta (Eds.), *Education, democracy, and the moral life* (pp. 9–30). New York, NY: Springer.

Gomes, C. (2005). *Integration of ICT in science teaching: A study performed in Azores, Portugal*. Third International Conference on Multimedia and ICTs in Education. Retrieved from http://cat.upatras.gr/en/biblio

Gough, A. (2006). Sustainable schools in the UN Decade of Education for Sustainable Development: Meeting the challenge. *Southern African Journal of Environmental Education, 23*, 48–63.

Gough, S. (2009). Philosophy of education and economics: A case for closer engagement. *Journal of Philosophy of Education*, *43*(2), 269–283.

Gough, S., & Scott, W. (2007). *Higher education and sustainable development: Paradox and possibility*. London & New York, NY: Routledge.

Greene, M. (1995). *Releasing the imagination: Essays on education, the arts and social change*. San Francisco, CA: Jossey-Bass.

Grosz, E. (1995). *Space, time and perversion: Essays on the politics of bodies*. Sydney: Allen & Unwin.

Gutmann, A. (1987). *Democratic education*. Princeton: Princeton University Press.

Gutmann, A. (1999). *Democratic education: With a new preface and epilogue*. Princeton: Princeton University Press.

Gylfason, T. (2001). Natural resources, education, and economic development. *European Economic Review, 45*(1), 847–859.

Habermas, J. (1997). Popular sovereignty as procedure. In J. Bohman (Ed.), *Deliberative democracy: Essays on reason and politics* (pp. 35–66). Cambridge, MA: MIT Press.

Hackman, H. (2005). Five essential components for social justice education. *Equity & Excellence in Education, 38*, 103–109.

Hanushek, E. A. (2004). Education and economic development. In E. A. Hanushek (Ed.), *The economic value of improving local schools* (pp. 59–72). Cleveland: Federal Reserve Bank of Cleveland.

Hanushek, E. A., & Woesmann, L. (2008). The role of cognitive skills in economic development. *Journal of Economic Literature, 46*(3), 607–668.

Hargreaves, A. (2007). Sustainable leadership and development in education: Creating the future, conserving the past. *European Journal of Education, 42*(2), 223–233.

Held, D. (1987). *Models of democracy*. Cambridge: Polity Press.

Honan, E. (2004). (Im) plausabilities: A rhizo-textual analysis of policy texts and teachers' work. *Educational Philosophy and Theory, 36*(3), 267–281.

hooks, b. (2003). *Teaching community: A pedagogy of hope*. New York, NY: Routledge.

Jenkins, H. (2006). *Convergence culture: Where old and new media collide*. New York, NY: New York University Press.

Jickling, B., & Wals, A. E. J. (2008). Globalisation and environmental education: Looking beyond sustainable development. *Journal of Curriculum Studies, 40*(1), 1–21.

Kabuya, F. I. (2011). Development ideas in post-independence: Sub-Saharan Africa. *Journal of Development and Agricultural Economics, 3*(1), 1–6.

Katz, M. (2009). Is there a right to education? In M. Katz, S. Verducci, & G. Biesta (Eds.), *Education, democracy and the moral life* (pp. 31–48). Washington, DC: Springer.

Khanya News. (2011). *Technology and science experimentation*. Retrieved from http://www.khanya.co.za/news/

Korte, W. (2006). *Benchmarking access and use of ICT in European schools 2000: Final report from head teacher and classroom teacher surveys in 27 European countries*. Seville: European Commission.

Krejsler, J. (2004). Becoming individual in education and cyberspace. *Teachers and Teaching: Theory and Practice, 10*(5), 489–503.

Kurth-Schai, R., & Green, C. R. (2008). Education and democracy. In E. F. Provenzo Jr. (Ed.), *Encyclopedia of the social and cultural foundations of education* (pp. 1–8). Thousand Oaks, CA: Sage.

Lawson, H. A. (2005). Empowering people, facilitating community development, and contributing to sustainable development: The social work of sport, exercise, and physical education programs. *Sport, Education and Society, 10*(1), 135–160.

Le Grange, L. (2011). Sustainability and higher education: From arborescent to rhizomatic thinking. *Educational Philosophy and Theory, 43*(7), 742–754.

Levin, B. (2003). *Approaches to equity in policy for lifelong learning*. A paper commissioned by the Education and Training Policy Division, OECD, for thinking about equity in lifelong learning, Equity in Education, Winnipeg, Canada.

Lewis, S. (2003). Enhancing teaching and learning of science through the use of ICT: Methods and materials. *School Science Review, 84*(309), 41–51.

Li, L., & Pitts, J. P. (2009). Does it really matter? Using virtual office hours to enhance student interaction. *Journal of Information Systems Education, 12*(1), 175–185.

Lingard, B., & Mills, M. (2013). Pedagogies making a difference: Issues of social justice and inclusion. *International Journal of Inclusive Education, 11*(3), 233–244.

Livingstone, A. (2009). The revolution no one noticed: Mobile phones and multimobile services in higher education. *EducaseQuarterly, 32*(1). Retrieved from http://www.educause.edu/EDUCAUSE+Quarterly/EDUCAUSEQuarterlyMagazineVolum/TheRevolutionNoOneNoticedMobil/163866

Lotz-Sisitka, H. (2006). Participating in the UN Decade of Education for Sustainability: Voices in a Southern African consultation process. *Southern African Journal of Environmental Education, 23*, 10–33.

Madge, C., Mee, J., Wellens, J., & Hooley, T. (2009). Facebook, social integration and informal learning at university: It is more for socialising and talking to friends about work than actually doing work. *Learning, Media and Technology, 34*(2), 141–155.

Malaza, D. (2013). *The contribution of South African higher education in Africa's development*. Retrieved from http://www.ieasa.studysa.org/resources/Study_SA_11/HE%20in%20africa.pdf

Manin, B. (1987). On legitimacy and political transformation. *Political Theory, 15*(3), 338–368.

Masschelein, J., & Simons, M. (2011). The hatred of public schooling. In J. Masschelein & M. Simons (Eds.), *Rancière, public schooling and the taming of democracy* (pp. 150–165). London: Wiley-Blackwell.

Mazer, J. P., Murphey, R. E., & Simonds, C. J. (2009). The effects of teacher self-disclosure via Facebook on credibility. *Learning, Media and Technology, 34*(2), 175–183.

McHaney, R. (2011). *The new digital shoreline: How Web 2.0 and millennials are revolutionizing higher education*. Sterling, VA: Stylus Publishing.

McMillan, S. J., & Morrison, M. (2006). Coming of age in the e-generation: Qualitative exploration of how the Internet has become integral part of young peoples' lives. *New Media and Society, 8*(1), 73–95.

Michelle, R. D. (2010). Social networking goes to school. *Education Week's Digital Directions, 3*(3), 1–7.

Miller, C. C. (2009, February 13). Who's driving Twitter's popularity? Not teens. *The New York Times,* p. 23.

Miller, D. (2003). *Principles of social justice*. London: Harvard University Press.

Misanchuk, E., Schwier, E., & Boling, E. (1996). *Visual design for instructional multimedia*. Saskatchewan: University of Saskatchewan.

Morrow, W. (1989). *Chains of thought*. Johannesburg: Southern Book Publishers.

Morss, J. (2000). The passional pedagogy of Gilles Deleuze. *Educational Philosophy and Theory, 32*(2), 185–200.

Mwonga, C. (2008). Multicultural education: New path toward democracy. In E. F. Provenzo Jr. (Ed.), *Encyclopedia of the social and cultural foundations of education* (pp. 1–17). Thousand Oaks, CA: Sage.

Ngowi, H. P. (2009). Economic development and change in Tanzania since independence: The political leadership factor. *African Journal of Political Science and International Relations, 3*(4), 259–267.

OECD. (2008). *Reviews of national policies for education: South Africa*. Paris: OECD Publishing.

Osborne, J., & Hennessy, S. (2003). *Literature review in science education and the role of ICT: Promise, problems and future directions*. London: Kings College and Futurelab.

Peters, M. A., & Roberts, P. (2012). *The virtues of openness: Education, science and scholarship in the digital age*. London: Paradigm Publishers.

Rancière, J. (1991). *The ignorant schoolmaster: Five lessons in intellectual emancipation*. Stanford, CA: Stanford University Press.

Rancière, J. (1992). Politics, identification and subjectivization. *October, 61*(1), 58–64.

Rancière, J. (1995/1999). *On the shores of politics*. London: Verso.

Rancière, J. (2006). *Hatred of democracy* (S. Corcoran, Trans.). London & New York, NY: Verso.

Rapid Response Team. (2011). Retrieved from http://www.microsoft.com/presspass/press/2011/may11/05-10corpnewspr.mspx

Rawls, J. (1971). *A theory of justice*. Cambridge, MA: Harvard University Press.

Rhine, S., & Bailey, M. (2011). Enhancing in-class participation in a Web 2.0 world. *Educating Educators with Social Media, 1*(1), 303–325.

Ringrose, J. (2011). Beyond discourse? Using Deleuze and Guattari's schizoanalysis to explore effective assemblages, heterosexually striated space, and lines of flight online and at school. *Educational Philosophy and Theory, 43*(6), 598–618.

Robertson, E. (2009). Public reason and the education of democratic citizens: The role of higher education. In M. Katz, S. Verducci, & G. Biesta (Eds.), *Education, democracy and the moral life* (pp. 113–126). Dordrecht, The Netherlands: Springer.

Roland Martin, J. (2013). *Education reconfigured: Culture, encounter, and change*. London & New York, NY: Routledge.

Rorty, R. (1999). *Philosophy and social hope*. London: Penguin Books.

Ryan, M., & Ryan, M. (2013). Theorising a model for teaching and assessing reflective learning in higher education. *Higher Education Research and Development, 32*(2), 244–257.

Sauvé, L. (2005). Currents in environmental education: Mapping a complex and evolving pedagogical field. *Canadian Journal of Environmental Education*, *10*, 12–37.

Schoepp, K. (2005). Barriers to technology integration in a technology rich environment. *Learning and Teaching in Higher Education, 2*(1), 1–24.

School (2011). *Practical skills and technology*. Retrieved from www.conf2010.school.co.za

Schreuder, D., Reddy, C., & Le Grange, L. (2002). Environmental education as a process of change and reconstruction: The science and sustainability project. In D. Tilbury, R. B. Stevenson, J. Fien, & D. Schreuder (Eds.), *Education and sustainability responding to the global challenge* (pp. 133–140). Cambridge: Commission of Education and Communication & The World Conservation Union.

Scott, W., & Gough, S. (2003). *Sustainable development and learning: Framing the issues*. London & New York, NY: RoutledgeFalmer.

Sicilia, C. (2005). *The challenges and benefits to teachers' practices in constructivist learning environments supported by technology*. Montreal: McGill University.

Smeyers, P., & Depaepe, M. (Eds.). (2007). *Educational research: Networks and technologies*. Dordrecht, The Netherlands: Springer.

Stables, A. (2002). The quest for holism in education for sustainable development. *Environmental Education Research, 8*(1), 53–60.

Tamboukou, M. (2008). Machinic assemblages: Women, art education and space. *Discourse, 29*(3), 359–375.

Thinkquest. (2011). *Learning and innovation*. Retrieved from http://www.thinkquest.org.za/

Thompson, G. (2010). *Modulating power and 'new weapons': Taking aim at the education revolution*. In 40th Conference of the Philosophy of Education Society of Australasia Inc. (pp. 1–8). Perth: PESA.

Thorpe, M. (2009). Technology-mediated learning contexts. In R. B. Edwards & G. Biesta (Eds.), *Rethinking contexts for learning and teaching: Communities, activities and networks* (pp. 119–132). London: Routledge.

Towner, T. L., & Munoz, C. L. (2011). Facebook and education: A classroom connection. *Educating Educators with Social Media, 12*, 33–57.

TRAC. (2011). *Technology education in South African secondary schools*. Retrieved from http://trac.sun.ac.za/trac_background.htm

Tremblay, E. (2010). Education the mobile generation-using personal cell phones as audience response systems in post-secondary science teaching. *Journal of Computers in Mathematics and Science Teaching, 29*(2), 217–277.

United Nations Development Programme (UNDP). (2011). Retrieved from http://www.un-ngls.org/orf/documents

Wals, A. (2009). *Review of contexts and structures for education for sustainable development*. Paris: UNESCO.

Warren, M. (1992). Democratic theory and self-transformation. *American Political Science Review, 86*(1), 8–23.

Warren, M. (1996). What should we expect from more democracy? Radically democratic responses to politics. *Political Theory, 24*(2), 241–270.

Watson, G. (1999). *Barriers to the integration of the Internet into teaching and learning: Professional development*. The Asia Pacific Regional Internet Conference on Operational Technologies. University of Singapore, Singapore.

Witschge, T. (2002). Online deliberation: Possibilities of the Internet for deliberative democracy. In H. J. Heinz (Ed.), *Prospects for electronic democracy* (pp. 1–22). New York, NY: School of Public Policy and Management.

Young, I. M. (1990). *Justice and the politics of difference*. Princeton, NJ: Princeton University Press.

Young, I. M. (2000). *Inclusion and democracy*. Oxford: Oxford University Press.

Zeichner, K. (2005). A research agenda for teacher education. In M. Cohran-Smith & K. Zeichner (Eds.), *Studying teacher education: The report of the AERA panel on research and teacher education* (pp. 737–760). Mahwah, NJ: Lawrence Erlbaum.

Zembylas, M. (2007). Risks and pleasures: A Deleuzo-Guattarian pedagogy of desire in education. *British Educational Research Journal, 33*(3), 331–347.

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