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Technology enhanced teaching and learning in South African higher education – A rearview of a 20 year journey

Dick Ng'ambi, Cheryl Brown, Vivienne Bozalek, Daniela Gachago and Denise Wood

Abstract

In the last 20 years, the South African higher education has changed significantly, influenced by global trends national development goals and pressure from local educational imperatives, in the context of a digitally networked world. Shifts in technology enhanced pedagogical practices and in discourses around information and communication technologies (ICTs) have had varying degrees of influence in higher education. This paper takes a rearview of a 20-year journey of technology enhanced learning in South African higher education. An analysis of literature view is presented chronologically in four phases: phase 1 (1996–2000), phase 2 (2001–05), phase 3 (2006–10) and phase 4 (2011–16). In phase 1 technology was used predominantly for drill and practice, computer-aided instruction, with growing consciousness of the digital divide. In phase 2 institutions primarily focused on building ICT infrastructure, democratizing information, policy development and research; they sought to compare the effectiveness of teaching with or without technology. During phase 3 institutions began to include ICTs in their strategic directions, digital divide debates focused on epistemological access, and they also began to conduct research with a pedagogical agenda. In phase 4 mobile learning and social media came to the fore. The research agenda shifted from whether students would use technology to how to exploit what students already use to transform teaching and learning practices. The paper concludes that South Africa's higher education institutions have moved from being solely responsible for both their own relatively poor ICT infrastructure and education provision to cloud-based ICT infrastructure with "unlimited" educational resources that are freely, openly and easily available within and beyond the institution. Although mobile and social media are more evident now than ever before, teaching and learning practice in South African higher education remains largely unchanged.

Practitioner Notes

What is already known about this topic

- Many "state of play" reports on trends and challenges in educational technology are published annually.
- Developing countries have to take their own lead in terms of planning and predicting change in technology enhanced learning.
- Research on access to information and communication technology and use for teaching and learning within South Africa has been published over the past decade.

What this paper adds

- Provides a discussion of findings from a literature review of teaching and learning with technologies in the South African higher education context over a 20-year period.
- Reflects on changes in teaching and learning and maps these to the local context.
- This paper offers a view of trends and challenges in educational technology from a global to a South African perspective that *may be useful in other developing contexts*.

Implications for policy and practice

- Provides a base for which to think about technology enhanced learning in any low-cost, mobile, flexible, ubiquitous technology context.
- Promotes an expanded view of computer literacy within this context.
- Highlights some of the challenges for professional development in these contexts.

Introduction

One of the challenges facing Higher Education Institutions (HEIs) in South Africa is the contradiction in acknowledging and progressing beyond systemic contextual problems inherited from past educational policies (Bozalek & Boughey, 2012; Leibowitz, 2012; Soudien, 2012) to attain participatory parity (Fraser, 2008, 2009) and preparing future generations of students for "emerging technologies"[1] (Broekman, Enslin, & Pendlebury, 2002; Veletsianos, 2010). Although these challenges are contextual, they are not unique to South Africa. In South Africa, the education that served as a foundation for building and entrenching inequalities in the past, is now having to reverse the effects of unequal educational opportunities. The new generation of students, born after 1994 (known as the born free generation) are expecting unequal educational opportunities as a default and the #feesmustfall protests on 2015, is a case in point.

In this paper we undertake a detailed analysis of the specific ways in which South African higher education (HE) has engaged with technology in teaching and learning over the past 20 years. In 1994, with the advent of the South African democracy, there was a great deal of idealism evident in policy documents about what could be accomplished to make HE more inclusive (Leibowitz & Bozalek, 2014). However, the role that technology could play in this was not made explicit in such documents until the National Plan on HE

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(Department of Education, 2001), which noted how information and communications technologies (ICTs) had the potential to bring far-reaching changes in the HE landscape in the twenty-first century. The National Plan drew upon the social theorist Manuel Castells (1996) to highlight the need for South African HE to ready itself by making use of communication networks through the Internet to improve pedagogy. Due to its history, South Africa has a different trajectory from that of other northern and southern countries in using technology to enhance teaching and learning. Even within South Africa, the differently positioned historically advantaged and disadvantaged institutions, which have been inherited from the apartheid era, have produced different visions on how technology could be used.

In this rearview of how the use of ICTs in teaching and learning has shifted, 1996–2016, we argue that South African HEIs have appropriated technologies in different ways to address the challenges they have faced: these include the soaring cost of education, dwindling government funding, pressures to improve efficiency and throughput and to increase the proportion of students in the HE sector (from 16% to 30% in 2030, DHET, 2012) and diverse levels of preparedness of students.

The paper is organised as follows: it first provides an overview of the international landscape of the technology enhanced teaching and learning (TETL) in the last 20 years, then proceeds with what was happening in the South African HE context, and concludes with a summary that compares the international trends during each phase with the South African landscape.

The international context
HE globally shifts its practices to align with and exploit the affordances of changing technologies. For example, in the 1960s, institutions appropriated the Intranet for cost-effective learner-centred curricula (Bates, 1997; Harding, 1944). From 2005, with the advent of mobile technologies and ubiquitous wireless Internet, the focus shifted to more active learning and collaborative production of knowledge enabled by social computing tools (Web 2.0).

When the New Media Consortium (NMC) was established in the United States in the early 1990s, its aim was to recognise and support innovative uses of "new media" technologies, which at that time meant text, illustrations, photographs, sound, voice, animations and video, to enhance learning and teaching in HE (The New Media Centers initiative, 1993). The NMC's reports, published annually, are context-and time-bound, focusing on innovative practices given the changing affordances of the technologies, in the countries covered. In the 2004 report (The NMC Horizon Report, 2004), eg, the focus shifted to technologies and strategies for the design of effective computer-based learning tools, with some appreciation of the possibilities of collaborative learner activities foreshadowed as emerging technologies within the next 4 or 5 years. This prediction became a reality with growing interest in the social web, in line with a global trend in business and social use of Web 2.0 technologies from 2005 onwards. In 2005 and 2006 the NMC reports (The

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NMC Horizon Report, 2005, 2006) predicted increasing use of social networks and mobile technologies, including mobile phones and tablet computers. The reports explain the technologies and their possible adoption timeframe, but if they are not read in context they can create among HEIs a sense of lagging-behind and playing a "catch-up game" even when the lack of adoption is global. For example, virtual worlds in HEIs have not been adopted globally and have not been reported since 2007 in the Horizon Report NMC Horizon Reports, 2007–15). In South Africa adoption of technologies has not always aligned with predictions in these reports.

The 2013 NMC Horizon report (Johnson et al., 2013: 9–10) cautions that there are many continuing hindrances to effective use of technologies for teaching and learning. These include: lack of adequate training of HE practitioners in the appropriate use of technology to improve learning outcomes; institutional barriers limiting broader uptake of such technologies; an increasing need for more effective practices to support personalised learning; the need for a "culture shift" among academics to accept challenges to traditional approaches to teaching and learning and scholarly publication, as they move towards a more open and participatory approach to teaching, learning and research. In the 2016 NMC Horizon report, Johnson et al. (2016) concedes that one of the challenges facing HE is how to balance between learners' connected and unconnected lives. With an increasingly connected learners, a holistic education will need to be mindful of these transitions of learners lives. Certainly these are continuing difficulties in Africa's HE context and South Africa in particular.

Methodology
We write this paper as previous members of a South African National Research Foundation (NRF) project, undertaken by eight HEIs across South Africa and one international non-governmental organisation called the Open Courseware Consortium (Emerging ICTS in Higher Education, 2013). The project "Emerging ICTs in Higher Education" was set up to investigate how qualitative outcomes in HE can be realised through using emerging technologies to transform teaching and learning interactions and paradigms across differently positioned HEIs in South Africa. Motivated by anecdotal evidence and personal experiences of project members that emerging technologies were diffusing into HEIs, the project conducted a national survey of all 22 HEIs to uncover possible associations between use of such technologies and transformation of pedagogical practice. The baseline data from the survey (Bozalek, Ng'ambi, & Gachago, 2013; Bozalek et al., 2013) were stimuli for in-depth case studies of innovative pedagogical practices using emergent technologies.

In order to contextualise the project, we compiled a literature review from sources including NMC's Horizon Reports from 2004 to 2016, using key search terms such as "information and communication technologies," "e-learning," "flexible learning," "technology enhanced learning (TEL)" and "emerging technologies." Their search ranged across South African Council on HE reports on the use of ICTs, relevant South African policy documents, consultation with experts in the field and postgraduate dissertations on

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ICTs in teaching and learning in South African HE. The paper provides a chronological analysis of the findings from the literature review to understand the shifts in the (TETL) in the 20-year period.

Chronological analysis of selected literature

In grappling with how to analyse the period 1996–2016 we looked at how TEL had been described in the literature. One example was Keats and Schmidt's description of the University of the Western Cape's e-learning transitions from Education 1.0, characterised as enabled through an electronic learning management system, Education 2.0, which involved collaborations across universities but largely within the confines of learning management systems and Education 3.0, which was driven by the perspective of personal distributed learning environments (Keats & Schmidt, 2007). However, Keats and Schmidt's categories do not capture the changes in a sufficiently nuanced way. Instead, we structured our own analysis chronologically in four thematic phases as they emerged from the analysis of literature:

1. Phase 1: 1996–2000 Computer-assisted instruction.
2. Phase 2: 2001–05 Democratisation of knowledge and development of strategies.
3. Phase 3: 2006–10 Scholarship and professional development.
4. Phase 4: 2011–16 Digital literacies, flexible learning, social media and professional development.

Phase 1: 1996–2000 Computer-assisted instruction
The first 5-year period of ICTs in South African HE has been characterised by Czerniewicz and Brown (2006) as the expansion of computers and networks across institutions for use by individual staff, with a particular concentration of computers in libraries. The role of technology was to increase of staff productivity and facilitate staff development.

The use of ICTs for teaching and learning was fragmented, with a strong focus on computer- aided or -assisted instruction (CAI). One of the first publications on the use of ICTs in South African HE was published in the early nineties (Lippert, 1993). It was entitled "Computer-based education and training in South Africa." Computers facilitated a form of behaviourist individual instruction (Czerniewicz & Brown, 2006), usually employing a "drill and practice" approach, with the computer as a tutorial tool, replacing the lecturer in, eg, language teaching labs.

The debates on digital divide at that time were about those who had physical access to computers and those who did not (National Telecommunication and Information Administration,1999). The digital divide concept gained prominence in discourse (Kling, 1999): ICTs were described as offering an opportunity to eliminate the distinctions between information-rich and information-poor countries and the global north and south (van Audenhove, 2003). While the potential for teaching and learning with ICTs in HE was acknowledged, there was also a strong sense of failure to realise this potential and respond to it, with perceived serious consequences for South African HEIs in terms of global competitiveness.

However some universities such as the University of Cape Town were successful in obtaining donor funding to establish projects aimed at investigating the use of technology in education, as (Czerniewicz, 2004) pointed out, but these institutions generally acted independently of each other.

Phase 2: 2001–05—Democratisation of knowledge and development of strategies In the 2000s, just as the notion of the "digital divide" was being criticised for its lack of consideration for the personal, epistemological and social dimensions of access, the South African government began to see information as a commodity, equating access to ICTs making knowledge easier to obtain (Department of Education and Communication, 2001). Writers began to position technology as a tool for radical democratisation (Pejout, 2004). The focus on physical access to technology though, continued to pervade the sector and was foregrounded in educational discourse as studies focused on learners' access to telecommunication infrastructure, computers and the Internet (Herselman & Britton, 2002). At this time, government strategies also set out several ambitious yet well intended aims for access in schools such as basic connectivity, wired schools and educator development (Department of Education and Communication, 2001).

In South Africa, the National Plan on HE (Department of Education, 2001) noted how ICTs ad brought far-reaching changes that influenced the HE landscape in the twenty-first century. The National Plan drew upon the social theorist Manuel Castells (1996) to highlight the need for South African HE to ready itself to meet the challenges of the new knowledge economy.

There was an increasing proliferation of e-learning strategies at South African HEIs: many developed detailed and comprehensive policies regarding the use of ICTs in teaching and learning, often labeled e-learning policies, although in many cases the focus was limited to institutional learning management systems (Czerniewicz, Ravjee & Mlitwa, 2006; Keats, 2003; Keats, Collins & Petersen, 2001; SAIDE, 2006).

During this phase, computers were seen as a tool to support teaching, learning and research, rather than merely assisting academics do their administrative work (Czerniewicz & Brown, 2006). Nationwide, structures and units were being established and personnel hired, with the sole purpose of supporting the use of technology in teaching and learning. Institutional focus was on acquiring learning and content management systems and setting up infrastructure rather than how to use it effectively for teaching and learning.

The early 2000s saw the mainstreaming of the networked computers in South African HEIs, adding "communication" to the picture by introducing email and the Internet to all staff members. Institutions set up support structures to meet increased demand by staff members who wanted to take more seriously the use of technology in teaching and learning. A study of 1,023 students' use of "walk-in" computer laboratories at the

University of Cape Town in 2002 found that accessing course-related content to download for offline reading was one of the predominant activities for students using the computer labs (Czerniewicz & Ng'ambi, 2004).

In 2004, the first South African online conference (e/merge) was launched. This event was designed to support the growth of communities of practice among educational technology researchers and practitioners across Southern Africa and it became a regular feature in the field, providing an online platform for engagement with issues around the use of ICTs in teaching and learning (Czerniewicz & Carr, 2005).

By 2004 the use of ICTs within South African HE was very much a reality, although use was quite narrow and was dominated primarily by instrumental tasks such as finding information and writing assignments (Czerniewicz & Brown, 2005; Hodgkinson-Williams & Mostert, 2006; Louw, Brown, Muller, & Soudien, 2009). The web literacy skill was seen as a critical literacy and programmes to support web searching skills were becoming popular (Walton & Archer, 2004). In similar fashion, institutional technologies were even more driven by an efficiency and management agenda, to address, eg, the challenges of dealing with large student numbers, where classroom size and limited staffing inhibited interaction with students (Le Roux, 2004).

The South African government's e-education policy mentioned that all higher educators and learners should be able to participate in the global community by using ICTs (Department of Education, 2004), but Czerniewicz and Brown (2005), in their report for the South African Council on Higher Education (CHE), noted that while other countries had developed policy frameworks for technologies in HE, Cross and Adam, note there were no such national policies in South Africa in this period (2007). This CHE report also indicated that while only a few HEIs in South Africa had developed ICT strategies (Universities of Pretoria, Stellenbosch, Cape Town and Western Cape and the Tshwane University of Technology), HEIs were shifting their focus from access to use of TEL.

Phase 3: 2006–10—Scholarship and professional development
In phase 3, increased interest in designing and evaluating staff development initiatives on the use of ICTs for teaching and learning was reported. These initiatives were focused on technical skills and on the development of pedagogical understanding of the ways in which to use technology to support teaching and learning, hence questioning perceptions that ICTs were separate from pedagogy and content (Mostert & Quinn, 2008). The importance of credit-bearing professional development programmes in TEL was debated from 2008 (Tlhoaele and van Ryneveld, 2008).

Conferences with a specific focus on South Africa like CITTE—the Conference on Information Technology (IT) in Tertiary Education—started in 2004. WebCT Africa User Conferences also started in 2006 and other regular IT conferences on world wide web applications and the Higher Education Learning and Teaching Association South Africa (HELTASA) conference started featuring papers with an "e-learning" focus (eg,

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Simelane, Blignaut, & Van Reyneveld, 2006; Blignaut & Trollip, 2007; Fresen, Drysdale, Kotźe, Scheepers, & Jordaan, 2007; Le Roux, 2004).

Brown, Thomas, van der Merwe and van Dyk (2008) pointed out that e-learning support centres during this period played both advocacy and advisory roles in integrating ICTs into the curriculum, some working with lecturers and others with both students and lecturers to enable them to integrate ICTs into their practice.

Although there was a growing consciousness of the opportunities for pedagogical innovation through ICTs in this period, South African HEIs were still not able to use ICTs for the improvement and innovation of teaching and learning. Use was limited to supporting traditional practices (Kirkup & Kirkwood, 2005; Schmidt, 2008) and only a small number of innovative practices started to mushroom. Most institutions started to adopt ICTs in their strategic plans, motivated by the potential of ICTs, eg, or pressure to remain competitive (Cross & Adam 2007; Czerniewicz & Brown, 2009).

In addition to an increase in individuals using ICTs in their pedagogical practice, there was engagement from senior management to strategically support ICTs during this period, sometimes, even in the case of historically advantaged institutions, without the requisite resources to support these aspirational institutional strategies (Czerniewicz & Brown, 2005).

Research on teaching and learning with ICTs showed a strong link to a pedagogical agenda, in particular student learning (Moll, Adam, Backhouse, & Mhlanga, 2007; Spurrett, 2005). In 2007 the South African Journal of Higher Education published a special issue on "exploring the role of ICTs in addressing educational needs: Identifying the myths and miracles" (Prinsloo, 2007). This issue showed that academics from a variety of disciplines were beginning to investigate the use of technologies in their teaching (see, eg, Bozalek et al., 2007; Pratt, 2007).

In phase 3, technologies were also no longer seen as an equalising force from this period onwards, but awareness was increasing of the complexities of infusing technology into highly diverse and differently positioned institutions of higher learning (eg, Czerniewicz, Ravjee, et al., 2006; Greaves, 2005). Inequality of access has continued to be a key issue influencing use, particularly for students from low socio-economic groups who speak English as a second language (Czerniewicz & Brown, 2009). This pattern still impacted on students who were less confident in terms of their computer ability and had access to fewer supportive social structures when using ICTs at university (Czerniewicz & Brown, 2009). Broekman et al. (2002) raised the dilemma that universities faced about whether to deliver online learning when many students lacked either epistemological access to working online or physical access to ICTs. This was not unique to South Africa as findings from elsewhere showed that amongst youth globally, access was concentrated in the middle/high socio-economic groups (World Bank, 2007) and that people who suffered social disadvantage were much more likely to be disengaged from ICTs than the

socially advantaged (Helsper, 2008). In South Africa, young students who were technologically literate were a minority and represented an elite rather than a majority: the majority had "outsider status" (Brown & Czerniewicz, 2010).

By 2007, mobile device ownership amongst South African students had increased. A study in six HEIs reported that 98% of students had mobile phones (Czerniewicz, Williams, & Brown, 2009). The same report stated that though institutions had not taken charge of the opportunities offered through mobile phones, students certainly had: 80% indicated that they used their mobile phone in some way for academic purposes, with 40% of that group saying they did so often (Czerniewicz, Williams, et al., 2009). In certain disciplinary contexts innovative mobile based teaching and learning interventions were also being piloted. For example, the Dynamic Frequently Asked Questions tool provided a seamless interface between the institutional Learning Management Systems and mobile phones (Ng'ambi & Brown, 2009).

As more students started accessing smartphones, social media use increased. There was a continued rise in the use of student-owned tools, such as social media, instant messaging or mobile technologies (Kornberger, 2009). Bosch's (2009) study interrogated University of Cape Town students' engagement with social media and lecturer engagement with students via Facebook. Another example was Makoe's study (2010) on Mxit, a South African mobile chat service used to support social interaction among University of South Africa's (UNISA) distance learners. Cook's (2006) study examined how adult learners in distance education experienced short message service as a learning tool.

Phase 4: 2011–16 Digital literacies, flexible learning, social media and professional development

In the 2011 survey of 262 participants across all twenty two public HEIs in South Africa conducted as part of the "emerging technologies" project, participants were asked to list the technologies they used most frequently in their teaching as well as the ones felt they had used in innovative ways over the last 5 years. The question was significant in that it helped to uncover the extent to which HEIs were exploiting the increasingly ubiquitous cloud-based technologies in view of personal ownership of devices and increasingly connected society. What was interesting is that whilst participants indicated they most frequently used social media (49%) and social networking (45%) in their teaching on a regular basis when it came to innovation, "older" technologies like the Expanded to Learning Management Systems (LMS) ranked top of the list (24%) followed by blogging and podcasting/vodcasting (8%), and social media/social networking (7%). Innovative use of e-books, social bookmarking and web conferencing were least used (1%). However, another significant finding was the heterogeneity of what respondents identified as emerging technologies or innovative practices, pointing to the highly unequal distribution of resources not just within institutions and regions but also within faculties and departments (Gachago et al., 2013).

In 2016, South Africa still lacks a coherent national policy on the role of ICTs in HE teaching and learning. The Higher Education and Training minister's distance education document in 2012 has been the most comprehensive statement of intention to arise in this area in the past 5 years (DHET, 2012). This document seems to recognise the potential for ICTs to provide a more inclusive educational environment, with the possibility of addressing issues of inequality through more flexible forms of delivery to participants who could include rural communities and those who are currently unable to access HE (Cross & Adam, 2007). The Green Paper for Post-School Education and Training (DHET, 2012) also makes strong reference to the necessity for using ICTs in post-school education and for ensuring equitable access by providing infrastructural support.

Although students' access to digital devices is becoming increasingly diverse, a small but consistent group of first-year students arrive at University with insufficient access to ICTs and basic computer literacy skills (Nash, 2009). Interesting questions and dilemmas are raised about transferring digital capabilities from one technology to another (Magunje & Brown, 2013) and between in and out of university contexts (Kajee & Balfour, 2011). Challenges continue as students continuously need to learn new academic skills to operate in a digital world. An example of this is how students used SMS "lingo" for critical engagement with a recorded lecture using mobile devices (Boyinbode, Ng'ambi, & Bagula, 2013).

HE is now faced with a need to reconceptualise concepts such as computer literacy and move beyond a view of students' technical competence to one of situated knowledge practices that students need to use digital tools for communication, expression and social action in the academic world (Brown, 2012). Consuming technology is no longer enough to give students an edge and it is creative production that makes a student's usage truly unique in terms of their digital literacy (Brown, Czerniewicz, & Noakes, 2016; Ng'ambi et al. (2015).

Facebook is, now in 2016, one of the most widely used mobile applications on smartphones or basic java-based phones (Gachago et al., 2013). It is these user-driven initiatives enabled by the affordances of a social networking tool that has led to an increase in pedagogical explorations of using social media for educational purposes. South African educators have recently documented the use of Facebook in learning practices to promote authentic learning in discipline such as architecture and microbiology (Ng'ambi et al., 2015), engineering or architectural technology (Ivala & Gachago, 2012).

Instant messaging services like WhatsApp use is increasing exponentially in our mobile dominated context to foster student learning as discussed by Ng'ambi et al. (2015) or Gachago, Strydom, Hanekom, Simons, & Walters et al. (2015). With 7.4 million users in South Africa in 2015, Twitter is defining a new age of knowledge generosity, proliferation and take up. Users of Twitter send tweets (short messages with a maximum of 140 characters) and this determines the tweet style. However, Twitter's take-up in HE currently still lags behind other tools such as Facebook (13 million in 2015) or WhatsApp

and in general seems to lose popularity compared to its competitors (World Wide Worx and Fuseware, 2014).

Both distance education and distance supervision as well as support for distributed students has been impacted by collaborative tools such as Skype, Whatsapp etc. While a few years ago, a special video conference room was required to have a video conference meeting, videoconferencing has become both easy to setup, to use and free, of course as long as there is Internet.

While traditional institutional learning management systems seem to struggle with how best to incorporate social media features/technologies, emerging learning platforms such Edmodo[2] are increasingly becoming popular in both HE and schools in South Africa.

Another important player in this context is Google, which through its range of educational apps for online communication and collaboration has revolutionised online collaborative practices among educators and students (Rowe, Bozalek, & Frantz, 2013).

What all these tools and technologies, which reside outside the institutional control have in common, is that they are unregulated by institutions and that both educators and students are able to easily set them up without the knowledge or approval of institutional IT Support Units. This is changing the role of lecturers and students, who have more control over the teaching and learning processes but also of these service units in institutions, from merely providing technologies to becoming pedagogy support units. Closely related to this are debates around the promotion of Bring Your Own Device (BYOD) strategies. While an increasing number of HEIs in South Africa provide ubiquitous Wi-fi on campuses to support BYOD, the need to provide traditional computer labs both as teaching and walk-in labs will continue to exist because of the highly unequal contexts of South African HE where not all students can afford to own a decent laptop. Needless to say, trends show that students' ownership of devices is rapidly increasing and that reliance on institutional equipment, often poorly managed, is decreasing, as discussed above.

During this period, innovative practices were also reported across a range of disciplines in journals such as SAJHE, eg, in Economic and Management Sciences (Bayat & Naicker, 2012; Hough, 2012; Rhodes, 2012). Increased interest on inter-institutional collaboration and research resulted in the NRF funded research project on emerging technologies to improve teaching and learning in South Africa as reported earlier (Bozalek, 2011; Bozalek et al., 2013; Ng'ambi, Gachago, Ivala, Bozalek, & Watters, 2012). Professional development courses for academics on emerging technologies for teaching and learning began to be offered across HEIs in the Western Cape from 2011 (Bozalek & Leibowitz, 2012; Ng'ambi, Bozalek & Gachago, 2013). The intention to offer a similar course as an elective in a Postgraduate Diploma in Teaching and Learning in HE across the HEIs in Cape Town is planned for 2016.

The recent student protests such as the 2015 #RMF or the ongoing #FMF movement, which disrupted campus activity over extended periods of time highlighted the importance of setting up alternative communication and collaboration channels, for ad hoc communication, such as WhatsApp or Facebook. However, it also created a space for a reassessment of current teaching and learning contexts and rekindled an interest in blended learning formats, to allow more flexible, ubiquitous assignment and assessment regimes. This has in some incidents led to an increase in active lecturers on the institutional LMS of up to 20% within 2 months (personal communication with Director of eLearning at CPUT) and has pushed institutions to review mid and long term strategies, calling for a provision of flexible ways of course delivery.

Discussion and Conclusion

The paper provides a narrative on the past 20 years of TEL in South African HE. An analysis of the global trends as predicted by the NMC Horizon reports confirm that projections did not necessarily follow these trends because ICT infrastructure largely dictated the possibilities. The relationship between global and local trends is illustrated in Table 1.

Phase 1 (1996–2000) was a period of low ICT infrastructure and institutional control/regulated systems, most of which were home-grown or proprietary systems. The HE university concerns were to overcome the lack of parity in physical access to computers so as to ensure that CAI did not widen the digital divide. Many institutions built computer laboratories to ensure students had access for CAI. Like the first phase, the second phase (2001–05) was a period in which there was allow take up of opportunities for improving ICT infrastructure and the need for personal control was gaining recognition as yet constrained by access to personal devices. The predominant question that shaped TEL was about policies and infrastructure that would enable equitable access, uptake and use of ICT for teaching and learning in HE. This phase is aptly described as a democratisation of knowledge and development of strategies phase. In phase 3 (2006–10) ICT infrastructure started to improve with mobile devices and mobile communication networks entering the HE space. The predominant question for HEI was how ICT mediated practices could leverage the scholarship of teaching, learning and professional development. This question shaped the practices in that period. The past phase (2011–16) is described as high ICT infrastructure and high personal control through cloud-based tools.

The main question currently shaping HE responses in 2016 is about the role that HE should play given that all students now own mobile devices, are socially connected, digital content is freely available and Massively Open Online Courses (MOOCs) are a buzzword. The responses to this phase will define the future of HE both globally and South Africa for the next decade. This view was also echoed at the 2013 NMC Horizon Project Summit that involved one hundred distinguished thought leaders from around the world who outlined the future challenges for Education (The Future of Education 2013) with possible ramifications for HEI in South Africa as well.

- the meaning of "teach" and everything associated with this concept need to be revisited as it has its roots in oral traditions where knowledge was transmitted from one generation to the next.
- the demand for online learning will increase and new approaches will be required to meet
- the learning needs of disengaged learners.
- the concept of "failure" needs to be revisited so that failure can be as powerful as success—HEIs are currently failure intolerant.
- the need to develop innovation as a learning culture because "innovation springs from the freedom to connect ideas in new ways" (p.2).
- the imperative to devise strategies to preserve digital expressions of institutional practices otherwise HEIs are at risk of "losing generations of scholarly, cultural and creative contributions."

Finally, we conclude that there is a clear shift in South Africa's HE from relatively low/poor ICT infrastructure where institutions were solely responsible for both infrastructure and education provision to a more cloud-based ICT infrastructure with 'unlimited' educational possibilities, with a higher reliance on low-cost, mobile, flexible, ubiquitous technology solutions often initiated and provided by academics and students. While large systemic shifts in the teaching and learning practices of institutions on the whole are not perceptible, there now exist multiple opportunities for individual academics and students to shape their own learning and teaching context.

Table 1: Twenty years of technology-enhanced learning in South Africa in a nutshell

Phases	Global shifts (Horizon Reports)	South Africa	Underlying question for each phase
1. (1996–2000)	Predominate focus on innovative uses of "new media" technologies in particular text, illustrations, photographs, sound, voice, animations, and video to enhance learning and teaching	Technology was used to increase productivity, for research in libraries and for drill and practice, computer-aided instruction, with a beginning consciousness of the digital divide	How to overcome the disparity in physical access to computers so as to ensure that computer-assisted instruction did not widen the digital divide
2. (2001–05)	The Internet, mobile technologies and ubiquitous wireless were exploited for active learning and collaborative production of knowledge	Primarily focused on building ICT infrastructure, the democratisation of information, policy development and research mainly focused on comparing effectiveness of teaching with or without technology	What policies and infrastructure would enable equitable access, uptake and use of ICT for teaching and learning in higher education?
3. (2006–10)	The NMC Horizon reports predictions for this period were learning objects, content aware computing (2004) and extended learning, ubiquitous wireless and social networking (2005, 2007)	Use of ICT became part of institutional strategic directions, digital divide debates focused on epistemological access, research begin to have a pedagogical agenda	What ICT mediated practices could leverage the scholarship of teaching, learning and professional development?
4. (2011–16)	The 2007 NMC Horizon report anticipated that new forms of scholarships and emerging forms of publications would become mainstream in 4–5 years as of 2007	An era of mobile learning and social media. The promise of digital devices acknowledged in Green Paper (DHET, 2012)	What is the role of HE when the majority of students own mobile devices, are socially connected, digital content is freely available and MOOCs are a buzzword? How will we proceed in the future?

We are hopeful that these opportunities provide ways of working towards participatory parity in terms of access and use of TEL practices, extending learning seamlessly across many boundaries and barriers currently thwarting participatory parity.

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Statements on open data, ethics and conflict of interest

This paper draws on the findings of a review of the literature and publicly available secondary and tertiary sources. Human ethics approval was therefore not required since no confidential databases or primary data are reported. The authors are not aware of any conflicts of interest.

Notes

[1]We see our own definition of emerging technologies to be consistent with that of Veletsianos (2010:17), who defines them as, 'tools, technologies, innovations, and advancements utilized in diverse educational settings to serve varied education-related purposes'.

[2]www.edmodo.com.

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