

## Editorial

This special issue is published at a time when education systems globally, and South Africa in particular, are at the cusp of significant changes on many fronts. In September 2015, the University of Cape Town's Educational Technologies Inquiry Lab (ETILAB), in conjunction with the University of Greenwich, the University of the Western Cape, Cape Peninsula University of Technology and the University of Stellenbosch, as well as the British Educational Research Association and the British Journal of Educational Technologies, hosted the *Emerging Technologies and Authentic Learning in Higher Vocational Education Conference* in Cape Town, South Africa. This conference was also part of the ESRC HIVE-PED Research Seminar Series<sup>1</sup> (Higher Vocational Education & Pedagogy). A glittering line-up of highly respected scholars joined the conference from around the world to make this an unforgettable experience. In the same year, the African Virtual University, the e/merge Africa network and the ETILAB hosted a unique online colloquium with the theme: “*Transforming Pedagogical Practices in African Higher Education with blended and online learning.*” Both the conference and the colloquium provided the incentive for this special issue.

Emerging technologies (Veletsianos, 2010) are either instruments of change or catalysts for transformation. Emerging technologies are transforming society as we know it (Bozalek, Ng'ambi, & Gachango, 2013; Johnson, *et al.*, 2016; Ng'ambi, 2013) and inspiring technological innovation in previously un-thought-of practices, beliefs and perceptions (Ng'ambi, 2013; Somyürek & Coşkun, 2013). New careers have sprouted as a result (digital media marketer or social media strategist to mention but two) and opportunities that could not be imagined even a decade ago. Despite the pervasive effect of technological innovation on the greater society, many education systems have remained unresponsive, while others have been variously, cautious, lethargic or resistant towards effecting change. However, as the New Media Consortium (NMC) Horizon 2016 Report for Higher Education notes, the two greatest trends in education globally are likely to be “*advancing cultures of innovation*” and “*fundamentally rethinking how universities and colleges work*” (Johnson *et al.*, 2016). This special issue is positioned to explore the fundamental transformation of education globally and the formation of cultures of innovation mediated by emerging technologies.

Students entering institutions today no longer learn the way their teachers and parents did when they were students, and will pursue future careers, which parents and teachers could scarcely imagine. (Which parent or teacher could add to their CVs that they drove the Mars Rover while seated on Earth, or perhaps that they were endorsed by leading brands simply for having followers share their carefully posed online photos?) What is more, the recent OECD Programme for International Students Assessment (PISA) report observes that both parents and teachers lack experience and knowledge of the technologies that today's students use and will use in their adult lives (OECD, 2015). Accepting this statement has implications on how teachers will be equipped to prepare the next generation of adults. Educational institutions are under increasing pressure to fundamentally change long-established teaching and learning practices to prepare learners with the knowledge, skills and competencies needed to successfully navigate such future requirements. In addition, there is an enormous expectation placed on institutions of learning to embrace the potential role of emerging technologies in preparing future generations of an entrepreneurial, knowledge workforce towards cultivating cultures of innovation (Johnson *et al.*, 2016).

Fundamentally changing education systems is a mammoth undertaking. In many ways education systems can be compared to the South African national railway system (the Railways). It

took years to lay down the tracks (railway lines) that predetermine where users get on board (at stations), where trains change tracks or link up to other tracks. Trains operating on the system follow predetermined routes and users adjust their plans to fit the routes preplanned by the Railways, they go to predetermined stations to board and get off at fixed locations. Even when the users' travelling needs change, moving the track to re-position it on a new pathway is not a short term project, is a costly venture and, more often than not, the default position is to resist change altogether.

Over the years, many pressures, from school reform to effectiveness and improvement movements, have required educational institutions to change and transform. Emerging technologies have both amplified calls for change, and the need to harness learners' competencies in using emerging technologies outside education systems to achieve pedagogical outcomes. Such arguments have slowly but surely moved to the centre of education debates, with most educational institutions now regularly including Information and Communication Technologies (ICTs) in their strategic plans for future development. This follows the example of governments worldwide that have defined ICT policies on education as critical areas of development. The government of South Africa, for instance, developed a vision of how schools will be beyond 2020, inspired by the current rate of technological penetration (Department of Basic Education, 2015).

The general diversity of learners, their needs and varied levels of preparedness for higher education, requires that learners have varied entry points in education, personalised support, and be neither taught nor assessed homogeneously. However, educational institutions find themselves in a similar situation to the Railways: curricula are standard, as is the standard travel-time—12 years in formal education if students are lucky or maybe longer if they are not; while pedagogy and assessments assume uniformity of learners. Individual travel paths are almost unheard of and changing tracks mid-way through the journey may just be an 'inconceivable' request. To transform such a fixed light rail system fundamentally, is near impossible if one uses the same mindset with which it was developed. When viewed through the same lens with which education has traditionally been seen, for instance, emerging technologies become interchangeable with previous tools, just a newer and more modern chalkboard or writing slate. Learners continue to receive information in carefully measured amounts at specific points in their development, points predetermined by a homogenous age expectation rather than their individual development or potential, their needs or priorities.

Fundamentally transforming such a system requires a radically different mindset, one that does not perceive existing systems and structures in the same way nor places the same value on beliefs, perceptions and practices that have been celebrated, upheld and perpetuated for generations.

Various avenues towards achieving this intricately involve the use of emerging technologies in re-imagined ways. The use of emerging technologies globally is changing how society perceives problems and challenges, how solutions are developed and implemented, and how changing discourses impact practice.

Globally, social media platforms like Twitter and Facebook have become vehicles for social or political mobilisation. These have included global fundraising (remember the Ice Bucket Challenge that raised funds and awareness of ALS/Lou Gehrig's Disease?) and awareness campaigns from Global Warming to Save The Rhino campaigns, for instance. During the events of the Arab Spring of 2011 and, most recently, the #FeesMustFall movement starting in Cape Town, South Africa, social media provided a powerful tool not only to broadcast information among participants, sympathisers and the greater public, but also to provide a shared space for debate and conversation.

This type of digital political activism powerfully impacts practice: in the 70s and 80s, armed with loudhailers or public address systems, protesters against the Vietnam War or Apartheid could share their message to those immediately present, while mostly only the leaders spoke and shared their views. In 2015, students across the South Africa shared their opinions on a public platform, a national conversation on Twitter and Facebook ensued, and many thousands could share their thoughts, ideas and suggestions. This was not possible 10 years previously, as Facebook was only started in 2004 and Twitter in 2006. The confluence of devices, data and users had first to reach a critical mass to warrant the widespread impact seen in 2011 and 2015.

The #FeesMustFall movement may well have initiated an irrevocable change to Higher Education, not only in South Africa but globally. What started as a barricade of the University of Cape Town's campus in the early hours of Monday, 19 October 2015, within hours grew into the #FeesMustFall movement. Within days of the original protest, universities around South Africa had shut down, as students protested high fees and demanded an end to the outsourcing of campus workers. However, as the University of the Witwatersrand (WITS) Student Representative Council (SRC) president, Nompandolo Mkhathshwa, noted, "*There was not a master plan*" (Cape Talk Radio, 24 November 2015), instead, using Twitter and Facebook, student leaders were able to mobilize fellow students, read the demands of thousands of voices, and use this as their mandate. They created a space where they could lead themselves, make demands and execute this devoid of external pressure and influence (Mkhathshwa, CapeTalk Radio 2015). Through Twitter and Facebook, the country's students became instantly part of a greater tide that sparked a national and international debate, with many joining the protests locally and in other countries. Under pressure from students across the country and abroad, the South African government capitulated and agreed not to increase fees for 2016. Their combined efforts, mediated by social media across the nation's universities, directly challenged the 'way things are done'. The students' efforts are an example of how change or radical transformative ideas can emerge from the bottom, without first waiting for a 'master plan' (such as policies) and can lead to change that persists.

The #FeesMustFall movement was arguably one of the first nationally cultivated cultures of innovation (Johnson *et al.*, 2016) that quickly gained global support. The powerful potential of social media use such as that in both the Arab Spring and the #FeesMustFall movement's success, is unparalleled in its immediacy, instantaneous reach and power to unite widely dispersed communities and demographically diverse individuals to a common cause. The #FeesMustFall movement enables us to ask critical questions as to the potential of emerging technologies in education to cultivate cultures of innovation and ways to change practice.

Creating and cultivating cultures of innovation disrupts the Railways mentalities to education. The example of the organic growth of students' and activists' use of social media provides some guidance in this regard. Through social media the students were able to connect supporters across provincial and national borders to a broader collective, enabling them to tactically and strategically react to events in real time. Their existing connections enabled them to network with already established networks and harness the powerful energy inherent in collaboration mediated by emerging technology tools. This collaboration provided the momentum for the rapid rise in its prominence and within hours the movements' actions were trending around the world.

At its heart, the movement created and cultivated a community by networking existing networks of communities to a common cause. Unlike face-to-face (f2f) communities that are limited to engaging with a few hundred individuals, the online communities instantly enabled members to engage with many thousands of individuals who shared in the culture, ideology and goals of the movement. The #FeesMustFall and the Arab Spring movements provide good examples of this logic in action. Online communities determined what was important and mobilised communities to address the problem. Having risen to prominence in the online community, the

cultural meme of #FeesMustFall and #EndOutsourcing, became dominant and powerfully focused the community on their end-goal, allowing them to ignore peripheral motives and distractions. In this way less powerful memes fell away in favour of more prominent ones. Through Facebook and Twitter, students, for example, disseminated the critical meme of “No Violence” that was disseminated to all participants, often repeated and reinforced in various spaces. This cemented an anti-violence discourse throughout the movement, which translated into action. The meme translated into a changed discourse captured on Twitter and Facebook, in public meetings and small group discussions, where student protest through non-violent means was emphasized. The discourse became embedded in action, embodied as belief and perception, changing dispositions of those involved in the protest action and leading to changed behaviour.

The powerful role that social media played in disseminating memes and thus leading to changed practice, could only be achieved once a critical mass of enough active users, owning enough devices (mobile phones) to generate content / data that could be used by many others, was achieved. The memes that were generated provided the building blocks for creating a new culture, a new multiple-single-mindedness shared by many, towards achieving an organically created goal. This powerfully shifted students’ internal dispositions to no longer see themselves purely as individual beings but as part of a broader collective of students walking into classrooms in 2016.

Education systems worldwide are welcoming these learners in 2016. Walking into classrooms, the greater majority are forced to leave their devices, and especially their mobile phones, outside the classroom. They are mostly forced to sit still, expected to absorb information disseminated from the teacher and tested individually on their retention of said information. Their socially broadened and networked lived-experiences differ significantly from this experience, but are disregarded, as the Railways-Education model does not easily deviate from its predetermined tracks or allow students to determine how they want to travel, let alone with whom they would like to travel. Creating a culture of innovation within such a predetermined mindset requires a breaking with a the Railways-education system mindset, and a deliberately designed, empathy-driven change process that does not merely rebrand existing structures in ‘new apparel’ but actively fosters the development of new mindsets with which to imagine a different way of thinking and being.

The University of Cape Town’s Educational Technologies Inquiry Lab (ETILAB) conceptualised a space in which this mindset-change can be imagined and a different culture cultivated. Critically informed by the process of empathy, the ETILAB runs ‘sandpit sessions’ in which participants are given an opportunity to play with various technologies towards finding solutions to their own pressing problems or agendas. Teachers, for instance, have found it very difficult to know ‘*how to integrate technology*’ into their everyday practice, and approached the ETILAB team to help them achieve this. Using the ETILAB process, the team works alongside teachers towards changing mindsets and finding solutions that are immediately usable in their classrooms. The ETILAB functions as a Makerspace where the outcome of teachers’ engagement is a built model, system or product, that participants develop using a design-thinking process.

Through their engagement in the sandpit session, participants are introduced to a different mindset, that of ‘learning in action through play’. This is modelled to participants who experience rapid prototyping, often for the first time. The environment is purposefully kept light-hearted and cheerful, with facilitators guiding participants through the process in a jovial, relaxed manner. It deliberately contributes to creating a playful atmosphere. Play, as Koehler *et al.* (2011) point out, is “‘*fun*’ for its own sake” and involves high levels of engagement and participation, cognitively and physically (Koehler *et al.*, 2011, p. 153). Engagement in play encourages creativity and rapid adjustment to change, fostering an innovative culture since “*Play has been shown to contribute to the development of more flexible brains, leading to mental suppleness and a broader behavioural vocabulary*” (Koehler *et al.*, 2011, p. 153).

Education systems globally need to transform pedagogies. This fundamentally requires a mindset change to address existing structures with a different mindset from that which was used to create them. Since emerging technologies are increasingly ubiquitous and students are already using these, a critical next step towards transforming antiquated education systems requires action on behalf of educators and enabling policies to mediate change. Emerging technologies are transforming society, as in the example of the #FeesMustFall movement discussed above, and have the potential to transform the practice of teaching and learning, given the chance. Since the critical mass of teachers as active users of social media, owners of devices and online data users may not have been widely achieved yet, another avenue may be the use of Makerspaces (Johnson *et al.*, 2016) like the ETILAB where participants engage in play to develop solutions to address their immediate needs and priorities.

The papers in this issue further discuss means towards transformation and change. It is hoped that the papers in this issue provide a critical reflection on pedagogic practices, and rather than wait for change to arrive, to become consider the potential for? a dynamic instigator for change, one who does not only bring about change but is also changed in the process. This is typical of emerging technologies, they are catalysts of change, and they change to re-adjust to the changes they have brought about. It is this evolution that makes the future unpredictable, and creates a high dependence of continuous checking of both the global and national dashboards.

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## Note

<sup>1</sup><http://goo.gl/qJUXaq>

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