

Editorial

This special issue: *Emerging Technologies and Transforming Pedagogies: Part 2* continues our theme of recognising and responding to profound changes in educational technology. This focuses not only on significant, rapid global developments in technological change, but also on the accompanying capacities—or inabilities—of higher education institutions to adapt their pedagogic theories and practices to cope with the changes affecting tertiary education systems across the world. The focus of this issue is, therefore, again on technology-enabled learning (Jonassen, 1996) in authentic learning contexts in higher vocational education in Africa, but in this follow-up companion to *Part 1*, we broaden out our scope from the continent to include also articles from around the world that recognise the potential for rapid educational change orchestrated in tandem with technological advancement. The edition extends the work achieved in *Part 1*, building on research linked with two educational technology initiatives held in Africa in 2015. First, we include research that emerged from the online colloquium, *Transforming Pedagogical Practices in African Higher Education with blended and online learning* held in April 2015 and, second, academic research linked with the conference on *Emerging Technologies and Authentic Learning in Higher Vocational Education (ETinEd)* held in September of the same year. The University of Cape Town, in collaboration with numerous expert international partners, hosted and organised both of these scholarly initiatives. The African Virtual University, the e/merge Africa network and the University of Cape Town's Educational Technologies Inquiry Lab (ETILAB), hosted the online colloquium. For the organisation of the conference, the papers from the colloquium and in support of both special editions, the ETILAB collaborated with the University of Greenwich in London, the University of the Western Cape, Cape Peninsula University of Technology and the University of Stellenbosch, funded in part by the British Educational Research Association Educational Technology Special Interest Group (the BERA EdTech SIG), supported by the Editors of the *British Journal of Educational Technology*.

The underpinning themes of authentic learning (Herrington, Reeves & Oliver, 2010) and pedagogic responsiveness to emerging technologies (Veletsianos, 2010) are highlighted in our continuing emphasis on the potential of “cultures of innovation” positively to transform and re-shape student experiences, universities and colleges through technology-enabled learning (Johnson *et al.*, 2016). In consideration of the many ongoing obstacles to such transformation, however, it is salutary to note that two decades after Christensen's concept of “disruptive innovation” (Bower & Christensen, 1995) was first applied to the potential of educational technology to transform teaching practices in higher education, there is, in fact, still continuing resistance to pedagogic change in academic teaching practice.

Prior research also demonstrates that “most students have not used digital technologies in deep and/or critical ways” and that differential student preparedness is key: there are “important variations in students' experiences in technologically integrated learning” (Howard, Ma & Yang, 2016). Furthermore, Herrington *et al.* (2010: p. 3) critique the tendency within higher education to rely “on pedagogy that promotes decontextualised, abstract forms of learning – learning that frequently remains *inert*,” lacking authentic real-world relevance. Hence, although an unstoppable momentum of technological change is all around us, to an extent, within higher education, a resistance to embrace the full potential of technological innovation has given rise to a continuation of traditional methods. “*Plus ça change, plus c'est la même chose*” (“the more things

change, the more they stay the same”), as the historian Karr sagely observed in 1849 (Karr, 1867). Indeed, Laurillard’s caution in 2007 regarding the realities of implementing pedagogically-inspired educational technology transformations still holds true in 2016 in many institutions:

“[...] we tend to use technology to support traditional modes of teaching – improving the quality of lecture presentations using interactive whiteboards, making lecture notes readable in PowerPoint and available online, extending the library by providing access to digital resources and libraries, recreating face-to-face tutorial discussions asynchronously online – all of them good, incremental improvements in quality and flexibility, but nowhere near being transformational.” (Laurillard, 2007: p. xv).

Hence, the Editors observed in *Part 1* that emerging technologies could be both “instruments of change” and “catalysts for transformation” in student experiences of learning (Ng’ambi, Jameson, Bozalek & Carr, 2016), but, the same time, we recognised that like the Railways, large-scale higher education systems could have such rigidly pre-determined rules for learners that anything other than individualistic one-off experimentations in pedagogic transformation were almost impossible. The continuing lack of e-leadership and resistance to implementing change that we highlighted (Jameson, 2013; Ng’ambi & Bozalek, 2013) therefore, paradoxically, has gone alongside technological innovations that are *also*, simultaneously “transforming society as we know it” (Bozalek, Ng’ambi, D. & Gachago, D, 2013; Johnson *et al.*, 2016) and inspiring “previously un-thought-of practices, beliefs and perceptions” (Ng’ambi, 2013; Somyürek & Coşkun, 2013). In the late C6th BC, Heraclitus suggested a kind of complex unity of opposites in the fact that one could not step into the same river twice. While a river-bed might remain more or less same, the water running through it is always ceaselessly in flux. So, in like manner, higher education systems around the world are facing a paradoxical, somewhat tense coexistence of contrary impulses both for and against change in the convergence and integration of emerging technologies with changing pedagogical practice.

In South Africa, eg, a new generation of students born after 1994 (famously referred to as the “born-free” generation) are the new water running through the river-beds of higher education. This Special Issue is published at a time when higher education institutions in South Africa are revisiting their strategic plans in order to be more responsive to this new generation of students who expect blurring lines between technologies they use every day and those they use for learning, and new debates are emerging on decolonisation of the curricula.

To highlight the need for diverse, critically engaging, challenging responses to these demands for both change and ongoing stability in higher education, we include in this Special Issue an innovative thought leadership position paper on *The Realm of Learning Innovation— a Map for Emanators* from **Professor Gilly Salmon** of the University of Western Australia. An invited Key-note Speaker for the ETinEd 2015 conference held at the University of Cape Town, Gilly provides a map for framing new learning and teaching initiatives, classifying these into four quadrants of learning innovation to describe activities undertaken in or outwith higher education institutions by the kinds of inventive educators she terms “Emanators”. Recognition of the inspirational qualities, importance and complexities of this “sense-making” navigational map led us to position this paper as a leadership thought-piece emerging from the conference to report on potentials for educational and technological change, itself riding the crest of an editorial wave towards greater flexibility in publishing.

Looking back to an informed historical perspective can contribute to global knowledge of developmental contexts. The article by **Ng’ambi, Brown, Bozalek, Gachago and Wood** provides

an important link within the focus of this special issue. The article provides a “rearview” summative analysis of a 20-year journey of technology enhanced learning (TEL) in South African higher education, reflecting massive global and national digital networking developments in that era. An analysis of relevant literature is presented in four phases: phase 1 (1996–2000), phase 2 (2001–05), phase 3 (2006–10) and phase 4 (2011–16). Each phase in this long journey represented a gradual shift towards greater openness and access to Information and Communication Technologies (ICTs), with “unlimited” educational resources now freely available. Yet the authors find that although mobile technology and social media access has greatly increased, teaching and learning practice in South African higher education remains, disappointingly, largely unchanged. The authors note that this article provides a base from which to think about technology enhanced learning in any low-cost, mobile, flexible, ubiquitous technology context, promoting an expanded view of computer literacy within this context, and highlighting some of the challenges for professional development.

The issue of changing developments in educational technology in South Africa is again picked up in the articles by Daniela Gachago *et al.* and Michael Rowe. **Gachago, Livingston and Ivala** identify the potential of a low-cost accessible resource in “podagogy” (pedagogy enabled through the tool of podcasting) to provide inclusive learning in South African higher education for non-traditional students in resource-poor situations, particularly when those students are mature, female and when English is either their second or third language. The paper highlights the importance of differential uses of podcasting in teaching to maximise student engagement and benefit within particular subject areas in higher education, articulating the unusually rich potential of pedagogy to enable socially inclusive provision. The authors’ findings confirmed the complex nature of emerging technologies, highlighting results that in part contradict the literature and calling for an approach to integrating technologies that is sensitive to local contexts, specific student needs, challenges and resources. The authors note that this study and many others in the field show that students’ perceptions of technology cannot be pre-judged, based on research carried out elsewhere.

Writing in the context of a South African university physiotherapy department, **Michael Rowe** analyses an innovatory development of higher level graduate attributes in undergraduate physiotherapy students through a collaborative open online course, applying principles of authentic task design. The focus of this authentic learning study involved a professional ethics course undertaken by undergraduate physiotherapy students: the research involved a collaboration with qualified physiotherapists from multiple countries around the world (Canada, Estonia, India, New Zealand, Saudi Arabia, South Africa, United Kingdom and United States). Rowe analyses the use of a blogging platform in a collaborative open online course, in which authentic learning, combined with technology, enabled new forms of communication. This improved student engagement, opening up academic processes in ways that are hard to achieve using traditional, classroom-based teaching methods. Rowe found that open online courses offer innovative teaching and learning opportunities that can enhance the student learning experience, especially in the development of non-cognitive skills and generic graduate attributes. Rowe recommends that as social media and other collaborative online technologies become increasingly embedded in higher education, educators will need to be familiar with the context of learning in open online spaces.

Widening out from pedagogical innovations in educational technology in Africa, we consider now a range of papers from around the world that echo in different ways the themes of this special issue. **Lucie Lindsay** discusses transformation in a New Zealand context of authentic professional development in teacher practice, applying this to mobile technology and m-learning pedagogical approaches. While most of this special edition focuses on students in higher

education, the professional contexts for teachers in schools in Lindsay's study include an analysis of teachers' m-learning pedagogical approaches and the extent of transformation involved. She found that mobile technology enhanced learning with task activities and information access, also commonly offering innovative content production. Opportunities for pedagogical transformation appeared partially realised, but the potential for situative learning using authentic contexts seemed largely unrealised. Transformative pedagogical approaches were not prevalent despite collaborative inquiry and situative approaches, with authentic contexts linked to developing higher order thinking and future focused skills, a key focus for educators. Lindsay concludes that the use of one-to-one mobile technology in the classroom is a new educational practice with significant potential. This study provides a snapshot to contribute to building the necessary body of work on m-learning pedagogical transformation.

A focus on innovation in technology enhanced learning is again the theme of the article by **Foshee, Elliott and Atkinson**, who describe a situation in the US in which colleges face an academic crisis, in that thousands of high school graduates are performing below the expected ability for college-level mathematics. The paper describes an innovative approach intended to improve the mathematics performance of first-year college students, at a large US university. The innovation involved the integration of faculty-led instruction with technology-enhanced learning. In this case, TEL referred to a software program that delivered mathematics education using an adaptive, self-paced, individualized, mastery-based approach. The authors examined the extent to which TEL met the educational requirements of college students in need of remediation, exploring the effects of TEL on students' beliefs about their academic ability and academic behaviours (academic competence). The sample of 2880 included all students enrolled in a single semester of remedial mathematics. Results suggested successful remediation, as indicated by the end-of-semester course completion rate, with 75% of students eligible to enrol in a first-year sequence mathematics course and an additional 18% on track for eligibility by the following semester. TEL also appeared to have a positive, statistically significant effect on students' learning and academic competence. For these findings, the authors discuss study limitations and implications for future research.

Writing from the Netherlands, **Bos, Groeneveld, van Bruggen and Brand-Gruwel** discuss the use of recorded lectures in education and their impact on lecture attendance and exam performance. Universities increasingly record lectures and make them available online for students. Though the technology to record these lectures is now solidly implemented and embedded in many institutions, the impact of the usage of recorded lectures on exam performance is not clear. The purpose of this study is to address the use of recorded lectures in an authentic setting by focusing on the actual time spent on the usage of recorded lectures and the impact on lecture attendance and exam performance. The participants were 396 first-year university psychology students attending a mandatory course on biological psychology. During the course, student attendance to face-to-face lectures was registered and the viewing of the recordings monitored. Results revealed that a large amount of students used the recorded lectures as a substitute for lecture attendance. The group who used recorded lectures as a supplement when developing a knowledge base scored significantly higher on the assessment. When assessing higher order thinking skills, no significant differences were found between using recording lectures and attending lectures. This can be partly explained by relatively low predictive value either form of lectures had on exam performance.

Venturing out now into innovation in virtual worlds, **Ward, Falconer, Frutos-Perez and Harold** analysed pedagogical innovation in the use of virtual online simulations to engage undergraduate psychology students with employability issues. The authors compared online simulation with equivalent face-to-face activities for three scenarios. The intention was that the

three sets of activities would increase participant awareness of how psychology is applied in relation to work-based contexts. These were a Dragons' Den-style activity to increase awareness of entrepreneurialism, a supermarket-based activity based on consumer and work psychology and a counselling agency. After engaging in the activities, participants completed various measures, including a satisfaction questionnaire. In the supermarket scenario, Second Life® was rated significantly better in terms of student satisfaction and the extent to which awareness of the application of psychology in this context had increased. For the other scenarios, Second Life® and face-to-face activities were largely equivalent on the various measures. The exception was that in the online counselling scenario, participants did not indicate to a significant degree that they were now more aware of how psychology was applied in this setting. The authors suggest that the overall superiority of the online supermarket scenario is because this complex problem-based activity achieved greater immersion in the online version.

Authentic learning relating to a vocational learning context emerges as an important theme for the article by **Martin and Ertzberger**, who discuss the effects of reflection type in a “here and now” mobile learning environment with the capability to engage learners anytime and anywhere and situate them in their learning context. Mobile devices provide opportunity for learners to participate in reflective activities with experts, peers or self while being situated in the learning context such as being in a museum or gallery and using mobile content to learn about exhibits. The authors examined the effects of here and now mobile learning on student achievement and attitude based on different types of reflection (no reflection, self-guided reflection and reflection with virtual expert). Students ($n = 103$) who were enrolled in teacher preparation courses at a public regional university in the United States participated in the mobile learning intervention on art content, completing a post-test and attitude survey. Analysis of achievement data revealed positive significant differences on reflection type whereas attitude data did not reveal significant differences. The implications of the findings are discussed for those designing and implementing mobile-based learning.

From an academic faculty perspective, **Kopcha, Rieber and Walker** explore the understanding of university faculty perceptions about innovation in teaching and technology. The purpose of their research is to understand these faculty perceptions in a college of education in a research-intensive university. Their study was motivated by the creation of a new initiative begun in a large college of education at a Carnegie research-intensive university to promote innovation in teaching with the support and creative use of technology. This study used Q methodology, a mixed methods research design involving quantitative and qualitative analysis of descriptive data derived by a sorting activity. Results showed four emerging profiles about how faculty perceive innovation in teaching and technology. Faculty comprising three of these profiles shared the characteristic of valuing technology's role in teaching, though in different, nuanced ways. Faculty representing the fourth profile, by contrast, were cautious and skeptical of using technology for teaching. Implications of the study are discussed, including the authors' caution not to assume that college faculty share meanings for words like “innovation in teaching and technology.” The results of this study are useful to understanding theories of innovation based on faculty's perceptions of their ability to adapt to rapidly changing and ever-increasing technology innovations for teaching.

From another global context, reporting on technological innovatory research in a tertiary educational context from Hong Kong, **Cheng, Chu and Ma** investigate tertiary students' intentions to e-collaborate for group projects, exploring the missing link from an extended theory of planned behaviour model (TPB). With the emergence of web technologies, students can conduct their group projects via virtual platforms, which enable online collaboration. However, students' lack of intention to use web technologies for conducting group work has recently been

highlighted. Based on the theory of planned behaviour, the authors' paper developed and examined an extended model, specifying what factors affected e-collaborative intentions. Data were collected from major tertiary institutions in Hong Kong, with 1120 students completing the questionnaire. The partial least square approach to structural equation modelling was used to analyse the a priori hypothesised model, which was empirically supported. Past experience and self-esteem were found to play substantial roles in explaining e-collaborative intentions. Moreover, the mediating roles of attitudes and perceived behavioural control were confirmed.

In an Australian context, **Ellis and Bliuc** report on an exploration into first-year university students' approaches to inquiry and online learning technologies in blended environments. In these environments, research into university experiences suggests that student approaches to learning are a key determiner of the quality of outcomes. The study developed relevant measures to help understand the interplay between student approaches to inquiry (SAI) and approaches to using online learning technologies (SAOLT) in blended environments. Based on a first-year university sample, two questionnaires exploring qualitative variations in the SAI and SAOLT were developed, each with two subscales of deep and surface approaches: their construction was informed by existing research identifying qualitatively different approaches to inquiry and learning technologies. Results indicated that the two questionnaires showed satisfactory validity and reliability in measuring SAI and SAOLT. Deep approaches to inquiry were positively and logically related to deep approaches to online learning technologies (while surface approaches to inquiry were related to surface approaches). Participants clustered in distinct groups according to qualitatively different approaches to inquiry and online technologies. The outcomes have tangible implications for teaching and design, in particular for teachers aiming to support students to develop effective learning strategies in blended environments where students need to integrate experiences and ideas across face-to-face and online contexts.

Continuing the theme of pedagogic innovation from the UK, **Toeteneel and Rienties** analyse 157 learning designs using learning analytic approaches to evaluate the impact of pedagogical decision making. The authors assert that educators need to change their pedagogic practice as contexts within educational transformation. The article highlights the need to capture educators' "tacit" knowledge relating to course material, visualising learning design decisions, activity types and workload by employing learning analytics methods. In the analysis of the learning designs of courses taken by 60,000+ students, common pedagogical patterns were identified. Analysing the learning designs using a taxonomy of seven different learning activities, the authors found that the majority of educators used two activity types most widely: assimilative and assessment activities. While educators rely heavily on these activities, no positive correlation was found between any of the seven learning design activity types and student outcomes. The authors' initial findings suggest that student outcomes are negatively correlated with a high proportion of assimilative activities. Further studies are needed to establish whether particular learning design decisions are related to student outcomes and whether these findings can be replicated in different research settings.

The theme of pedagogic innovation in higher education is again explored in the UK in the final article by **Glover, Hepplestone, Parkin, Rodger and Irwin**, who explore Pedagogy first, a programme to realise technology enhanced learning by focusing on teaching practice. The authors' paper explores the "pedagogy first" approach to technology enhanced learning that was developed by Sheffield Hallam University as a method to encourage the use of, and experimentation with, technology within teaching practice and to promote the mainstreaming of innovative practice. Through a consultative approach where all university staff members were invited to contribute, the university created a Teaching Approaches Menu that reflected practice at the institution and can be used to explore teaching practice and appropriate supporting

technology, either by individuals or as part of a facilitated discussion. The authors provide the background to the project, along with the design philosophy and approach, including a brief review of other frameworks. In this paper, the authors introduce the Teaching Approaches Menu, outlining its development: some initial feedback is presented.

Jill Jameson

Professor of Education and Chair, Centre for Leadership and Enterprise, University of Greenwich, London, United Kingdom

Email: J.Jameson@greenwich.ac.uk

Professor Jill Jameson's research interests are in higher/post-compulsory education, critical issues in educational technology, e-leadership, social learning, trust, communities of practice and social media.

Dick Ng'ambi

Professor and Founder of the Educational Technology Inquiry Lab (ETILAB), School of Education, University of Cape Town, South Africa

Professor Dick Ng'ambi's research interests are in mobile learning, emerging technologies in resource-constrained contexts, emerging digital practices, and social learning.

Vivienne Bozalek

Professor and Director of Teaching and Learning, University of the Western Cape, South Africa

Professor Vivienne Bozalek's research interests and publications focus on the political ethics of care and social justice, feminist new materialisms, innovative pedagogical practices in higher education and participatory methodologies.

Tony Carr

Centre for Innovation in Learning and Teaching, University of Cape Town, South Africa

Tony Carr's research interests focus on professional development for teaching with technology, the use of social media in tertiary education, and the design of online conferences and networks for professional development.

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