Editorial

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Exponential technological innovation in areas such as Artificial Intelligence, robotics and the Internet of Things, will change the nature of work across industries and occupations with many future jobs being ones that do not yet exist. Concomitantly, there will be job losses particularly where automation substitutes human capital. When we take into account the need of human beings to generate an income and to have a meaningful and purposeful life, which for many is given expression in work, it is apparent that education needs to change. Major shifts in understanding the nature and purpose of education need to occur to reflect this new reality. There needs to be education appropriate for this fast-emerging new global economy and in which all learners and students are given the skills and tools to flourish.

Furthermore, not all countries are at the same stage of development or following the same growth trajectory. Each country has different circumstances and challenges. Indeed, within many countries there is a wide gap between education practices not only at the different levels in the system but within levels. Nowhere is this more apparent than in South Africa with its first and third world divide; the increasing rise of squatter camps; the rural and urban divide, and the correspondingly widely varying infrastructure and resources not least in its education institutions. In some areas of the country, the second industrial revolution still needs to be fully experienced due to a lack of electricity and in yet more, the third industrial revolution is still not fully realised. Nevertheless, this fourth industrial revolution will still impact such communities.

What then do we teach at the different levels in the system and what are the appropriate pedagogies to ensure that students are optimally prepared for work and society during this period of disruption? One initial response with respect to the latter is to equip students with 21st century skills in the cognitive, interpersonal and intrapersonal domains, which, it is claimed, will produce flexible, adaptable, innovative and agile workers as well as active citizens who participate in civic society and who have cultural and global awareness.

In this 14th volume of the *Independent Journal of Teaching and Learning*, teaching strategies and student learning are addressed in many articles. While no reference is made explicitly to 21st century skills, aspects of these are addressed in the first cluster of articles. These focus on the learning experience of students as evident in teaching strategies. The concern is to ensure that deep rather than surface learning takes place. Deep learning occurs when students are able to transfer their knowledge and skills to different situations through critical thinking and problem solving and to work collaboratively to solve problems.

In the first article, the authors offer a conceptual teaching model that facilitates learning agility and softens the boundaries between theory and practice; work and study. They hold that this approach will *inter*

alia graduate students who have well-developed problem solving skills which enable successful decision making. This model meets the desiderata of collaboration and teamwork; creativity and imagination; critical thinking; and problem solving – all first tier 21st century skills. An advantage of the model is that it can be applied in different curricula.

The following two papers are concerned that deep learning takes place; that students are not merely learning for exam passing then forget what they learned. In the first, the author investigates practices at a university through exploring teaching strategies and the learning approaches of students from the lecturers' perspectives through semi-structured interviews and an examination of assessment papers. She finds that at best, surface learning is taking place. This, she suggests, is due to a lack of teaching and learning policy, staff development and student support programmes. This needs to be addressed. The authors in the next paper, in a quantitative descriptive study, investigate the impact of using clickers as an active learning strategy. They find that students enjoyed using clickers, that they had a better understanding of course content and there was increased facilitator and peer interaction. As a result, this model is likely to be included in other modules of the Pharmacy programme.

It hardly needs to be said that technological expertise is a *sine quo non*; these are critical skills needed to participate fully in the 21st century world of work and society. In their paper, the authors explore in a quantative study, the use of cloud computing technologies in a higher education institution with respect to students' experiences. Their research shows that students lack sufficient skills for cloud technologies to be used successfully in learning. The last paper in this cluster investigates in a qualitative study, the challenges faced by nurse educators in ensuring the success and retention of undergraduate nursing students. The author identifies a wide range of challenges that need to be addressed if student success is to be assured.

The other cluster in this edition gives voice to a range of issues in schools that need addressing before attention can be given to 21st century skills. These deal with disparate issues such as teacher job satisfaction and the use of corporal punishment which may, at first blush, seem to have no link. However, a closer examination reveals that at the core, these concern policy and management at the different levels of the education system. In the first of these papers, the author explores factors which affect job satisfaction in a private school. He finds that working conditions, professional development and empowerment of staff are key factors in job satisfaction without which morale and motivation is low. This, in turn, has a negative impact on student learning. To create and sustain a healthy learning community, all schools need to ensure that these factors are addressed.

Sadly, the article in Practitioners' Corner shows not only a failure of implementation of policy but a failure of the policy itself. Despite corporal punishment being illegal, it is still used in the classroom and as the article shows, often with devastating consequences. Through participatory action research, the authors examine the use of corporal punishment in a school and investigates the reasons for this. They recommend professionalising the teaching profession and the democratisation of schools as a means to ameliorate this practice.

Doctoral Corner comprises abstracts of recently awarded doctoral degrees which are concerned with curriculum design frameworks at access, foundation and postgraduate levels as well as a mentoring programme for new teachers in primary schools. The publication of abstracts alerts researchers and practitioners to new research in their areas of interest.