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EDITORIAL

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Reimagining and reengineering education systems for the post-COVID-19 era

Now is the time for higher education institutions and industry partners "to systematically tackle the development of workforce skills" suggests a recent review of university–industry collaboration in teaching and learning commissioned by the Australian Department of Education, Skills and Employment (see Bean & Dawkins, 2021, p. 7). The authors—both former vice-chancellors—note, "It is critical that we view our tertiary education system as a coordinated national platform capable of developing the knowledge, skills, and capabilities of learners of the whole population, while also enhancing our economy and society" (p. 7). The report identifies specific actions in the short term, and several directions for the long-term which governments, higher education institutions, and industry partners—in Australia and elsewhere—can, and ought to, take right now to promote greater collaboration along these lines. Why now, it would seem reasonable to ask? Has the COVID-19 pandemic revealed anything we have not already known? But more importantly—if we were to act now—then how and where do we begin?

As institutions throughout the world attempt to rethink and reengineer educational futures in the wake of the COVID-19 pandemic (UNESCO, 2021), the most obvious question is where does one start and how? While there is consensus around the realization that going back to where we were pre-COVID-19 is neither possible nor advisable, there is little agreement on where and how to begin to reengineer and rebuild. There are many who fear that online and flexible approaches to learning and teaching, if featured too strongly in any future-focused educational scenario, will lead to the loss of the conventional face-to-face and campus-based educational experience. This need not be the case and it is not a foregone conclusion. It is, in fact, a misconception, and it needs rebuttal and clarification.

Online and flexible learning need not replace the conventional campus-based educational experience. Its adoption means the design and development of learning and teaching transactions and scenarios—regardless of their context—that are a lot more resilient and far less likely to lead to the wholesale breakdown of operations in the event of the next big disruption. Online and flexible learning enables us to build productive learning experiences where learners are empowered to make choices about how they wish to learn and interact with their learning and teaching environment and institutions. This is not unlike the options currently available to us on how we engage with shopping or banking and many other services. None of these options has led to the demise of shops, grocery stores, or banks. All that has changed is their operational models, and how we might be able to access their services at our own convenience as well as with impunity from disruptions of any kind. The adoption of open and flexible learning has the potential to afford us comparable affordances for building learning and teaching operations and transactions that leaves no one behind irrespective of their particular circumstances, and when this is the case, education serves as a liberating force. But one size does not, and will not fit, all types of learners and learning contexts. Getting the mixture right on the degree of openness and flexibility, and with what, will depend very much on the context, culture, and the history of an educational institution.

If we asked educational institutions or their teachers anywhere why they have designed their learning and teaching operations the way they have, many will be likely to point to conventional wisdom and practices. Educators are very likely to say that students need to know this stuff, and students will concur. Very few of the teachers or their students are likely to say that the learning activities they are engaged in serve to help them resolve an authentic problem or a challenge with which they have been presented, or that the learning activity resembles a challenge or an activity that they are likely to face in real life and in their prospective workplace. Here then lies the problem with the vast majority of the learning activities and processes in the contemporary educational space. At best, very few are likely to point to some theoretical construct about learning and teaching as their foundations. Most of these transactions are too focused on understanding and acquiring subject matter knowledge and not enough on the acts of knowing and the development of skills and competencies for the workplace, and for life more generally. What is needed is a set of uncontested generic principles of learning and cognition that we can use to guide the development of productive learning experiences, regardless of the context and the content.

A recent essay in the *Educational Researcher* offers a comprehensive set of these principles that is worth serious consideration (see Nasir et al., 2021). It draws from research on a range of disciplines including learning and cognition, neuroscience, psychology, and anthropology to propose a comprehensive set of principles to guide the development of learning experiences where "learners' full selves are engaged" (p. 557). These principles are based on the premises that "1) learning is rooted in evolutionary, biological, and neurological systems; 2) learning is integrated with other developmental processes whereby the whole child (emotion, identity, cognition) must be taken into account; 3) learning is shaped in culturally organized practice across people's lives; and 4) learning is experienced as embodied and coordinated through social interaction" (p. 557). These principles draw on no particular learning theory but on a range of theoretical perspectives on learning and cognition. Collectively, they have the potential to help us develop learning experiences—irrespective of the mode—that is respectful of, and situated in, the culture and context within which learners live and work. These generic principles ought to be the starting point of any conversation around how to rethink and reengineer education systems in a post-COVID world, or for that matter at any other time—as the articles in this issue of the journal show.

The increasing adoption of open, flexible, and technology-enhanced learning across the education sector has made available large datasets on learners' interaction and engagement with their learning environment. The opportunity to interrogate this data for further improvement of the educational experience of learners has in fact led to the emergence of learning analytics as a whole new field of educational inquiry. Unfortunately, the focus of much of this work is currently about a stocktake of learners' activity online. This data-driven approach on learners' online learning activity without a clear purpose is a serious weakness in the field, as is suggested in the article "A Scoping Review of Empirical Studies on Theory-Driven Learning Analytics" by Qin Wang, Amin Mousavi, and Chang Lu. What is missing from this analysis—these authors argue—is an educational reason for the interrogation of this data, and how this can link back to the learning process. Why is it important—for instance—to know what learners are doing online, its timing, frequency and duration, if this kind of data cannot be associated with a desirable learning outcome? The article by Wang, Mousavi, and Lu offers a rare review of studies into learning analytics that seek to reach beyond the mining of such data, to focus on the gathering of data on the

student learning experience, which is what will eventually lead to the improvement and the effectiveness of their online learning experience.

One of the key components of this kind of inquiry is the role of student peers in the learning experience of others. Much is made about the affordance of the online learning environment for facilitating the role of peer support. But this does not mean that peers are always available and ready to help out, only because of the convenience of the communication channel. Finding and accessing peer support online is fraught with challenges, and this is the subject of the article "Toward Building a Fair Peer Recommender System to Support Help-Seeking in Online Learning" by Chenglu Li, Wanli Xing, and Walter Leite. Help-seeking with the aid of artificial intelligence (AI)-based algorithms is a common and valuable practice in online learning contexts, where biases such as gender and ethnicity have the potential to negatively influence the student learning experience. In this article, the authors report on their work with building and exploring the affordances of a fairer peer recommender algorithm which minimizes or eliminates such bias found in many existing and popular AI-driven approaches. This kind of work is critical in shaping the conversation around learning analytics to help it focus on the proactive design of the online learning experience and how that can be supported by fair AI-based algorithms, as opposed to the currently predominant post-hoc data-driven stocktake of what learners are doing online.

Despite the growing popularity of open and flexible learning across the education sector, distance education has traditionally attracted older students often with a young family and full-time or part-time paid employment. This is clearly different from increasing numbers of high school graduates who are also choosing flexible approaches to learning while devoting all their time in the pursuit of their first tertiary qualification. The pressures on both groups of learners to be successful are likely to be high and cannot be easily compared. The freshmen, of course, while having the privilege of full-time study will possess far less-developed self-regulation skills. The mature-age distance learners, while possessing more developed self-regulation skills, will have competing demands on their time and energy from household chores as well as their employment responsibilities. This is the subject of the article "Distance Education Students' Satisfaction: Do Work and Family Roles Matter?" By Philippa Waterhouse, Rajvinder Samra, and Mathijs Lucassen. The findings of this study, as pointed out by Nasir et al. (2021), are the reason for the design of learning experiences that are respectful and appreciative of the context and the culture within which learners live and work.

A measure of the goodness of fit of such learning experiences is how close learners feel they are to their learning environment. This is the focus of the article by Ravi Paul, William Swart, and Kenneth MacLeod: "A Scale for Measuring Relative Proximity of Transactional Distance." Closeness, or relative proximity, is an estimate of the alignment of learning environments along several critical dimensions. These include learner-to-learner, learner-to-teacher, learner-to-content engagement, and also learner engagement with the learning environment, their assessment activities, feedback on them, and with the institution. The more closely aligned the learner feels they are along these dimensions, the better is the learning environment and the learning experience for them. As learning environments develop in complexity, measures of their proximity and suitability for learners become increasingly complex. The work reported in this article is directed at helping the understanding of that complexity. It builds upon and advances work already done along these lines by Zhang (2003), Paul et al. (2015), and Weidlich and Bastiaens (2018).

The closeness or relative proximity learners might feel in a learning environment is arguably as much a product of a learner's own agency and fortitude as it is a consequence

of the alignment of the learning environment along these dimensions, especially between learners, the learning environment, and the institution. The article "Distance Education Students' Mental Health, Connectedness, and Academic Performance during COVID-19: A Mixed-Methods Study" by Gina Di Malta, Julian Bond, Katy Smith, Dominic Conroy, and Naomi Moller explores links between distance education students' mental health, connectedness to the institution, and their academic performance. Findings of this study show that poorer wellbeing leads to less emotional intimacy, loneliness, and consequently poorer self-reported academic performance, whereas a sense of closer connection to the university helps mitigate loneliness and its impact on mental health. Although observed during the COVID-19 pandemic, these findings clearly look like having a much broader appeal.

Another measure of goodness of fit of student learning experiences is the extent to which they promote open thinking. The idea of open thinking involves openness to access through multiple pathways and perspectives such as with microcredentialing; openness to diversity and inclusion; openness to flexible learning opportunities, collaboration and competition; and openness to sharing such as with the adoption and use of open educational resources, and engagement with open scholarship. These attributes—all desirable traits that are growing in popularity—have the potential to promote the development of societies where everyone has access to learning opportunities in order to be able to make meaningful lifestyle choices and achieve their full potential. This is the focus of the article "Open Thinking as a Learning Outcome of Open Education: Scale Development and Validation" by Insung Jung and Jihyun Lee. This article reports on the development and validation of a measure of open thinking as a learning outcome. The higher the scores are on this scale, the more open, and therefore suitable, a learning environment is considered to be.

Learning engagement is another measure of the goodness of fit of student learning experiences. And this is the subject of the article "Effects of Teaching Presence on Learning Engagement in Online Courses" by Yang Wang. Learning engagement is described in this article as students' behavioral, cognitive, and emotional engagement with their learning experiences. It is a lot more than students' participation in class, group work, or in online discussion forums. The strength of learning engagement is a strong indicator of academic achievement. Teaching presence, on the other hand, comprises the sum total of teaching activities that are designed to help students optimize their behavioral, cognitive, and social presence throughout their learning experiences. These teaching activities include instructing, facilitating learning, and supporting students achieve their learning goals and outcomes. The results of this study suggest that while the various dimensions of teaching presence have different effects on students' learning engagement, some of these dimensions, such as supporting learners with their assessment activities and using technology in the learning environment, produced strong positive correlations with learners' cognitive as well as emotional engagement with their learning experiences.

A strong barometer for learning engagement in the online learning context is learners' participation with, and in, online learning activities such as discussion forums, the strength of which is also a strong indicator of learning achievement. However, student participation in online discussion forums is fraught with challenges, notoriously characterized by inadequate and erratic contributions. A major cause of this pattern of behavior is the lack of structure and guidance that is usually provided in this learning activity. Quite often these forums are left open-ended, where learners are encouraged to raise issues, ask questions, and seek help as they wish. When they are left open-ended, these asynchronous learning opportunities work well sometimes, for some learners and for certain activities. More often than not, these discussion forums remain underutilized and ineffective. For a more productive learning experience, the learning opportunities afforded by online discussion

forums need a lot more structure and guidance, careful design, and orchestration. The article "Doctoral Students' Perceptions of Student-led Discussion Forums in Online Classes" by Nara Martirosyan, Patrick Saxon, and Sandra Lee Coleman investigated the affordances of one such strategy—student-led discussion in forums. Students participating in this activity assumed the role of moderators of online discussions. There were several benefits in the assumption of this teacher/moderator role by student peers. Foremost, it required students to demonstrate leadership responsibilities, which involved design and preparatory work on their part, and moderation of the designed activities. For doctoral students—the sample in this study—this learning opportunity afforded a valuable, authentic, cognitive apprenticeship, as many of them would be engaged in this role when they themselves assumed faculty roles upon graduation. This study found that when carefully designed and orchestrated, these learning opportunities, despite being time-consuming, led to in-depth learning, diversity of thoughts, student engagement, and the development of teaching skills.

A key attribute of all of these investigations, is their focus on one or more of the core fundamental principles of learning and cognition articulated by Nasir et al. (2021). In the wake of COVID-19, the full set of these principles offer the best starting point of conversations and actions around the rethinking and reengineering of learning and teaching, as well as whole-of-education systems for the post COVID-19 era—or for that matter, any era, really. Enjoy!

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