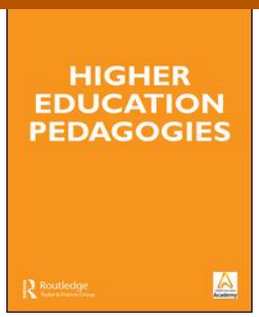

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ARTICLE

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The future of higher education (HE) hangs on innovating our assessment – but are we ready, willing and able?

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ABSTRACT

Graduates are entering a sociotechnological world, with teaching and assessment needing to reflect that, by shifting from a 'recall-on-paper' to 'do-it-for-real'. With increasing student numbers, it is not feasible to have staff-student ratios and round-the-clock availability required to provide instant feedback and ever-more interactive teaching sessions, so digital solutions are the only option. There is already growing comfort with using computers in formal assessment; however, more work is required to extend beyond performance indicators enabling digital assessments, to addressing how students apply their learning to relevant work-based scenarios. This opinion piece discusses the issues HE currently face to ensure students develop the employability skills that equip them to be proficient in the skills directly related to their degree subject but also transferable to other graduate careers. It raises possible solutions to current technological problems in developing more computer-based assessment, to enable academics to design assessments that develop the capabilities students need.

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Employability skills; assessment diversity; digital solutions

Opinion piece

Graduates are entering a sociotechnological world, with students and employers requesting more innovative teaching and assessment; testing knowledge and performance of graduate skills. Lack of innovation has caused the failure of a number of high-profile companies – outpaced by strategic inflections that altered fundamental assumptions (Grove, 1996). It is almost certain they were aware of, but discounted, factors that led to their undoing (Carroll & Mui, 2008; West & Gallagher, 2006).

Are we making the same mistake in HE? There are hints of external developments already outpacing traditional HE practices, given tensions around essay mills (Draper, Ibezim, & Newton, 2017), reduced student engagement (Parsons & Taylor, 2011), rising mental health problems (Thorley, 2017), and HE staff dissatisfaction (Loureiro, 2019). With more private-funded universities and social media, edtech and biotech sectors increasingly interested in HE (Williamson, 2018), addition of these well-funded players

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should result in significant change in the way Universities conceive themselves and operate.

To prepare graduates for this sociotechnological world, teaching and assessment needs to focus on shifting from 'recall-on-paper' to 'do-it-for-real'. What we do not assess is often ignored by ever more strategic learners, yet assessment can be limited by our current methods and technology. Hence, these two aspects are interlinked; we will not make significant operational changes without innovating in assessment. How can technology support us in designing assessments that develop capabilities students need in order to learn? More importantly, are STEM academics ready, and willing, for this transition?

A key capability for STEM graduates is the addition of digital skills to their core competency. Although assessments that develop generic digital skills are present within STEM HE (Guzzomi, Male, & Miller, 2017; Kaupp, Simper, & Frank, 2014; Vargas-Mendoza, Gallardo-Córdova, & Castillo-Díaz, 2018) most require students to submit work that is analysed and assessed manually. Authentic assessment of student competency in digital skills is intrinsically computer-mediated (Royal Society, 2019). With computer-mediated assessment lending itself to automatic analysis, opening the door to instant feedback. Traditional coursework and exams usually involve manual assessment and unless staff members are present while students perform tasks, it is impossible to overcome dangled feedback – feedback coming days or weeks after it was needed (Boud & Molloy, 2013). It is not financially feasible or physically practical to have staff-student ratios and round-the-clock availability required to provide instant feedback, so developing more digital-based solutions are the only option. Digital assessment that mirrors existing paper-based processes also have an important advantage in transferring on-campus operations to remote-working during externally induced campus closures within term time (https://www.teaching-matters-blog.ed.ac.uk/spotlight-on-alternative-assessment-methods-remote-exam-marking-holding-on-to-the-philosophy-of-paper/).

Development of more computer-mediated assessment is gaining traction within STEM HE, with growing comfort in using computers in formal assessment (Conole & Warburton, 2005; Gal, Uzan, Belford, Karabinos, & Yaron, 2015; Martin, 2019; Sim, Holifield, & Brown, 2004). However, work is required to extend beyond using technology to provide performance indicators (Dzikovska, Steinhauser, Farrow, Moore, & Campbell, 2014; QAA, 2019), with digital teaching methodology needing to address the balance away from manual marking to high-value tasks like engaging with students and enabling development of more innovative course design not constrained by traditional assessment methods. Furthermore, as our current assessment activities need to be better at measuring performance of skills, with less reward on rote-learning model answers and not susceptible to plagiarism, the introduction of more computer-mediated assessments delivered within taught sessions will enable students to demonstrate the application of their individual knowledge and skills of the task at hand.

Development of more computer-mediated teaching and assessment is going to be challenging. Time-intensive approaches will be initially required to develop and refine teaching methods and corresponding assessments, with academic teaching staff requiring training and support to develop confidence and competency. Training of academic and professional services will also be required to enhance understanding of the application of digital assessments, to decrease objections about moving from traditional assessment to

those enhancing both subject-specific and technological skills and to diminish perceptions that computer-mediated assessment could cause harm, such as privacy data issues.

Furthermore, within certain subject disciplines, digital development may require advanced physics modelling and sophisticated signal processing to support and/or interpret students work. A potential solution to this constraint is the development by the academic sector of an open-source (West & Gallagher, 2006) approach allowing remixing and rapid piloting of new approaches, and overcoming potential diversity and inclusivity issues associated with 'buying-in' software designed to suit use-cases which do not fully reflect local circumstances. Good models already exist for supporting academics in their teaching, via lab technicians, and in their research via software research engineers. It seems natural to extend this model to encompass support for the creation and delivery of computer-mediated assessment, enabling academics to engage without being required to learn coding.

Although the move to more computer-mediated assessment will require significant institutional and HE sector support; institutions will benefit by having better educational outcomes, with reduced tensions between what is learnt and what graduates require/want for a successful career. A final benefit – looking ahead to a future when our conditions are more stable – will (hopefully) be happier academics, who with less time spent on onerous manual assessment, can focus on other areas of their academic role. In times of severe operational need, such approaches also permit the buy-back of staff capacity to address changes in content and delivery methods.

Disclosure statement

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