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STAFF USE OF TECHNOLOGY-ENHANCED ASSESSMENT IN HIGHER EDUCATION: A SYSTEMATIC REVIEW

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This **Forum Insight** summarises a systematic review of literature, exploring 65 peer-reviewed publications in the area of technology-enhanced assessment (TEA), with a particular focus on staff experiences of various TEA approaches[1]. The study was funded by the National Forum, in partnership with the Irish Research Council, and was conducted by researchers at Trinity College Dublin (Kiersey, Devitt & Brady, 2018).

Background

There is a clear impetus at national and international levels to determine how higher education systems might stimulate, support and scale up purposeful use of digital technology in teaching, learning and assessment (Department of Education and Skills, 2016; European Commission, 2018). Recent years have witnessed teaching staff in Irish higher education become more familiar with, and competent in, the pedagogical application of relevant digital technologies, and this has extended to the use of technology in assessment. The National Forum's 2016-18 enhancement theme, which focused on Assessment OF/FOR/AS Learning, and the concurrent initial implementation of the National Professional Development Framework for All Staff Who Teach in Irish Higher Education (National Forum, 2016), provided a catalyst for the development of high-impact assessment approaches, including TEAs. As such high-impact approaches are developed, it is important that they are rooted in evidence; students should learn in an environment that is informed by up-to-date practice and knowledge (Department of Education and Skills, 2011).

Aim of the Study

The systematic review of literature presented in the report which this insight summarises set out to explore the literature in the area of TEA, with a particular focus on staff experiences of various TEA approaches. The broad aim of the review was to explore and synthesise peer-reviewed evidence regarding technology-enhanced Assessment OF/FOR/AS Learning in higher education, with a view to informing practice. The review aimed to respond to the following research questions, which stemmed from discussions with staff across the sector.

1. What models of assessment design can assist staff to harness the potential of technology to enhance student learning?

2. How can technology enhance staff efficiencies in the Assessment OF/FOR/AS Learning process?

3. What approaches could address staff concerns on the issue of student plagiarism that are often associated with technology-enhanced Assessment OF/FOR/AS Learning?

4. What types of learning environments do institutions need to provide to support technology-enhanced Assessment OF/FOR/AS Learning?

Methodology

The review followed the style of a Cochrane systematic review while also including a qualitative synthesis of the contribution(s) the included studies made to answering the specific research questions. The EPPI Reviewer tool (EPPI Centre, 2017) was used to undertake the systematic literature review and the qualitative synthesis. An overarching search string was designed using principal keywords from the research questions, in addition to variant words pertaining to each of the initial topic areas. The following databases were searched: Academic Search Complete, ERIC, Scopus, PsycInfo and IEEE. Articles were included if they were peer-reviewed, published in English on or after Jan 1st 2012, from selected ranked/subject-specific journals, and responded to all or any of the research questions.

When the search was complete, 1,490 papers had been retrieved. The first phase of screening involved the project team screening references by title and abstract. This resulted in 252 papers being deemed suitable for full review. The full text screening phase involved reading each paper thoroughly to discern if it was suitable for inclusion based on whether it met the inclusion criteria, was evaluated to be of suitable quality, and answered some or all of the research questions. In all, 65 papers were included in the final review. The process of data extraction and analysis was carried out using EPPI Reviewer.

Findings

The findings are summarised in four sections, each pertaining to one research question.

Assessment design

As models of assessment design were not explicitly discussed in any of the reviewed studies, the review examined the motivations framing discussion of assessment design in the included papers. The dominant motivations were: (i) fostering collaborative learning, (ii) stimulating reflective learning, and (iii) structuring tasks to scaffold students' learning. The strongest examples of TEA being used to foster collaborative learning were those which incorporated Web 2.0-Social Media technologies. When the motivation was to stimulate reflective learning, the underpinning designs often focused on different levels of electronic analysis and feedback tools which aim to achieve Assessment FOR Learning. Where assessment design was focused on structuring tasks to scaffold students' learning, the emphasis was often placed on developing Assessment AS Learning while also freeing up class time via interactive and/ or self-directed learning. However, many TEAs endeavouring to develop students' ability to self-regulate their learning (Assessment AS Learning) focused on lower order skills through the use of simulations/games, online quizzes and multiple choice questions (MCQs).

Staff efficiencies

The potential of TEA to contribute to staff efficiencies was evident through (i) efficiencies of time and workload, (ii) increased transparency and visibility of student activity and (iii) the fostering of student autonomy. TEA in the automated assessment/intelligent tutorial systems domain was shown to have the clearest potential for efficiencies for staff in terms of reduced workload around assessment, particularly if the assessment process is valid and reliable and provides automated feedback. The evidence also suggested that potential efficiencies were often counterbalanced by limiting factors such as the workload and management involved in setting up and maintaining TEAs, in particular for social media, and some perceived issues regarding the reliability and validity of TEAs or the quality of feedback received. It is important to note here that most of the studies discussed or evaluated a TEA based on experiences of early implementation; there were no longitudinal studies documenting efficiencies sustained over time.

Approaches to plagiarism

The most straightforward approach to combatting plagiarism is through using plagiarism detection software, such as Turnitin. Some studies found that the use of plagiarism detection software helped to raise student awareness of plagiarism, with the software used as a preventative mechanism. Automated assessment systems that used MCQs addressed cheating primarily through randomisation of questions or randomisation/ personalisation of question content or data. Other trialled or suggested approaches to reduce cheating and plagiarism included time limits/website restrictions for online exams, use of a virtual proctor, use of biometrics for identification and binding honesty agreements between students and the institution. The use of Web 2.0-Social Media TEA tools raised particular concerns regarding cheating and plagiarism. This resulted in staff having to expend more time policing student activity resulting in an increased workload for staff. Approaches to mitigate against these concerns included the implementation of a governance policy on collaborative online spaces to ensure a code of practice and appropriate online conduct, managing, monitoring and intervening, sending warning emails to persistent copiers, and giving lower grades where copying was detected. Many of the studies highlighted that the best approaches to tackling plagiarism and cheating were rooted in strong and sensible institutional policy and governance on plagiarism and cheating in the open information world.

Learning environments

The evidence demonstrated that learning environments that support the development of technology-enhanced Assessment OF/FOR/AS Learning are those which are underpinned by supportive institutional policies, provide appropriate and adequate training and professional development for students and staff, are in a position to provide the financial investment needed to facilitate the use of TEAs, give due consideration to the integration of TEAs with existing systems and the ease of use of TEAs more generally, and provide adequate time for staff to develop and implement TEAs within their local contexts and over various iterations. While none of the reviewed studies evaluated these considerations, they did provide insights into the full range of supports needed.

In Conclusion

This systematic literature review sought to explore the evidence base underpinning the use of technology in assessment in higher education within the context of a drive to harness technology to enhance teaching and learning.

Specific models of assessment design were not an explicit focus in any of the reviewed papers. This absence is notable and may suggest that the literature on technology for assessment is not fully integrating the theory and evidence base on assessment more generally. The evidence gathered on staff efficiencies in TEA suggests that, while there may be potential for staff efficiencies to be enhanced through the use of technology, there is a need to investigate this more thoroughly through longitudinal research examining whether efficiencies develop over TEA iterations from set-up, to initial implementation through to maintenance, taking account of the human and financial resources required. The papers detailing approaches used to mitigate against concerns regarding the issue of student plagiarism that are often associated with TEA provide a valuable perspective on how to design TEA approaches in ways that improve understanding, encourage integrity and minimise plagiarism. While assessment design, the efficiencies it can generate and the need to counter plagiarism in assessment are all important considerations, the environment within which assessment is planned and the supports surrounding staff and students are fundamental to the quality and effectiveness of assessment efforts.

Most of the studies included in this review focused on innovative, early-adopter staff and provided critical and rich insights into how these staff have engaged with technologies in designing Assessment OF, FOR and AS Learning. However, the review pointed to a number of gaps in the literature. There is a need for longitudinal investigations of sustainable and successful implementations of TEA in higher education, from which more definitive lessons might be learned about how to effectively and efficiently embed technology in assessment design and implementation. More research evaluating the degree to which learning environments in higher education currently enable enhanced TEA practices would also be helpful. A solid body of empirical work and comparative studies would provide more concrete empirical evidence on which to base assessment decisions.

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