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Enriching the Undergraduate Curriculum with Digital Research Skills: A Blended Approach

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Overview

This paper describes an 18-month digital learning project, designed to support the development of students' digital research skills in UCD's BA and BSocSc programmes. The project involved the creation of six original interactive e-tutorials focusing on key digital research topics, which were embedded in the institutional VLE (Blackboard) in a blended learning structure, and rolled out in four modules in the School of Information & Communication Studies in 2017/2018. During the post-evaluation phase, student feedback was gathered via an online survey and in two qualitative focus groups. This paper outlines the rationale, implementation and results of the project, and offers insights into incorporating digital learning into undergraduate programmes, and student experiences of blended learning.

Literature and Theoretical Foundations

The conceptual framework for this project was twofold, focusing a) on the rationale for embedding digital research skills and research-based learning into undergraduate curricula, and b) on the means of effectively harnessing educational technologies to ensure a pedagogically sound learning experience, based on best practice principles in instructional design. The project was also initiated within the broad landscape of digital enhancement in Higher Education (HE), in which a core objective is "to educate students to be successful in a complex and interconnected world that faces rapid technological, cultural, economic, informational, and demographic change" (Kampylis, Punie, & Devine, 2015, p.7). The inculcation of an undergraduate research culture in HE is increasingly seen as a critical element of undergraduate education, and is viewed as beneficial to the strategic goals of the institution, to students' personal and professional development, and to society at large (Petrella & Jung, 2008; Healey & Jenkins, 2009; Carnell & Fung, 2017). The benefits of research education for undergraduate students include, amongst others, enhanced capacity for critical thinking, problem-solving and independent thought, deeper understanding of how disciplinary knowledge is co-constructed, challenged and communicated, an awareness of their own role in scholarly communities, and "the confidence to form one's own conclusion based on available evidence" (Petronella & Jung, 2008, p. 92). The growth of Internet-based research methods in particular (Salkind, 2010) has also had a profound impact on scholarship, raising unprecedented concerns about research ethics, the management and storage of large datasets, evolving research metrics, open access publishing, and the increasing complexity and quality of digital research and information tools (Bartling & Friesike, 2014).

While several models exist for embedding research skills in undergraduate curricula (Edwards et al, 2017), the optimal framework is perceived as a sequential, scaffolded and flexible approach across the entire degree programme, providing multiple opportunities for students to learn about research and research processes, to engage in experiential learning by working or collaborating on authentic research projects, and to participate in critical dialogue about the purpose and meaning of research in society (Healey & Jenkins, 2009). In terms of how

this is operationalised in practice, this project explored the paradigm of blended or hybrid learning, which has been described as "everything between the poles of fully face-to-face and fully online learning" (Pomerantz, Brown & Brooks, 2018, p. 4). Although the precise effect of hybrid modes on student learning is difficult to measure objectively (Lederman, 2017), recent research suggests that students prefer to learn in blended environments; for example, the ECAR Study of Undergraduate Students and Information Technology (Educause, 2017), found that most students stated a preference for courses that "assimilate both face-to-face instructional components with technological features of the online environment," rather than fully F2F or fully online (p. 20). For this project, Oliver & Herrington's instructional design framework (2001) was adopted to support the creation of a blended learning environment; the framework comprises three critical interconnecting elements of online learning settings (i.e., learning tasks, learning resources, learning supports), to provide a holistic structure to guide the design process. E-tutorials were designed according to best practice principles drawn from multiple accounts of research and practice, including Blummer & Kritskaya, 2009; Oud, 2009; Clark & Mayer, 2011; Hess, 2013; Mayer, 2014; Scales, Nicol, & Johnson, 2014; and Weeks & Davis, 2017.

Method

Working closely with the project investigators, a suite of six interactive e-tutorials was created by a research assistant using Articulate 360 software, and embedded in Blackboard for selected modules across the three stages of the undergraduate BA and BSocSci programmes in September 2017. All e-tutorials contained a compulsory 10-item quiz, and digital badges were associated with each e-tutorial to be awarded upon completion. All e-tutorials were graded for module credit, and each addressed a key aspect of digital research, increasing in difficulty with each stage:

Stage 1	E-tutorial 1: Managing Your Research with Web-based Tools E-tutorial 2: Understanding Digital Research Ethics
Stage 2	E-tutorial 3: The Academic Web: Using Google Scholar and Open Access Resources for Research E-tutorial 4: Foundational Social Media Analytics for Research
Stage 3	E-tutorial 5: Digital Tools for Managing Research Data E-tutorial 6: Data Visualisation for Novice Researchers.

Students who took the modules in question were invited to voluntarily evaluate the e-tutorials they completed, in terms of functionality, content and relevance, and to comment on their overall experience of blended learning. To this end, they were first asked to complete an anonymous online survey via SurveyMonkey to share their experiences, i.e., how they perceived that the e-tutorials supported their learning, and how the design and accessibility of the e-tutorials influenced their absorption of information. Secondly, two focus groups were conducted with selected students who volunteered to participate. A total of fifty-three (60% female; 40% male) participated in the survey, while six students took part in the focus groups, (focus group 1: 4; focus group 2: 2), which delved further into questions emerging from the survey to present a more detailed student experience of learning. All data was gathered anonymously or de-identified. The project, reviewed by UCD's Research Ethics

Committee, has been declared for full ethics exemption.

Findings

Student engagement with e-tutorials

Engagement was shown to be positive and enthusiastic, with most students agreeing that the e-tutorials reinforced their understanding of digital research, were relevant to module content, supported practical skill development, and were enjoyable to complete. They generally perceived the content as clear, accessible, easy-to-navigate, and pitched at an "about right" level of difficulty, and they applauded the ability to repeat e-tutorials multiple times, a feature which reinforced learning and instilled confidence. Digital badges were viewed as useful motivators.

Technology in learning

Students reported a range of technological expectations; for instance, one focus group participant cited the need for a pause button to enable note taking, a task that would help to reinforce learning and slow any information load. Students perceived technological glitches, such as difficulties with launching, inconsistent sound quality and browser incompatibility as frustrating and disruptive to their learning. Technology continues to present a challenge; because of the complex integration of Articulate software, the VLE, browsers, and operating systems, maintaining a consistent experience for learners can be difficult.

Perspectives on Blended Learning

When asked to compare online with F2F learning, the students expressed a clear preference for a mixed-mode environment; according to one student, "They need to be complementary. Not really stand alone at university level." Online learning was viewed as useful for convenience, self-pacing, self-discipline, and reinforcing module content, while the key benefits of F2F learning were highlighted as providing opportunities to interact with lecturers and ask questions, and encouraging better engagement by carving out a set time each week during which students are required to be present.

Discussion & Conclusion

Three key learning points emerged from the project. First, findings showed that while the students clearly embraced online learning, their preference was for a blended environment rather than fully online, emphasizing the continuing importance of F2F classes and human interaction. This aligns with the ECAR study mentioned above. Second, while students engaged well with the e-tutorials, two factors were critical; a) the importance of extrinsic motivation, including compulsory quizzes, digital badges, and module credit; and b) the disruptive effects of technological glitches on learning. Finally, it is essential to be strategic about the points at which digital learning objects are embedded within modules - not as add-on extras, but as core learning activities, linked to the rest of the learning activities in a logical and meaningful sequence. If they do not lead to attainment of modular learning outcomes, they should not be included. Oliver & Herrington's instructional design framework (2001) offered a solid and intuitive approach for considering a blended learning structure for this project..

Recommendations

Embedded e-tutorials offer an effective means of helping students learn essential digital research skills. Importantly, this is not about simply adding technology to existing learning modes; rather, in-depth consideration of learning outcomes and appropriate design for achieving intended outcomes is required. Future work on this project will develop the blended learning approach with further integration with programmatic level learning outcomes.

References

Bartling, S., & Friesike, S. (2014). *Opening science: The evolving guide on how the internet is changing research, collaboration and scholarly publishing*. Cham, [Germany]: SpringerOpen. doi:10.1007/978-3-319-00025-1

Blummer, B. A., & Kritskaya, O. (2009). Best practices for creating an online tutorial: A literature review. *Journal of Web Librarianship*, *3*(3), 199-216. https://doi.org/10.1080/19322900903050799

Carnell, B., & Fung, D. (2017). *Developing the higher education curriculum: Research-based education in practice*. London: UCL Press.

Clark, R. C., & Mayer, R. E. (2011). *E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning*. (3rd ed.). San Francisco, CA: Pfeiffer. https://doi.org/10.1002/9781118255971

EDUCAUSE Center for Analysis and Research (ECAR) (2017). *2017 Student and Faculty Technology Research Studies.* Retrieved from https://library.educause.edu/resources/2017/6/2017-student-and-faculty-technology-research-studies

Edwards, C. et al. (2017) 'Cultivating student expectations of a research-informed curriculum: Developing and promoting pedagogic resonance in the undergraduate student learning pathway' in Carnell, B.and Fung, D. (eds). *Developing the Higher Education Curriculum: Research-based education in practice*. UCL Press, 2017.

Healey, M. and Jenkins, A. (2009). *Developing Undergraduate Research and Inquiry*. York: The Higher Education Academy.

Hess, A. N. (2013). The MAGIC of Web tutorials: How one library (re)focused its delivery of online learning objects on users. *Journal of Library and Information Services in Distance Learning*, *7*(4), 331-348. https://doi.org/10.1080/1533290X.2013.839978

Kampylis, P., Punie, Y. & Devine, J. (2015); *Promoting Effective Digital-Age Learning - A European Framework for Digitally-Competent Educational Organisations*; EUR 27599 EN; doi:10.2791/54070

Lederman, D. (2017, July 26). What Works in Blended Learning? *Inside Higher Ed.* Retrieved from https://www.insidehighered.com/digital-learning/article/2017/07/26/researchs-clues-what-works-blended-learning

Mayer, R. E. (2014). Cognitive theory of multimedia learning. In R.E. Mayer (Ed.), *The Cambridge handbook of multimedia learning* (2nd ed.) (pp. 43-71). Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9781139547369.005

Oliver, R., & Herrington, J. (2001). *Teaching and learning online: A beginner's guide to e-learning and e-teaching in higher education.* Perth: Edith Cowan University, Centre for Research in Information Technology and Communications.

Oud, J. (2009). Guidelines for effective online instruction using multimedia screencasts. *Reference Services Review*, *37*(2), 164-177. doi:10.1108/00907320910957206

Petrella, J. K., & Jung, A. P. (2008). Undergraduate research: Importance, benefits, and challenges. *International Journal of Exercise Science, 1*(3), 91-95.

Pomerantz, J., Brown, M., & Brooks, C. (2018). *Foundations for a Next Generation Digital Learning Environment: Faculty, Students, and the LMS*. Louisville, CO: ECAR

Salkind, N. J. (2010). *Encyclopedia of Research Design*. Thousand Oaks, CA: SAGE Publications, Inc. doi: 10.4135/9781412961288

Scales, B., Nicol, E., & Johnson, C. (2014). Redesigning comprehensive library tutorials theoretical considerations for multimedia enhancements and student learning. *Reference & User Services Quarterly, 53*(3), 242-252. https://doi.org/10.5860/rusq.53n3.242

Weeks, T., & Putnam Davis, J. (2017). Evaluating best practices for video tutorials: A case study. *Journal of Library & Information Services in Distance Learning*, *11*(1-2), 183-195. https://doi.org/10.1080/1533290X.2016.1232048