Innovating with Digital Badges in Assessment: A Case Study Using Digital Badges in an Undergraduate University Module.

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Abstract

Digital methods of learning are increasingly common in university education, and digital badges offer a new and evolving way of motivating and rewarding students' learning achievement. The major learning outcome for undergraduate students on the second-year module, *Social Media and Computing*, was to develop a range of digital literacy competencies that will support their full social participation as digital citizens. To that end, assessment encompassed learning not only about new social technologies, but also about critical evaluation and social application of these technologies and concepts, such as digital ethics and privacy, to solve information problems in students' academic work and future careers.

Each digital badge was aligned with assessment learning outcomes. In particular, two methods of badging were trialled over a two-year period: an external open badge, recognising completion of particular skills acquisition that students could display via their LinkedIn accounts in support of their CVs; and an internal digital badge, matched to prescribed university achievement levels through the university's learning management system (LMS), Blackboard. This project was conducted, in part, alongside a university level pilot scheme around digital badging, which provided support for digital badge creation and technical integration.

This paper examines the implementation of the trial badging project with undergraduate students, including a comparison of different badging approaches and outcomes. Based on student reactions to badging and staff administrative and teaching roll out of badging for this module, suggestions around badging practices and strategies to enhance learning through assessment are offered.
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Keywords: Assessment, digital badging, digital citizenship, digital literacy, higher education.

1. Introduction.

Digital methods of learning are increasingly common in university education, and digital badges offer a new and evolving way of motivating and rewarding students' learning achievement. However, understanding the benefits of digital badging and applying digital badging in learning is still in early development. Over a two-year period, digital badges were trialled alongside assessment in a second-year university course on social media, in which students were studying to develop a range of digital literacy competencies to support their full social participation as digital citizens. Assessment encompassed learning not only about new social technologies, but also about critical evaluation and social application of these technologies and concepts, such as digital ethics and privacy, to solve information problems in students' academic work and future careers, and badges were applied to the completion of units of learning on these topics. This paper offers a case study of a classroom innovation to apply digital badges to module assessment to increase engagement with course content and to discover the ways in which students perceived the digital badges to influence their learning for ongoing teaching development.

1.1. Digital badges.

Badges may be dated back to symbols used to represent information historically, and more recently badges of "merit" (Berge & Muilenburg, 2016; West-Puckett, 2016) often earned in organisations, such as the Scouts or the military, in which achievement of practical skills are rewarded by badges to be collected and displayed together on garments. Additionally, digital badging is used in commercial schemes to motivate customers, e.g. frequent flyer programmes (Abramovich & Wardrip, 2016), and in gaming settings (Coleman, 2018; McDaniel & Fanfarelli, 2016). Digital badges offer the most recent form of this recognition of learning. As defined by Gibson, Ostashewski, Flintoff, Grant, & Knight (2015, p.404), a digital badge is "…*a representation of an accomplishment, interest or affiliation that is visual, available online, and contains metadata including links that help explain the context, meaning, process and result of an activity*." As Berge and Muilenburge (2016) have observed, the major purposes of a badge are recognising and encouraging learning. Digital badges offer one means of documenting mastery of specified learning.

Digital badges cover a range of badge designs and applications. In particular, open badges, that is, "digital image files that contain metadata" which describes the badges (Grant, 2016, p.3), are popular means of badging a range of activities. Open badges are not governed by centralised control nor authority: "*They can be created by anyone with access to badge-issuing platforms or technical skills*…" (Grant, 2016, p.3). Shields and Chugh (2017) noted that digital badges can be used to show achievement visually, including recognition in a range of contexts from learning to association in professional bodies, gaming, etc. Willis, Flintoff and McGraw (2016) observed that digital badges enable micro-credentialing and that this process is reshaping curricula, learning, jobs acquisition, and workforce credentialing. Digital badges would seem to have the power to change education. Moreover, as Derryberry, Everhart, & Knight (2016) emphasised, open badges can help build connections between learning and the workplace. They advocated the use of an Open Badge Ecosystem Model, in which learning involves all stakeholders and incorporates competency frameworks to enhance the value of badges (Derryberry *et al*. 2016).

The uses of digital badges are many. Devedžić and Jovanović (2015) advocated open badges as a means of providing feedback, which is immediate for students and reminds them of the learning goals and progress in a given course. In addition, badges many be used as a means of validating and recognising skills development, community engagement, and prior learning (Devedžić & Jovanović, 2015; Lockley, Derryberry, & West, 2016). Further, Derryberry *et al.* (2016) envisioned digital badges as supporting the development and achievement of professional credentials.

1.2. Digital badges in higher education.

The use of digital badges in education has grown significantly to reward participation and recognise learning (Law, 2015). Abramovich (2016) advocated using digital badges for assessment, rather than for awarding credentials. He found that digital badges could be beneficial for assessment. Pitt *et al*. (2018) further viewed a wide application of digital badges across learning in STEM disciplines, supporting informal and formal learning. West and Randall (2016) explained that rigor is essential in the learning process to support badges in education. The authors divided rigor into two components which much be present for successful badging: 1) criteria needed to acquire a badge, through which earning a badge becomes a meaningful accomplishment, and 2) a consistent assessing process (West & Randall (2016). In addition,

McDaniel and Fanfarelli (2016) advocated attention to design of digital badges, which incorporates a number of psychological factors, such as self-determination, feedback, goal setting, motivation, self-regulation etc. West and Randall (2016) further considered micro-credential badging as the most disruptive and powerful application of badging. Importantly, micro-credential badges communicate specific learning, a richer description of information, which is advantageous when compared with final degree certificates or transcripts that often contain much less information (Berge & Muilenburg, 2016; West & Randall, 2016).

Digital badges are often cited as being useful for motivating learning (e.g. Abramovich & Wardrip, 2016; Fanfarelli, Vie & McDaniel, 2015; Grant, 2016; Gibson *et al.*, 2015; Jovanović & Devedžić, 2014), though the nature of that motivation may be debated (e.g. Coleman, 2018). Devedžić and Jovanović (2015) observed that open badges allowed learners flexibility in setting learning goals, reflecting on learning, and planning future learning, which, in turn, supports learners' development of self-regulation skills that provide a foundation for lifelong learning. This finding was echoed by Carey and Stefaniak (2018), who identified self-regulation as a key part of learning through badges, since self-regulated learners take responsibility for their learning and take independent action to find information to help themselves with their learning. These authors found that digital badges in higher education should be skills-based leading to mastery of an area, as opposed to participation-linked, to be most effective in student learning (Carey & Stefaniak, 2018).

White and Shellenbarger (2018) offered digital badging as a gamification tool to encourage competitive skills acquisition among nursing students. However, as Hickey and Willis (2017) and Jovanović and Devedžić (2014) have noted, gamification can lead to keeping score, rather than actual learning. These authors also found that where digital badges are intrinsically connected to the learning process, the badges support motivation to learn. Fanfarelli *et al.* (2015) identified three essential approaches affect motivation: badging as rewards, badging as feedback, and badging as narrative. Coleman (2018, p.221) noted students' motivations are "…*nuanced and complex*…," but observed it is possible for digital badges to empower learning beyond the curriculum. To encourage student engagement, digital badges should have the following characteristics: they must be challenging, useful, flexible, and voluntary (Coleman, 2018). Importantly, digital badges should promote what McDaniel & Fanfarelli (2015b) refer to as

deliberate practice, that is, students should work toward improvement of particular skills or knowledge acquisition.

Digital badges may have a positive impact on learners' engagement, but may also influence students' valuing of tasks, so that they focus on badges to the exclusion of other activities and resources made available to them (Devedžić & Jovanović, 2015). Appropriate design of learning to mediate potential negative effects is needed, for example, connecting badges with meaningful outcomes and activities and relating badges to achievement as opposed to rewards (Devedžić & Jovanović, 2015; Ford, Izumi, Lottes & Richardson, 2015).

Digital badges have been associated with a role in teaching and organisations. For educators, digital badges can facilitate engagement and help scaffold learning, and from an institutional perspective, digital badges can help evidence learning at a higher level (e.g. Devedžić & Jovanović, 2015). Digital badges can also help highlight achievements and skills to employers, connecting education with the workplace and facilitating job-seeking (e.g. Gibson *et al*., 2015; Raish & Rimland, 2016). As Abramovich and Wardrip (2016) have illustrated, digital badges can be displayed together to make achievement visible to employers.

2. Digital Badging Approach.

It should be noted that digital badging offered a new addition to learning in the university; the UCD pilot study of digital badging revealed that digital badges were new to students (UCD Teaching & Learning, 2017). In our case study, external open badges created using Open Badge Factory and an internal application of digital badges through *Blackboard Learn Achievements* were trialled. Open badges were designed to represent achievement of specified learning outcomes, themed to represent topical areas in social media, e.g., presentation of information via social media, social networking, etc. In keeping with examples from the literature, badge descriptions included verbal descriptions (e.g. McDaniel & Fanfarelli, 2015a; West-Puckett, 2016). Digital badges were aligned and linked to assessment instructions and the assessment rubric for grading.

In the first year of implementation, badges could be applied by learners to external contexts, such as social media's LinkedIn, which students were already using within the context of the module. In the second year, internal digital badges were template badges drawn from and

applied via the university's learning management system (LMS) and were applied automatically by the LMS according to student learning outcomes. This is in keeping with examples from the literature, for example, McDaniel & Fanfarelli (2015a) awarded badges through their course management interface and stored badges on a separate page linked to their course's homepage.

The implementation of digital badges in this project offered an exploratory teaching innovation to encourage student engagement with module content in the context of a case study. A module in which students explored social media tools and issues lent itself easily to digital badging of digital skills learning. At the same time, the university was in the process of piloting digital badging in some of its modules, and the digital badging in the social media module ran in tandem, benefitting from the expertise of the UCD Teaching and Learning pilot study (UCD T&L, 2017), while developing the digital badging experience for the social media module.

Two different badging approaches to recognise learning took place over a two-year period, as outlined below.

Implementation 1:

The external open badges were a series of badges, designed as badges with ribbons, which recognised particular skills acquisition. Once they had achieved a particular badge, students could opt to display the badge in their LinkedIn accounts as part of their resumés constructed in that forum during the module. A final, cumulative open badge recognised completion of all badging activities in that semester.

Implementation 2:

In the second year, the method of badging changed. Internal badging was provided through the university's learning management system (LMS), Blackboard. A plain ribbon badge was selected from the *Blackboard Learn Achievements* list and then matched to prescribed university achievement levels, with Gold for A range achievement, Silver for B range achievement, and Bronze for C level achievement. Grades below C level were not badged.

2.1 Students taking the Social Media module.

Students in this trial of digital badges were second stage students in University College Dublin. All students were enrolled in *IS20110: Social Media & Computing* in the School of Information and Communication Studies. While the majority of students were also enrolled in the school's

undergraduate programme, some students took this module as an elective, with some enrolled in other programmes in the university or as international students. Over a two-year period, there were 164 students enrolled: 91 in 2016-2017 and 73 in 2015-2016.

2.2 Data analyses.

Students provided feedback about their experience with badging through their end-of-module feedback, in addition to providing anonymous, written feedback in-class about their experience with digital badges. Data were analysed thematically to provide a picture of students' perceptions of the role of digital badging in their learning.

Because the university was also conducting a pilot implementation of digital badging, students were also invited to provide feedback in a survey about digital badges, collected via Teaching & Learning; the outcomes of feedback from this survey for this module were returned to the module coordinator. This report is cited in this paper to provide additional evidence of findings for the badging trial.

3. Findings.

3.1 Impact on module and assessment design.

Badging influenced assessment design and implementation in the module. In the first year of badging, badges were matched to individual digital skills and a cumulative badge was offered to those who completed all badges as recognition of this additional accomplishment. This method proved effective in terms of following a continuous assessment approach; however, the instructor and assistant grader found their workload increased significantly, as they worked continuously over the 12-week module to return grades for each badged assessment piece before the next was due.

For the second year of badging, the assessment was reconfigured to group digital skills, with badges awarded by a given theme. This approach enabled students to consider their assessment in greater depth, adding reflective pieces to each piece to document their understanding of their learning. The final piece was a cumulative reflection on learning across badges. From an instructor's perspective, this change also supported the timing of grading effectively to

support student feedback prior to submitting the next piece and facilitated greater depth in monitoring student progress with assessment.

3.2 Badges for highlighting assessment achievement.

Interestingly, in feedback, students did not simply comment on the design of digital badges themselves. Instead, students focused on their assessment as a whole and connected this to digital badging of activities. For instance, one participant stated:

> *'I found the assignments really helpful. The badge system is an amazing way to show our work and the progress we made on social media.'*

The roll out of the digital badges did, however, raise other questions during classes and office hours, mainly that the open badges required additional student effort to accept and post the badge to social media. In the first year, an additional instructional handout to post badges to students' LinkedIn accounts was created to bridge the gap between achieving digital badges and showcasing students' learning. Taking this step with social media was optional for students; however, the university's pilot project found that the average redemption rate across the two years was 64%, demonstrating that the majority of students wanted to showcase their badges (UCD T&L, 2017).

3.3 Impact of Digital Badging on module outcomes.

Digital badging facilitated students' understanding of assessment instructions and learning outcomes. Students identified their badged assessment as helping them to learn. For example, one student commented: *'Things that most helped in learning: Badge work.'*

Students also connected digital badges and assessment seamlessly. One student stated: *'The badge instruction sheets were good.'* In addition, students appreciated the progression of assessment and digital badges. One student observed: *'Continuous assessment was very manageable'* and another student listed: *'Badge work over the semester, rather than larger assignments'* as an advantage for learning. Importantly, students found instructions for assessment and badge achievement clear; one student summed up: *'Badge activity descriptions [were] always very clear and concise.'*

In addition, some reflected on their learning engagement. A student in the first year of digital badging summed up:

> *'The badges each week are a fantastic way to learn new things, and to learn by doing and setting up social media accounts.'*

Another student explained how badges helped motivated them to engage with module content: *Badging activities were great for getting me to engage with the tools.'* Students' perceptions of digital badges reflected the findings of other researchers, such as Law (2015), who reported that a majority of students perceived badges as motivational and important to their development of a sense of achievement.

3.4 Impact on digital citizenship and participation.

Students also appreciated means of applying learning to future contexts. For instance, one student stated: '*I am coming away from it [the module] with real skills which I can apply to my life after college.'* Another student added: *'The skills learned in the class are actually applicable to daily life.'* In particular, students connected their learning to the workplace, with one student noting: '*The tools used were extremely useful and I'll bring them with me into the workplace.'* In particular, students appreciated future applications of their learning, with one observing: '*I got to create a Linked In account which will be very beneficial for the future.'* Overall, students' comments suggested that learning social media skills and concepts, and documenting and presenting these achievements via digital badges, were well matched.

4. Discussion.

This case study design and implementation of digital badges was well received by students. Students valued the process of learning skills, with success marked by thematic digital badges. Students responded positively to achieving badges, noting the important role of digital badges in their engagement with module content. Students' perspectives of engagement are in keeping with Abramovich and Wardrip's (2016) evaluation that digital badges have the potential to promote engagement with learning.

This trial with digital badging has offered several valuable learning points for working with digital badging alongside assessment. For example, there are multiple pedagogical items to consider when using digital badges, in particular, alignment with assessment. In this project, the topic of social media lent itself well to digital badging. The challenge lay in organising the badged assessment appropriately for a twelve-week long module for student completion and for instructors' timely review. Importantly, digital badges should target the core learning the student should acquire through engagement with a prescribed activity. Alongside this, assessment instructions should be clear and concise. Students in this project found assessment instructions clear and connected the assessment outcomes to badges.

The internally-applied badging system through *Blackboard Learn Achievements* acknowledging gold, silver, and bronze achievement helped to send a clear message about assessment success. The internal badges offered a ready source of badges; however, the specially-designed badges in the first year could be tailored further to convey information. The difference between badging in the two years rested with the ability to showcase learning via social media. Where an institutional LMS permits, embedding institutional grade ranges is advisable to support student understanding of achievement. In addition, students valued the provision of the option to showcase badging achievements to employers as micro-credentials with clear explanations of badge meanings as advantageous.

The assistance of educational technology support members is key to smooth implementation of badges and linkages to materials via the LMS. Initially, the project did not have an educational technologist in place, depending heavily on assistance from the university's Teaching and Learning staff assigned to the institution's digital badges pilot. Since then, an educational technologist has become available in the College of Social Sciences and Law, and this individual has been central to forward planning of digital badging for the social media module. Educational technologists may also assist with badge design, which may or may not be predetermined in a given system.

4.1 Conclusion.

The Digital badges, in the case outlined, were positively received by students who commented favourably about digital badges in their learning. Currently, University College Dublin has transitioned from *Blackboard* as its LMS to *Brightspace*. Digital badging has again been

implemented in modules in the new LMS, specifically around the assessment for the same social media module. In addition, digital badges are being tested in other e-learning contexts in the School of Information & Communication Studies, for example, for e-tutorials. An educational technologist in the college is now assisting with badging; this promises to facilitate further development of the project.

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