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Engaging Learners with Challenges and Badges: Designing and Evaluating a Microlearning System

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This study presents a design case situated in a graduate-level asynchronous online course. In this case, a system of microlearning challenges and digital badges was designed to encourage students to engage in conceptual and technological learning tasks. In addition to microlearning challenges, students could also earn badges for high levels of course participation or as an acknowledgment of other positive course behaviors. Student engagement in challenges and badges was used to evaluate the activity. Findings show that most students were motivated to participate in the optional activity at some level, and badges associated with individual challenge activities were the most popular. Tasks and issues related to the design and development of the system are discussed along with ideas for future refinement.

Keywords: Digital badges, higher education, learning design, microcredential, microlearning

Introduction

Microlearning is the preferred term for brief learning experiences, such as developing a new skill by watching an online video or completing a tutorial. A widely accepted definition of microlearning is elusive and various practitioners and scholars may disagree on specific details such as scope, delivery, and contexts for microlearning (Torgerson, 2021). Still, the idea of looking at learning on a small scale and valuing these small-scale accomplishments in isolation has garnered great attention in the last decade, including in higher education contexts (Kohler et al., 2021). Although learning has value unto itself, microlearning accomplishments can be documented by the issuance of microcredentials, often coming in the form of digital badges. In this paper, we share the design and development process of an optional challenge (microlearning) and badge (microcredentialing) system situated in a graduate-level online class and use student engagement data to evaluate participation in the challenge activities.

Literature Review

The concept of microlearning is simple. Most people can relate to the ability to satisfy a learning need by accessing small chunks of content or developing a simple skill, without the need for a formal course or degree program. Microlearning can occur independently via interaction with reusable learning objects (Olivier, 2021), but it also can be woven into a curriculum in a formal course setting (Kohler et al., 2021), with gamified elements used to motivate learner performance (Salas, 2021). While microlearning often occurs for personal satisfaction, it can be with microcredentials to acknowledge learner outcomes and competencies (Zhang & West, 2020). Essentially, just like learning and formal credentials such as course credits and degrees work together at the macro scale, they represent a connection between process and outcomes at the micro level as well.

Designing Microcredential Systems

Whereas the design of microlearning is a typical instructional design task at a small scale, the design of a microcredential system, such as a digital badge system, is a larger, more complex task. When creating a system, designers should consider situational factors such as culture, values, and experiences at all levels of an organization (institution through learners), to ensure the system is well received (Grant, 2016; Hartnett, 2021; Oliver, 2019;

Stefaniak & Carey, 2019). In formal learning institutions, such as K-12 schools and universities, digital badging systems often function as an alternative or complementary credentialing system, offering stakeholders the opportunity to explore "new ways of what we want to count, value, and acknowledge" (Alt, 2021, p. 1) as well as the ability to examine teaching and learning functions in a transformative way, at a smaller than usual scale (Davidson & Coldberg, 2009; Newby & Cheng, 2020).

Digital badges and badging systems serve some of the following purposes (Fields, 2015; Gibson et al., 2016; Hartnett, 2021; Newby & Cheng, 2020; Peck et al., 2016; Roy & Clark, 2019):

(a) recognize engagement and achievement of knowledge, skills, attitudes, and competencies at a granular level;
(b) track learning status and progress;
(c) scaffold learning by integrating instructional strategies with badges (e.g., goal setting, evaluation, and feedback, etc.);
(d) motivate learners to engage in desired learning behaviors in both formal and informal contexts;
(e) guide learning opportunities for informal learning;
(f) document progress and accomplishments; and
(g) share evidence of accomplishments in diverse platforms including digital badge platforms, Learning Management Systems (LMSs), e-portfolios, and social media sites.

To accomplish these goals, digital badging systems must be thoughtfully designed. Components to consider include badge requirements, evaluation standards, graphics (e.g., the image associated with the badge), and metadata, as well as issuing platform (Cheng et al., 2018; Schürmann & Quaiser-Pohl, 2022). From a pedagogical perspective, designers also must consider clear learning goals and objectives, a roadmap or pathways describing how the learning opportunities are sequenced for optimal learning and desired competencies, meaningful indicators of learning, engagement strategies, and mechanisms for assessment and feedback (Besser & Newby, 2019; Davies et al., 2015; Gibson, 2006; Newby & Cheng, 2020).

Digital Badge Research in Higher Education

Digital badges are believed to have a positive impact on students, with the potential to enhance motivation, engagement, learning, retention, and academic achievement (Putz et al., 2020; Schürmann & Quaiser-Pohl, 2022). Prior studies have been inconclusive on the relationship between these factors, although generally positive. One study found that digital badges were effective to support students' goal-setting processes (Cheng et al., 2018) although another one found that a badge intervention did not increase intrinsic motivation survey scores (Facey-Shaw et al., 2020). Alt (2021) found that undergraduate students used badges to support learning and competition, with variance in focus (e.g., mastery vs. performance, deep vs. surface) based on learner interest and use. Many researchers have heavily discussed the potential of digital badges as motivators (e.g., Abramovich & Wardrip, 2016; Cucchiara et al., 2014; Gibson et al., 2013) but again research findings are mixed with some finding positive effects (e.g., Anderson et al., 2013; Ding et al., 2018; Hakulinen et al., 2015) and others finding null or negative effects (Dicheva et al., 2020; Kyewski & Krämer, 2018). Across these different studies, researchers indicated that learners' characteristics (e.g., prior knowledge, ability, individual motivational precursors, and expectation and value they place on the learning, etc.) and pedagogical enhancements integrated into the badge design (e.g., instructional elements and strategies and the badge design integrated motivation theories) influence the effects of badges on motivation or as motivators (Abramovich et al., 2013; Abramovich & Wardrip, 2016; Reid et al., 2015; Stefaniak & Carey, 2019). Still, research in this area is limited and each new study serves as what Borko (2004) termed a use case, contributing an additional dimension to the field's understanding of how learners experience and react to microlearning and credentialing systems.

Based on prior research, this study offers a new pedagogical perspective on digital badges by issuing microlearning challenges to students and providing choices. This approach assumes that while some students might be motivated by the badge (the reward), others might find the challenge (the task) to be the element that motivates engagement. The microlearning system used in this study was designed to meet multiple purposes, as outlined above, including recognition of engagement, motivation and guidance of informal, self-directed learning in a formal learning context, and documentation of accomplishments.

Purpose and Research Questions

The purpose of this study is to describe the design rationale and development process for a microlearning system in a graduate-level online course and then evaluate that system using student engagement data. Specifically, this

microlearning system involves learning activities presented to students as challenges, with the option to earn badges upon completion. The research questions guiding the design case are:

1. How were challenges and badges designed, developed, and implemented as an optional microlearning system to engage students?
2. How did students engage in the microlearning system?

Through the answers to these questions, we seek to provide other instructors, instructional designers, and researchers with a clear depiction of decision points when creating a challenge-based microlearning system. We also examine whether student engagement met design expectations, with considerations for how to improve the system for future iterations of the course.

Method

Research Design

This study represents a design case. As a single case study, it explores questions of how a particular phenomenon – in this case, the use of challenges and badges – occurred in a unique setting (Yin, 2003). Because this is a case study, this research does not attempt to generalize to other settings but instead offers an in-depth look at the design of one-course element and how students engaged with it.

Participants

This design case focuses on the design and facilitation experiences of the instructional team of a graduate-level instructional design class and the resulting student engagement. The instructional team consisted of a professor and teaching assistant, with feedback from a colleague instructional designer who was familiar with both the course and digital badge systems. There were 26 students enrolled in the course. The study was approved by the researchers' Institutional Review Board.

Data Collection and Analysis

Data collection consisted of design notes and documents; communication between the instructor and teaching assistant; course artifacts and records; and student survey data. The instructional team kept written notes throughout their design process and documented all their decision points and decisions throughout the course design process. Through the course site in the learning management system and other instructional spaces (a course blog, instructor tracking documents), data was collected about how the challenges and badges were implemented. Additionally, this data source yielded counts of how many badges students earned. Finally, an online survey was deployed at the end of the course, requesting student feedback on the challenge and badge experience via closed-response items.

To address the first research question, data analysis focused on mining through the design documents, instructional team communication documents, and course artifacts to reconstruct and thoroughly describe the design, development, and implementation process. To answer the second research question, course artifacts were reviewed with a focus on student patterns of engagement. The number of badges students earned was counted. The student survey provided data about students' self-reported interest in different types of badges. Frequency distributions were created for the closed items. The sample size was too small for other statistics to be meaningful.

Results

Study Context

This study is situated in a graduate-level instructional design course at a large research university in the United States. The class is taught online and asynchronously, with weeks serving as the temporal course module unit. The course has ongoing asynchronous interactions through blogs and discussion boards, and students complete four major assignments during the term.

This class focuses on designing performance supports and learning interactions using social technologies and offers students choices regarding how to meet the learning objectives. The instructor often refers to the course as a design playground because it is situated in the university-provided learning management system, Canvas, but makes additional

learning tools and spaces available for students to explore throughout the term. Students are encouraged to treat the course tools and spaces as a "choose your own adventure" experience. In other words, students complete the course assignments and meet the learning objectives**,** but rather than following a template they are asked to explore and share with classmates in meaningful ways. In this manner, the course is designed using a connectivist approach (Siemens, 2008). The instructor is decentralized and participates as a member of the larger learning network (Anderson & Dron, 2011). In turn, learners are required to exert agency in their learning process, which is appropriate for learners such as those who have sufficient maturity and digital literacy skills to thrive under these conditions (Dennen et al., 2018).

Challenges and badges both had previously been used in this course, but only on an ad hoc basis and the two concepts had not been connected. In earlier course iterations, the instructor issued challenges to learners informally to try to foster interaction and exploration on the course design playground. Badges were introduced separately from challenges, as part of the course content, with an optional exploration of badging platforms on the course design playground. Learners in the class did not earn badges themselves but instead learned about how they might incorporate a badging system into their learning designs as a means of motivating and credentialing people in informal educational contexts.

In prior course offerings, a subset of students reacted favorably to the challenges. In fact, the first time the instructor used the word "challenge" when suggesting a learning activity it was more serendipitous than intentional. For example, in a prior course one student responded by stating "challenge accepted" and another stated "ready for the next challenge." The instructor documented this in reflective teaching notes, and pondered whether students might enjoy a more formal system of challenges. In prior terms, by issuing a challenge the instructor observed that she could prompt multiple learners to enter an interactive learning space or use a tool within the span of a few days, facilitating social and collaborative experiences. Similarly, prior students had been intrigued by digital badges but something was lacking in their exploration of the concept. They seemed to need a more structured, practical experience. The concept of badges did not get incorporated widely into student projects in part because students did not appear to understand how to operationalize a badge system themselves.

As a new initiative, the marriage of challenges and badges in this course felt natural and was based on data from the instructor's reflective notes, which included comments from and participation patterns from students in prior courses when challenges were more informally issued to students. She realized that challenges could encourage students to engage in structured microlearning tasks related to course content. Through this microlearning, students would be led to try new things that they might later incorporate into course projects. By integrating a badge system, students who seek formal acknowledgment of their accomplishment would receive an award upon completing a challenge. The integration of a badge system would also provide a concrete within-course model of badging systems for interested students to experience.

Design and Development Process

The design process involved both conceptual and technological tasks. The first conceptual task was to decide how the overall badging system would work. We began with the idea that we would offer challenge badges, but quickly found other opportunities for awarding badges. Based on Horstman et al.'s (2020) study, which identified various microcredential types and functions, we designed a system with five types of badges (see Table 1). Although the badges vary in terms of what behavior is acknowledged or rewarded (i.e., learning or participation), all types were meant to demonstrate to students that their course engagement was valued.

Table 1.

Badge types and functions

Badge type	Function	Number of Badge Opportunities
Challenge	Badges earned upon the completion of a challenge and submission of corresponding evidence.	18
Easter egg	Badges that were hidden in different course spaces, waiting for learners to find them and complete the associated challenge.	4

Level	Badges that reflect levels of course activity over an extended period. For example, learners used Twitter and could receive badges for their first, 10th, and 20th tweets.	varied
Peer awarded	Badges that were based on peer nominations for contributions made to the course. Four types of peer-awarded badges were available: (1) community builder, (2) networker, (3) thought leader, and (4) tech helper.	4
Mega challenge	Badges earned by completing 5 challenge badges. Each mega-challenge badge was accompanied by a digital token that could be submitted to be excused from a minor participation activity such as one week of course discussion.	3

The challenge badges, which are the main focus of this study, were intended to push students to engage in independent microlearning experiences related to the course content. Easter egg badges were a special form of challenge badge; rather than being publicized widely through course announcements, students would only find them by examining different parts of the course. To find an Easter egg challenge was a reward for one's thoroughness in the course, and to complete the challenge and earn the badge would yield an indicator of that thoroughness. Level badges were meant to reward students for a different type of engagement, specifically for posting in various course spaces and tools such as Twitter. Mega challenge badges were a special form of a level badge, rewarding students for completion of challenges in multiples of five. Finally, peer-awarded badges were given to students who were nominated by classmates for their engagement in the class community along different dimensions. Each badge type rewarded students for a different form of class engagement, and the inclusion of multiple badge types allowed for the comparison of student engagement and interests.

Once badge types were determined, the challenges and badges had to be designed. Designing the challenges was a conceptual task. We examined the ad hoc challenges issued in previous iterations of the course and used those as inspiration. For each challenge, we identified a tool to be used, a skill to be developed and practiced, and an outcome to be demonstrated. The objective was to have students practice using tools and developing skills in ways that would both support peer interaction in the course space and help students prepare for the completion of graded course assignments. In this sense, although optional, the challenges were loosely aligned with the course learning objectives. Regular challenges were issued to students via posts on a course blog maintained by the instructor. This blog was part of the larger course design playground. Easter egg challenges were embedded elsewhere in the course design playground.

Challenges were scheduled to be issued during specific weeks of the course, although they were not released at the beginning of each weekly module. Instead, the plan was to use challenges to add a within-week temporal component that would foster timely interaction for all who were available and who cared to complete the challenge at that time. In other words, rather than having a list of challenges and badges at the beginning of the term, a challenge calendar was planned alongside the course calendar. The challenges were temporally unanticipated by students, but the goal was for students to undertake a challenge within a few days of issuing the challenge. Students could then motivate each other (e.g., by seeing what each other did for a challenge) and, in some instances, participate in each other's challenge activities.

Designing the actual badges was a graphic design task. Each badge needed a name and an associated graphic. The overall badge system needed visual coherence, with a general theme for all badges as well as a sub-theme for all badges of a particular type. Figure 1 provides an example of each badge type. Additionally, we developed graphics to promote each challenge to the students (see Figure 2). All visuals were created using canva.com.

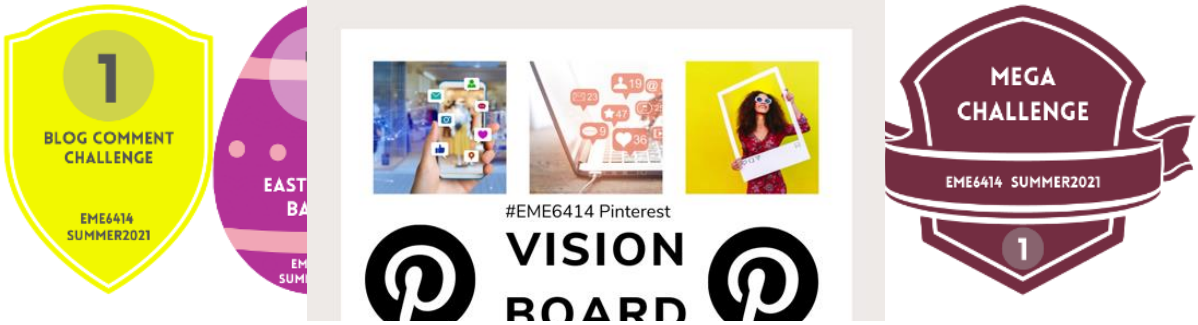

Figure 1. Sample badges

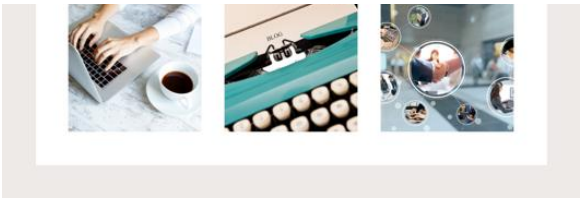

Figure 2. Sample challenges promotion graphic

Awarding Badges

Once challenges and badges were designed, we focused on the badge awarding process. We sought a badge platform that would make it easy to track and award badges. We explored badgr.com, which offered integration with the Canvas learning management system. However, this tool connected badges to module completion in Canvas and as a result was not sufficiently flexible for our needs. We did not wish to align badges with course modules because the badges were optional activities and not markers along the path to course completion.

We also tested badgelist.com. This option did not have Canvas integration available to us, but it had a free version that allowed us to flexibly create badge criteria and award badges. As we continued to explore tools and options, we faced some typical challenges when trying to innovate with instructional technologies at the individual level within a larger institutional context. Although it might have been possible with more time and a budget to get a system that was integrated with Canvas, the effort would not have been worthwhile given the scale of our course. Institutionally, tools need to be vetted for privacy and security policies before integration is approved. These are valid concerns, and while we proceeded without institutional integration and using a free version of the tool, we made sure to inform learners that signing up for badgelist was optional and that doing so was willingly using a tool that was not vetted by the university for security and privacy.

To set badges up in badgelist, we created a group for awarding badges, and then defined the various badges. For each badge, the award graphic was uploaded and the badge criteria were specified. Although badgelist was the central location for awarding badges, it did not provide us with a comprehensive overview of the badges that were awarded. We maintained a separate tracking system in a spreadsheet. This allowed us to easily see how many badges were being awarded and who was receiving them. With this data, we could effectively award the mega challenge badges and evaluate how the system was working. This system was cumbersome, but functional with 26 students. For a larger class, an integrated badge award and tracking system would be desirable.

Course Implementation

At the start of the term, 9 students indicated that they were already familiar with the concept of badging. A webinar was held to explain the course badge system, and it was recorded for students who would not attend the session live. To implement the badge system, we created a group on badgelist.com and posted the group link on the course Canvas site. Students were told to sign up for this group if they wished to earn badges, but that it was entirely optional. 23 students signed up. When students received badges, the badges appeared in badgelist and they could take the badge graphic and display it elsewhere. As the course progressed, challenges were posted. All students could complete challenges, whether they signed up for badgelist or not. Students who opted into the badging system could select the desired badge, upload their challenge completion evidence, and then the evidence would be manually checked by the

teaching assistant prior to awarding the badge. They would receive an email alert when a new badge was noted on their account.

Challenge and Badge Participation

Only five students did not engage in any of the challenges or participate in ways that would earn a level badge. The remaining 21 students, which included three students who did not sign up for badgelist, completed the challenges. Overall, 158 engagement-focused badges were earned (see Table 2). More than half were challenge badges. Nine of these badges were mega challenge badges earned by seven students; two students earned two mega challenge badges. In other words, one-third of the students who participated in the challenges completed five or more individual challenges. The range for challenge completion was 1-11, with a mean of 4.3.

Table 2.

Summary of Challenge and Level Badges Offered and Earned

Badge type	Unique Badges Offered	Badges Earned	% of Badges Earned
Challenge	18	91	57.6%
Easter egg	4	12	7.6%
Level	9	46	29.1%
Mega challenge	4	9	5.7%
Total	35	158	100%

In addition to the badge marking challenges and levels, there were four opportunities to nominate peers for badges during the course, and nine students nominated peers to receive badges. A total of 35 peer badges were awarded (see Table 3), with some students receiving the same badge type on multiple occasions.

Table 3.

Summary of Peer-Awarded Badges

Badge type	People Nominated	Badges Earned	% of Peer Badges Earned
Community builder	7	12	34.2%
Networker	3	7	20.0%
Thought leader	5	8	22.9%
Tech helper	4	8	22.9%
Total	19	35	100%

Only 7 (26.9%) of the students in the course completed the badge survey at the end of the course. This data is nonetheless useful for understanding student badge preferences. All seven respondents reported that they earned challenge badges within the course, and thus they represent 33% of the badge-earning students. Four of the seven had previously known about and earned digital badges.

As indicated in Table 4, all the responding students were very motivated to earn a challenge badge, whereas level, peer-awarded and mega challenge badges were not as popular. All seven students agreed with statements about enjoying, being interested in earning, and learning something new from challenge badges. They also all agreed that when they earn a challenge badge it is an indicator that they are doing well in the course, and disagreed that the lack of grade rendered the badges unimportant.

Table 4.

Student self-reported motivation by badge types (n = 7)

Badge types	Not all motivated	Somewhat motivated	Very motivated	I was not aware of these badges
Challenge	0	0	7	0
Level	1	5	1	0
Peer awarded	0	3	4	0
Mega challenge	0	3	3	1
Easter egg (hidden)	0	1	6	0

Despite overall positive perceptions of challenges, the badges themselves were not important as a public indicator of accomplishment. When ask whether they would want to display their challenge badges to others, five students disagreed and two were uncertain. Only two students reported that they displayed their badges to others.

When asked about the importance of challenges and badges, students indicated that learning a new tool via completing the challenge and earning a badge both were at least moderately important, as was counting their completed challenges and earned badges (see Table 5). The response rate was too low to yield statistically meaningful comparative insights across these items, although it is notable that these students had a greater orientation toward personal outcomes than social ones such as seeing what their classmates did.

Table 5.

Importance of challenges and badges (n = 7)

Item	Not all important	Slightly important	Moderately important	Very important
Learn a new tool	0	0	2	5
Earn a badge	0	0	4	3
See how many challenges I can complete	0	1	2	4
See how many badges I can earn	0	0	2	5
See how classmates complete challenges	0	3	3	1

Instructional Team Observations and Reflections

The instructional team was pleased by the overall level of engagement in challenges. The majority of the class participated and completed more than one challenge. At the high end, two students completed 11 challenges each. For an optional system, this level of student engagement is good. The instructional team did not expect that all students would participate in optional challenges, especially knowing that in any class students exhibit a wide range of participation levels for required activities. This optional microlearning system kept students who wanted to do the minimum level of work focused on the tasks they needed to complete to earn their grade while offering students who wanted to extend their learning experience further and be challenged the opportunity to do so.

The challenge and badge system had a mix of strengths and weaknesses. In terms of strengths, we witnessed students building momentum across challenges, enthusiastically sharing what they learned and created, and learning vicariously through peers who completed and shared challenges. Although we did not see most students who earned badges sharing their badges in course spaces (e.g., course blogs, Twitter), they nonetheless shared what they learned or created when completing challenges. For some challenges, the product was a form of student-created open educational resources (OER), showing how this system can foster renewable assessments. In that sense, the challenges were more important than the badges.

The instructional team noted areas where improvements could be made. The major weakness was the badge awarding system. While functional, it was neither elegant nor efficient. It was hampered by the amount of manual labor involved

in checking and awarding badges, and the use of a system outside the course LMS. Additionally, some challenges were more popular than others, which appeared to be related to multiple factors, including student interest in the tool and skill set involved in the challenge, requirements for interdependence (i.e., was the challenge a fully independent effort or more interesting if other classmates co-participated), and timing in the course. These represent areas for system refinement.

Discussion

As suggested by Horstman et al. (2020), the badge design and development process helped the research team reflect on course design as well as the overall learning experience. Conceptually, challenges need to be compelling for students to complete them and badges need to represent a valued achievement for students to want to earn them. In this class, the challenge badges were earned more frequently than other badges and students reported higher rates of motivation to earn challenge badges compared to the other badges offered in the class. Although motivation was only measured via a self-report survey with low response rates, the findings suggest that while badges may be attractive extrinsic rewards, the use of a challenge to promote student self-directed informal learning is as important if not more important than the badge. Other engagement focused badges, namely level badges, which indicated performance but not learning, and mega challenge badges, which did not represent new learning, were not as popular as challenge badges. Still, mega challenge badges provide an important indicator of student engagement levels because they provide evidence that students completed multiple challenges.

The challenge and badge system in this course encouraged students to practice course related concepts and tools, supported peer-to-peer interaction, and facilitated student-initiated informal learning and personalized learning. Although the badges did not accumulate in a way that marked the attainment of course competencies, like Zhang and West's (2020) system, and badges did not hold currency in other contexts as recommended by Horstman et al. (2020), students nonetheless found value in completing the challenges. Optional badge systems and voluntary learning activities often suffer from low participation rates (Beste, 2021; Jones & Korula, 2021), but in this class, a high percentage of the students participated in at least one challenge. Further, the point of optional systems is not to achieve full participation, but to provide a viable option for additional learning activities to those who are interested.

We did not investigate the relationship between items produced via challenges and reusable assessments and open pedagogy (Wiley, 2013). Nonetheless, it is possible that the social element of the course and its connectivist approach encouraged students to adopt an OER mindset (Word & Dennen, 2021) when engaging in challenges and to share freely with peers. In this way, the design and implementation of challenge-oriented badges can lead to meaningful course extensions and connections with other contexts.

Limitations

The study has several limitations, including a low post-course survey response rate and a focus on design processes and engagement markers rather than direct measures of motivation, but it provides an additional use case that supports the relevance and usefulness of microlearning and microcredentialing system within the course curriculum. As seen in this course, microlearning can be used to support individual choice for course-related practice and exploration, and is effective with graduate students who are focused on developing and applying higher order knowledge and skills.

Another limitation is that the data focuses on students who participated in the optional system, and does not investigate the perceptions of non-participants or the reasons they chose to not engage in challenges. This limitation is partly a function of these students not completing the post-course survey. However, it would be valuable to learn more about their perspectives to find out if there were barrier to participation that might be addressed via further revisions to the course design. That said, the purpose of the challenge and badge system was never to seek full student engagement. Had that been the goal, participation could have been mandatory and associated with student grades.

Conclusion

In this study, the design, development, and implementation of a badging system provided an opportunity to reconsider how students address course learning objectives by offering a variety of relevant practice activities. These activities, although optional, helped build knowledge and skills that students could then apply in their formally assessed course assignments. As with all optional systems, participation levels can be a concern. This study demonstrated how optional learning activities, when issued to students as challenges in a just-in-time manner, can engage students in relevant

microlearning activities. While the challenges were coupled with badges in this study, future research might explore challenges as a means of promoting microlearning without use of a badging system to look more directly at the motivating effect of challenges on student engagement. Additionally, to ascertain the power of challenges a future study might compare how students engage in the same optional learning activities across two sections of a course, one with the activities presented as learning options on the syllabus and formally integrated into the learning modules and the other using the challenge system, announcing the activities as challenges at temporally appropriate moments in the course.

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