

## **Work in Progress: Awarding Digital Badges for Demonstration of Student Skills**

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## *Introduction*

Digital badges are validated indicators of some accomplishment or skill. Data imbedded within each badge contains information such as learned material, specific criteria used, assessment methods and the issuing organization. Badges are created as a visible method for recipients to share on resumes, portfolios or professional networking sites. Digital badging has been used extensively in industry for highlighting employee skill sets and is valued in the workforce. Of late, there has been a growing focus on new assessment methods in higher education and universities are rethinking what skills students really need to master and how to define and measure those skills [1]. Micro-credentialing or digital badging is a relatively new assessment method in higher education used mostly in noncredit coursework, but is gaining attention in traditional colleges and universities as well [2]. Research on the effect of using this type of assessment is incomplete. Some research has shown that this type of assessment does make a positive contribution to student engagement with module content throughout the semester [3]. Digital badging has also been shown to help learners create a sense of personal reward, confidence and connection to the learning process [4]. Dyjur and coworkers showed mixed results on the perceptions of digital badge use, with many participants having a positive perception for instructors in higher education [5]. Other work from Chou and co-workers suggests that digital badging enhanced student interaction but not student participation [6].

## *Project Purpose and Hypotheses*

The first goal of this project is to create an innovative assessment approach in an undergraduate engineering project management class for skills needed in industry. The second goal is to measure student attitudes toward this assessment approach. Badges can be awarded for any type of acquired skills, such as problems-based or professional skills. In this research, the digital badges were awarded for the proficiency in two areas: the proficient use of Microsoft Project software and the ability to create effective team dynamics.

My motivation for using badges is that employers for engineering students seek many skills but specific skill sets are not always apparent from evaluation of a student's transcript. Completing a project management course does not necessarily mean that students have gained hands on experience utilizing software tools. Instructors might only introduce the tools in class, which would result in the students not using or only marginally using the tools. In addition, project management courses may or may not have required team projects and engineering students need to gain the skills to work successfully in teams. In the past, I have encouraged students who have gained proficiency in these areas to highlight those skills to potential employers. Creating assessments that are more visible could be a real advantage to students seeking employment. Currently, most companies require digital resumes for job applications, which is an opportunity for students to add badges directly. Students are also able to share the badges on professional networking platforms such as LinkedIn® for greater visibility.

This project is being executed in an undergraduate engineering class, Introduction to Project Management. This class is a Junior/Senior level core class for Engineering Management majors and is a technical elective for many other engineering disciplines. Throughout the term, students are trained to use a project management software, which is a skill not typically acquired by undergraduate engineering students. A team project is a course requirement and skills for developing effective team dynamics are discussed during class, practiced on the teams and evaluated by the instructor. Two digital badges, shown in Figure 1, were developed and awarded for those who show proficiency in the stated areas.



Figure 1

The badges were developed and assigned using Badgr, which is a free open sourced achievement recognition and tracking system that can be used to issue and share badges [7]. These badges were embedded into and automatically awarded through the University's learning management system (LMS), Canvas.

In order to develop a badge, instructors must first create an Issuer of Badges in Badgr. The Issuer can be an instructor, a class or a department, whichever suits the situation. I am the Issuer for my classes. Our university's marketing department created the images that were used for the badges. I worked with that department to create a basic framework design, which could then be adapted to other badges. Therefore, if I or other instructors wanted to create more badges, the basic design would be uniform, and have an approved university logo. I then added information such as the criteria, assessment and methods used to the badges. Students who acquire a badge can then share the image and embedded data. Badgr must be enabled in the Canvas course (under Settings/Apps).

In order to assign badges in Canvas, I had to use modules; my approach was to create a module for each badge. Then for each module, I created completion requirements, which established the activities necessary and minimum points required for badge assignment. For each student who met those requirements, Canvas automatically awarded the badges.

In this project, I hope to understand if the use of visual credentials motivate junior and senior level engineering students to learn class material and determine if these students view the badges as valid. I addressed the following research questions:

RQ1. Does the award of digital badges motivate student learning in a traditional undergraduate engineering course?

RQ2. Do engineering students view these credentials as valid?

### RQ3: Will students utilize/share their badges in their job search?

#### *Methods*

A survey developed by Dyjur and coworkers was modified and given in order to determine attitudes toward the use of digital badging [8]. The survey questions were asked using a Likert Scale (Strongly agree/agree/don't know/disagree/strongly disagree) and are shown in Table 1.

I offered students minimal bonus points (2/500 total) to complete the survey and survey completion was a requirement to receive the badge. Not all students who completed the survey were awarded a badge.

#### *Project Framework*

Throughout the semester, I taught students the use of Microsoft Project 2016. Typically, I hold five sessions during class in a campus computer lab. After each session, students are required to upload their work on the required activity in the class LMS. I graded these activities as complete/incomplete only. For this project, I created a summative assessment for measuring skill in using Microsoft Project software. I required that the students complete this activity to during class time in in the computer lab at the end of the term. For students earning 75% or greater on the assignment, a Microsoft Project Proficiency digital badge was awarded to them.

For the Effective Team Dynamics badge, I evaluated the student team products during the term and their interactions during our team meetings. Dysfunctional teams tended to produce inadequate products and I could sense conflict during team meetings. Each team member also evaluated themselves and their team members at two points during the project, after the second and forth (final) project deliverable. Students earned a bonus point for each of the following: demonstrating good team interactions, acceptable products and good evaluations from teammates. For students who earned 3 points total, the digital badge was awarded automatically. Students were able to access their badges through Canvas.

#### *Initial Results*

In fall class of 2018 (n = 73) 69 badges were awarded: 24 for Effective Team Dynamics and 45 for Proficiency in Microsoft Project 2016. Twenty-one students received both badges. Fifty-five students completed the survey on perceptions of the badges, but not all of them received both badges. Quantitative results are shown in Table 1. The "Not Sure" column includes: Somewhat agree, Neither agree or disagree and Somewhat disagree.

Table 1: Survey Results

#	Question	Strongly agree + Agree No. (%)	Not sure No. (%)	Strongly Disagree and Disagree No. (%)
1	I will be happy to receive a digital badge for learning a skill.	44 (80.0)	11 (20)	0 (0)

2	I am encouraged at the prospect of receiving the badge.	36 (65.5)	19 (34.5)	0 (0)
3	I feel motivated to receive a badge.	35 (63.4)	18 (32.7)	2 (3.6)
4	I want to earn more badges from this institution.	35 (63.6)	18 (32.7)	2 (3.6)
5	The badges seem authentic to me.	27 (49.1)	25(45.4)	3 (5.5)
6	The badges seem credible to me.	24 (43.6)	28 (50.9)	3 (5.5)
7	I would rather earn a badge than have exam questions over the material.	43 (78.2)	12 (21.8)	0 (0)
8	I feel that the digital badge is recognition of the skills I achieved.	38 (69.1)	15 (27.3)	2 (3.6)
9	I have worked extra hard to earn a badge.	26 (47.3)	23 (41.8)	6 (10.9)
10	The chance to earn a badge kept me more engaged with the material during the term.	28 (50.9)	22 (40.0)	5 (9.1)
11	I intend to share my digital badge during job searches.	33 (60)	20 (36.4)	2 (3.6)

From the initial data, the perception of digital badging is overall positive. Eighty percent of the students were happy to receive the badge while the other 20% fell into the “Not sure” category. Over 60 percent of students were encouraged and motivated to receive the badge and were interested in receiving more badges from our institution. Less than 4% were not motivated to receive the badge and were not interested in earning more. Almost 80% preferred the badge to exam questions. However, less than half indicated that they worked extra hard to earn the badge. In addition, just over 10% disagreed or strongly disagreed with that statement. A majority of students (60%) indicated that they intended to share the badge during job searches, with just under 40% being unsure and 4% indicating they would not share the badge.

In terms of authenticity and credibility, only about half felt positive (49.1% and 43.6%, respectively). For authenticity, 45% were unsure and 5.5% strongly disagreed. Almost 51% were unsure if the badges were credible and again, 5.5% strongly disagreed. Considering that badges have not been used on this campus for other courses, it is not surprising to me that students questioned the validity. Most have had some work experience, but may not have seen the use of badging in the workforce. Students should be more motivated to obtain the badges if they see them as credible and authentic. Possible approaches for improvement with these numbers would be for me to share examples of badge usage in industry and demonstrate how students could use the badges in job searches.

### *Lessons Learned to date*

After one semester of badge awards, a list of lessons learned is as follows:

1. When using Canvas LMS, badges are automatically awarded through Modules, so some set up was required.

2. Badge design should reflect accepted university logos and have approval through the marketing department.
3. If multiple badges will be awarded from one institution or class, creating a common framework with accepted logos on the design would more efficient.
4. Measurable criteria for receiving badges should be shared with students, even for soft skills.
5. The addition of mixed methods for analysis would be beneficial for a more complete picture of student attitudes.

### *Future Work*

Data will continue to be collected and possibly with the addition of semi-structured interviews. If collected, the semi-structured interviews could be analyzed using thematic coding to provide greater insight to student perceptions. One other possible question I could explore is if I observe a difference in motivation or attitudes with certain groups of students (based on gender, race, or background). Another question that I could explore is if the addition of more badges earlier in the term would improve motivation.

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