



Engaging undergraduate students in a co-curricular digital badging platform

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Abstract Digital badging continues to garner attention in the educational community. What remains to be seen is how badging will interact with traditional curricular elements. While concerns have been raised about using badges as extrinsic motivators in coursework, there are alternate areas of application for digital badging. Badges may actually serve to motivate and empower student learning and engagement outside of the formal curriculum. This action research was conducted to guide the implementation of a badging system at Maranatha Baptist University. It explores the concept of using digital badges as a platform for recognizing learning experiences in co-curricular education. More specifically, it seeks to determine how to best optimize a co-curricular digital badging system for maximum student engagement through a combination of extrinsic and intrinsic motivators. Student focus groups were used with a mixed-methods methodology of collecting data on potential student interest and involvement in a digital badging environment. The quantitative portion compares intrinsic vs. extrinsic motivations for participating, while the qualitative section consists of a coded analysis of student discussion of co-curricular digital badging.

Keywords Digital badging · Gamification · Game based learning · Co-curricular education · Experiential learning · Extrinsic motivation · Intrinsic motivation · Student engagement

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1 Introduction and general information

1.1 Relevance and significance

Digital badges continue to garner the attention of the educational community as a possible game-changer in educational engagement and credentialing (Lockley et al. 2016; Ifenthaler et al. 2016). Although they may be several years away from widespread adoption, the continuing and growing conversation around them indicates that they may be more than a temporary fad (Wu et al. 2015). What is not quite clear is exactly how badges best fit into an educational program. The most boisterous debates center on the viability of using badges as extrinsic motivators for engaging students in coursework (Goldberg 2012). Proponents of digital badging point to the purported success of gamification theories. As an example, Dicheva et al. point to online education sites like Khan Academy and Code Academy that successfully keep users engaged through game elements (2015). Skeptics argue that badges will foster a culture of achievement rather than one of learning. For them, extrinsic motivators like badges offer a shallow, temporary engagement that may not encourage a long-term love of learning (Olneck 2015; Jenkins 2012). Perhaps there is an alternative approach to digital badging apart from these positions. Bernard Bull argues that badges have the potential to create an entirely different vision for education by placing the emphasis on self-directed learning:

Badges, by design, amplify the value of making evidence of learning visible and giving greater control of this credential to the recipient (although some badge platforms are seeking to adjust this). Self-directed learning amplifies the value of human agency. Positive psychology amplifies values like well-being and success. Put these values together and we begin to see possible synergies (Bull 2015).

In other words, digital badges could potentially enable and reward self-motivated learning. A system designed to encourage students and help them track personal milestones could empower them to take learning to the next level on their own. Thus, badges might be particularly useful for encouraging educational objectives and building a culture of learning outside of the classroom and coursework. These possibilities were the catalyst for the development of an experimental co-curricular badging program at Maranatha Baptist University.

1.2 Background

At most schools, desired learning outcomes are not just academic but dispositional in nature. As such, they are best fostered by student mentoring, experiential learning, and campus culture. Curriculum experts recognize that “Great schools. .. [are] tightly aligned communities marked by a palpable sense of common purpose and shared identity” (Lickona and Davidson 2005). Creating that kind of school culture is no easy task – it must be developed intentionally yet organically. Maranatha Baptist University has chosen to use digital badging platform as one means of advancing the school culture by encouraging and

reward student engagement in co-curricular activities that are important to its ethos. For our purposes, co-curricular digital badging may be defined as using digital micro credentials to encourage and reward student engagement in educational activities outside of the classroom. These activities include involvement in fine arts groups, student body leadership opportunities, community service challenges, and many more. The overall philosophy is to encourage students to maximize the activities they are already involved in by participating in a reflection that helps them learn from those experiences. As students earn badges, they will be added to a visual co-curricular transcript (pdf) that links verification information to each badge and gives students a symbolic representation of their co-curricular experiential learning.

This form of digital badging appeals to students as a means to track and receive “credit” (in the form of micro-credentials) for meaningful co-curricular experiences. At the same time, it creates assessment points to help students links these experiences to their overall educational development and rewards skills that students develop through those experiences. This approach to digital badging is supported by recent research that suggests that badges have educational value as assessments, not merely credentials (Abramovich 2016). In the Maranatha Passport system, assessment takes place through student submitted responses to reflection prompts for each badge. These reflections are aligned with specific institutional outcomes such as “Servant Leadership”, for example, for the purpose of assessing student competencies related to the application of leadership principles in a given experiential scenario. Submitted assessments go to an assessment team for review using the Chalk & Wire assessment platform and are scored and returned to students with formative feedback.

1.3 Purpose

Prior to planning the full-scale launch of the co-curricular badging system, called Maranatha Passport, the research outlined in this paper was conducted to determine how students would perceive and react to the concept of co-curricular digital badging. Student input was important for crafting the system to appeal to students and attract their engagement. The goal was to make the program fun, rewarding and meaningful to them. The hypothesis was that students need a combination of extrinsic and intrinsic motivators for maximum engagement: a reason as well as a reward for participation in co-curricular digital badging.

1.4 Research questions

With that in mind, the following questions were developed to guide this research:

1. Do students require a combination of extrinsic and intrinsic motivators for optimal engagement in a co-curricular digital badging environment?
2. Which kind of motivators (extrinsic vs. intrinsic) are more powerful in motivating co-curricular student engagement?
3. What student perceptions or concerns could potentially prevent or limit their voluntary participation in the digital badging program?

2 Literature review

Although digital badging is a very recent trend in education, only appearing as an experimental phenomenon in the last five years, it has become the subject of great interest in the educational research community. Several major themes are beginning to emerge from the dialogue surrounding the concept of motivation in digital badging.

2.1 Sociocultural impetus

Several sociocultural forces are responsible for the sudden emergence of digital badging. The most obvious force at play is the culture of gaming, but forces within industry and education have hastened the widespread adaptation of digital badges.

Video gaming Video games and computer games in particular have a remarkable power to captivate attention and motivate users to engage in a compelling narrative (Dicheva et al. 2015). Over time, design elements of games have been refined to provide maximum engagement. One of those elements, digital badging, first appeared on the Microsoft Xbox 360 Gamerscore system in 2005 (Corbeil et al. 2015). Achievement levels and associated badges, in conjunction with leaderboards, quickly became a powerful motivator through elements of competition and social interaction (Alaswad and Nadolny 2015).

Business applications Seeing the success of digital badging in the gaming environment, other types of communities began implementing achievements in order to garner increased participation, most notably online question and answer communities such as Stack Exchange (Ahn et al. 2014). From there, the business community caught on due to an increasing need for constant professional continuing education in new competencies (Corbeil et al. 2015; Raish and Rimland 2016). In 2011 the tipping point was reached when Mozilla published a whitepaper promoting the concept of badges as mobile micro-credentials and developed a standardized framework for digital badges with embedded metadata (Peer 2 Peer University and Mozilla Foundation 2011).

Badging in education The Open Badge infrastructure paved the way for the use of badges in educational contexts (Ahn et al. 2014), through the development of a theory called game based learning (GBL) – building game-like elements into instructional design (Alaswad and Nadolny 2015). Educators, under pressure to steer away from a didactic approach to teaching by students who are used to exciting digital environments, have begun to welcome the opportunity to integrate game elements into the classroom (Lister 2015; Banfield and Wilkerson 2014; Dicheva et al. 2015). Several types of game principles have been applied in the classroom, such as goals/challenges, personalization, rapid feedback, visible status, unlocking content, freedom of choice, freedom to fail, storyline/new identities, onboarding, time restriction, and social engagement (Dicheva et al. 2015).

2.2 Uses of digital badges

After mapping out much of the experimentation surrounding game based learning, Alaswad and Nadolny (2015), determined that the most important attributes of games as applied to learning are feedback, goals and interaction. All of these aspects can be encapsulated into digital badges to motivate learners by “creating highly engaging, skill-related, and sequential sets of learning tasks (Alaswad and Nadolny 2015). Badges can be applied to a great variety of education scenarios, such as challenge achievement or participation awards (Dicheva et al. 2015). Further, they can be deployed as an assessment of mastery (Kocadere and Çağlar 2015) or simply as a mark of completion (Abramovich et al. 2013). According to Ahn et al. (2014) badges have three primary uses: (1) as a pedagogical tool to map out individual learning experiences, (2) as a signal or credential to provide more granular evidence of competency than a diploma, and (3) as a motivator for behavior. The last aspect of badging has generated a myriad of research questions and is worthy of its own separate discussion.

2.3 Badging and motivation

Researchers are divided on the subject of digital badging and motivations. Most would agree that badges have a powerful effect on learner motivation (Dicheva et al. 2015). However, there is disagreement regarding the nature of that motivation. Alaswad and Nadolny, for example state that “Badges enhance engagement for learners through providing extrinsic motivation (2015). On the other hand, Banfield and Wilkerson contrast digital badging with traditional learning, which they describe as extrinsic (focused on grades and tasks) rather than intrinsic (focused on participation for pleasure or satisfaction) in motivation (2014). They view digital badging as an opportunity to enhance experiential learning theory (ELT) by making exciting game-based learning activities. In this scenario, digital badges and leaderboards are viewed primarily as valuable feedback to enhance the learner’s self-efficacy. Others suggest that students with different learning characteristics or prior knowledge are motivated differently. One study noted that low-performing students were motivated by completion-type badges, while high-performing students needed mastery-type badges for motivation (Abramovich et al. 2013). Another study indicated a correlation between aggressive students and competitive-type badges (Fanfarelli and McDaniel 2015). Firmin et al.’s work with the AWANA program suggests the possibility of converting motivations from extrinsic to intrinsic over the course of a lengthy set of challenges (2005). Finally, Ibáñez et al. (2014) noted many different motivators, ranging from enjoying the work, to external rewards, to altruistic helping from students who all participated in the same activities, suggesting that digital badges must accommodate a variety of motivators.

2.4 Potential problems for digital badging in education

Some research, however, suggests that digital badging might actually have negative motivational implications for some students (Lister 2015; Davis and Singh 2015). The possibility of badges actually demotivating some students is certainly a problem that could potentially accompany the use of digital badges in education. Fanfarelli and McDaniel noted that passive-dependent students performed worse in badge courses

compared to a control group (2015). Another study indicates that “external rewards might undermine intrinsic motivation” (Deci et al. 2001). A related study suggests that too great an emphasis on extrinsic motivators can create expectations that eventually replace intrinsic motivations such that students will only work when provided with an external reward (Hakulinen et al. 2015).

Another danger noted by Hakulinen et al. (2015) relates to the so-called “presenter’s paradox”. He states “By adding badges [to a learning environment] we may signal that the exercises are not intrinsically motivating and hence completing the tasks is compensated with external rewards.” Other potential issues are poor design practices that do not guide learning effectively and too much complexity in digital badge systems with little structure to guide students through a pathway for meaningful learning experiences (Ahn et al. 2014). A final commonly held objection relates to the potential that digital badges will be used inappropriately (interpreted or modified for self-promotional purposes) thus undermining the credibility of the open badge standard. In an open market for credentialing, it will be difficult to determine which badges serve as valid credentials and which do not. (Ahn et al. 2014). The rise of digital badges necessitates a means of encryption and authentication as a sort of digital currency for credentialing.

Still, hope abounds in the educational research community that digital badging will provide timely solutions for pressing needs of authentic assessment, engaging experiences, and demonstrated educational value. Continued research is warranted to improve our understanding of the nexus of motivation and engagement in order to optimize digital badging environments for student learning.

3 Study design, results, and implications

To further explore student motivation and engagement in co-curricular digital badging, five student focus groups were conducted, ranging in size from five to nine students each. Approximately 15 min were spent demonstrating and explaining the Maranatha Passport concept to the students. Before opening the floor for questions and discussion, students were asked to read and agree to the study disclosures and then complete a twelve-question questionnaire (described below). A total of 30 students chose to participate in the study by completing the questionnaire. After all who chose to do so had completed the questionnaire, we opened the floor for questions and discussion. A total of 109 qualitative statements were recorded with no identifying information and were coded by response type (question, comment, suggestion), student attitude (positive, neutral, negative), and topic / key word.

3.1 Data collection

The research instrument was crafted with the purpose of identifying the strongest motivators for participation in the Maranatha Passport program. The student was given a list of twelve potential activities or reasons for involvement in the digital badging environment. These questions alternated between extrinsic and intrinsic motivations for engagement. The students were asked to rate how likely or unlikely they would be to participate in each item on a Likert scale from 1 to 5 (1 = very unlikely, 5 = very likely). After rating each item, the students were asked to order the items by priority (1 being

the highest priority and 12 the lowest). The purpose of combining ratings with rankings was to compare the level of student interest with the type of activities that were most motivating to them. The resulting correlations could then be used to analyze potential student engagement in various elements of digital badging (Figs. 1 and 2).

3.2 Data analysis

The most basic analysis of this data simply compares the ratings of extrinsic versus intrinsic motivators. The results show a slight preference by students for intrinsically motivated activities (3.87 out of 5) compared with extrinsically motivated activities (3.56 out of 5). This data is consistent with our hypothesis that students need more than purely extrinsic motivations to participate in digital badging.

The relative student ratings (Fig. 3) for each of the items on the questionnaire shows a mixed distribution of extrinsic and intrinsic motivators of student interest. The highest rated item was number 3 on the list, “Build a digital resume / professional portfolio with a collection of micro credentials,” immediately followed by four intrinsic motivators (Q2, “meaningful to me”; Q4, “developing skills”; Q10, “self-directed study”; and Q8, “personal development”). The relative student average rankings (Fig. 4) for each item show a similar mix of student motivations and priorities. These results suggest that while extrinsic rewards are a significant “hook” for student engagement, sustaining that engagement depends on intrinsically meaningful activities.

Since student responses clearly demonstrated a range of preferences for extrinsic versus intrinsic motivators, an extrinsic motivation score was extrapolated from the response data. By weighting the order in which students ranked the priority items on the survey (using a factor of 6 to 1 for the first six items), we were able to develop an extrinsic motivation score ranging from 100% (all items in the top half were extrinsic)

Focus Group Questionnaire

Circle the number to indicate how likely you would be to participate in the following activities on Maranatha Passport ((1 = very unlikely, 5 = very likely)). Then in the boxes, rank each group (5s, 4s) from greatest to least likely to participate.

<input type="checkbox"/> Publish an achievement on social media.	1 2 3 4 5
<input type="checkbox"/> Accomplish a “bucket list” of learning experiences that are meaningful to me.	1 2 3 4 5
<input type="checkbox"/> Build a digital resume / professional portfolio with a collection of micro credentials.	1 2 3 4 5
<input type="checkbox"/> Pursue developing specific skills or areas of interest not included in my degree coursework.	1 2 3 4 5
<input type="checkbox"/> Capture / record college experiences on an “co-curricular transcript”.	1 2 3 4 5
<input type="checkbox"/> Participate in collaboration / mentoring opportunities.	1 2 3 4 5
<input type="checkbox"/> Get involved with activities I might not normally do as part of completing a challenge.	1 2 3 4 5
<input type="checkbox"/> Use tools to better understand myself and how I can develop my gifts and abilities.	1 2 3 4 5
<input type="checkbox"/> Give or receive encouragement for doing something well.	1 2 3 4 5
<input type="checkbox"/> Meet degree requirements through self-directed learning and demonstration of proficiency.	1 2 3 4 5
<input type="checkbox"/> Track small milestones that help me accomplish larger personal goals.	1 2 3 4 5
<input type="checkbox"/> Reflect on co-curricular experiences in order to learn from them.	1 2 3 4 5

Fig. 1 Research instrument

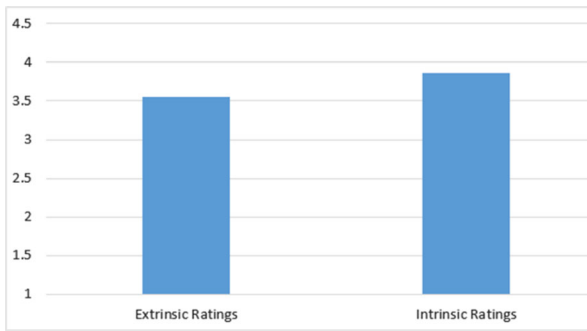


Fig. 2 Average student interest by type of motivator

to 0% (all items in to top half were intrinsic). Student preferences ranged from 14% to 76% in extrinsic motivation, with a mean of 48% and a median of 52%. Correlating the overall interest (average of student ratings) with extrinsic motivation returned a very low level correlation with results that were not statistically significant ($R = 0.164$, $P = 0.394$) as indicated in the Fig. 3 below. This again corroborates the hypothesis that extrinsic motivation is not the only or even the primary driver for student engagement in digital badging (Fig. 5).

Finally, we wanted to determine what combinations of factors were most important in influencing student engagement. The strongest and most statistically significant correlations were found between intrinsic and extrinsic pairs of questions rather than between items of the same type (Tables 1, 2, and 3). This again suggests the importance of extrinsic and intrinsic motivators working in tandem for optimum engagement.

4 Discussion

Quantitative results From the data, it seems clear that we should not view digital badging primarily in terms of extrinsic motivation. The data from this survey demonstrates that extrinsic motivators did not correspond to higher student interest. Rather, the reverse was true. Although extrinsic motivators were appreciated as a reward, and may

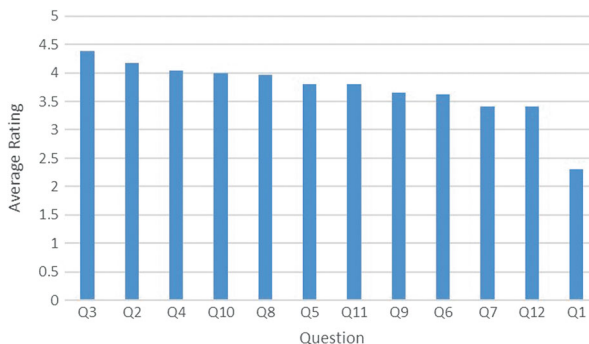


Fig. 3 Average student rating by question

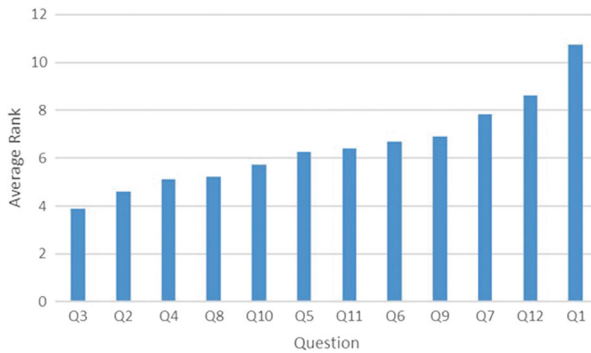


Fig. 4 Average student ranking by question

be in important factor for student involvement, students need more meaningful and compelling reasons to participate in the program.

Qualitative results The qualitative responses gathered from the open discussion in the focus group also indicated a high level of interest in digital badging with a few potential issues to overcome. Of the 109 responses, 65 were classified as “Positive”, 30 were “Negative” and 14 were “Neutral”. Forty-six responses were categorized as comments, 20 were questions, and 41 were suggestions. The topics of the suggestions and the corresponding comment types and attitudes are detailed in Fig. 6.

On the positive side, students loved the fact that participation would be flexible and voluntary. They seemed highly motivated to take advantage of self-directed learning opportunities. They appreciated the possibility of getting recognition for things they are already involved in, and seemed willing to invest additional effort to receive a badge for things they are involved in. Many of them acknowledged that they would be more involved in co-curricular activities as a result.

Many of the negative reactions were related to a “childish” stereotype connected with the term “badges”. Some students do not want to feel like they are in the Boy Scouts or that they need “stickers” to reward good behavior. Other students tend toward a pragmatic approach to their college education and may not make co-curricular involvement a priority because it is not a requirement for graduation. A few expressed concerns about cheating by falsifying involvement in order to get badges. Some were

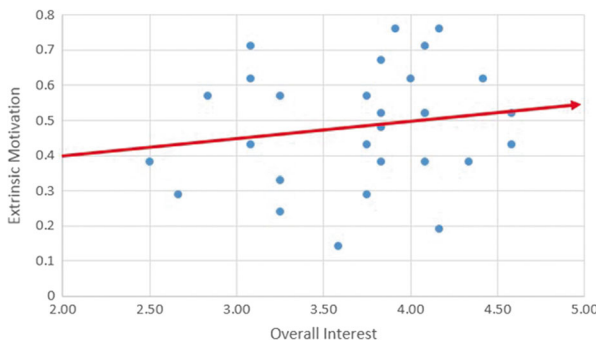


Fig. 5 Extrinsic motivation and student interest in badging

Table 1 Correlations between intrinsic and extrinsic rating pairs

Intrinsic / Extrinsic pairs	Correlation	Probability (<i>P</i>)	Significance
Accomplish a “bucket list” of learning experiences that are meaningful to me / Track small milestones that help me accomplish larger personal goals	0.702	0.00002	***
Capture and record college experiences on an “extra-curricular transcript” / Reflect on co-curricular experiences in order to learn from them	0.654	0.00012	***
Use tools to better understand myself and how I can develop my gifts and abilities / Give or receive encouragement for doing something well	0.610	0.00045	***
Capture and record college experiences on an “extra-curricular transcript” / Participate in collaboration or mentoring opportunities	0.585	0.00086	***
Participate in collaboration or mentoring opportunities / Give or receive encouragement for doing something well	0.551	0.00196	**
Accomplish a “bucket list” of learning experiences that are meaningful to me / Get involved with activities I might not normally do as part of completing a challenge	0.477	0.00885	*
Give or receive encouragement for doing something well / Meet degree requirements through self-directed learning and demonstration of proficiency	0.420	0.02337	*
Publish an achievement on social media / Accomplish a “bucket list” of learning experiences that are meaningful to me	0.413	0.02608	*
Capture / record college experiences on an “extra-curricular transcript” / Use tools to better understand myself and how I can develop my gifts and abilities	0.372	0.04713	*

concerned that using the system would be difficult for students who are not tech-savvy. Many students recognized that there would be significant challenges to overcome in

Table 2 Correlations between extrinsic rating pairs

Extrinsic / Extrinsic pairs	Correlation	Probability (<i>P</i>)	Significance
Participate in collaboration / mentoring opportunities / Use tools to better understand myself and how I can develop my gifts and abilities	0.608	0.00047	***
Use tools to better understand myself and how I can develop my gifts and abilities / Meet degree requirements through self-directed learning and demonstration of proficiency	0.527	0.00328	**
Accomplish a “bucket list” of learning experiences that are meaningful to me / Pursue developing specific skills or areas of interest not included in my degree coursework	0.401	0.03131	*
Use tools to better understand myself and how I can develop my gifts and abilities / Reflect on co-curricular experiences in order to learn from them	0.386	0.03879	*

Table 3 Correlations between intrinsic rating pairs

I/I Pairs	Correlation	Probability (<i>P</i>)	Significance
Capture and record college experiences on an “co-curricular transcript” / Give or receive encouragement for doing something well	0.401	0.03089	*
Give or receive encouragement for doing something well / Track small milestones that help me accomplish larger personal goals	0.383	0.04007	*
Build a digital resume or professional portfolio with a collection of micro credentials / Capture and record college experiences on an “extra-curricular transcript”	0.368	0.04949	*

launching the system, informing and educating the student body about it, and generating student buy-in.

In short, it appears that students care most about whether the activities behind the badges were meaningful to them. They appreciate the extrinsic rewards as “milestones” of progress, but need to see how it relates to their overall goals. A few will be “too cool for school” when it comes to digital badging, but it seems that the system will encourage those who care about experiential learning to get engaged.

4.1 Study implications

It seems clear that a “badge it and they will come” approach to digital badging in co-curricular education will not work. Student motivations are nuanced and complex. If educators solely focus on extrinsic motivations, students may actually become

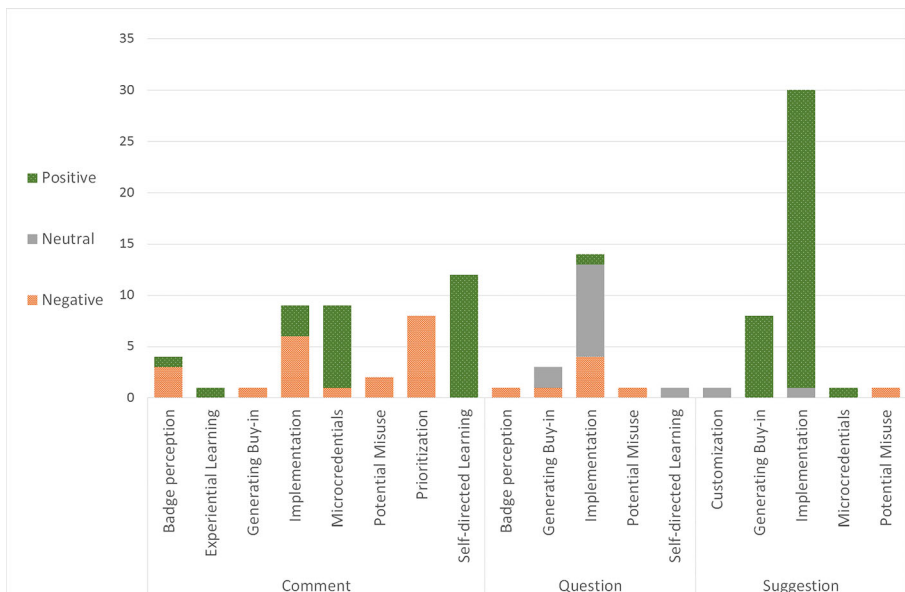


Fig. 6 Qualitative response distributions

demotivated or at least motivated in such a way as to encourage a culture of achievement rather than learning. For optimum student engagement, a digital badging environment should be:

Challenging Students need to feel like they are growing and accomplishing something through the system. The system should be easy to navigate and the tasks should be simple (i.e. not just jumping through hoops), but it should be something that students have to put some effort into. Ideally, it should take something they are already involved with or interested in and challenge them to take it to the next level.

Useful Students want to know how participating in something will help them achieve their goals. A well-designed digital badging system will do just that: help them think about their goals and connect their activities to them. It is important to have clear connections to institutional outcomes and clear means by which these experiences become useful to students. Connecting the badges to a portfolio platform might be one way to do so.

Flexible Further, the badges should be somewhat flexible in application. Students want to be able to apply the concepts they are learning to their own interests, passions, and experiences. Allowing students multiple pathways for earning badges helps them extract meaning from those experiences and connect them to their overall learning and development.

Voluntary Nothing kills motivation like imposition. True student engagement in learning must arise authentically. We can certainly develop an environment or culture that promotes student engagement, but we cannot force it. Digital badges can be a way to gently lead students to love learning through micro-rewards and authentic experiences.

5 Conclusion

As a result of this study, we conclude that the co-curricular aspect of education appears to be an ideal area of focus for a digital badging environment. Co-curricular badging allows for a rich variety of motivations and opportunities for engagement, while helping students connect their activities and experiences to their learning and development in a meaningful way. A co-curricular badging platform must be carefully constructed, however, to naturally stimulate student engagement through a combination of extrinsic and intrinsic motivators. Further research will be necessary, however, to determine what actual effects co-curricular badging might have on student engagement and learning.

Compliance with ethical standards

Disclosure There are no relevant financial or nonfinancial interests to disclose.

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