

Achievement Recognition Using Digital Badge Skill Hierarchies

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Problem Statement

The opportunity for learning has expanded considerably over the past several years. More recently, with the ubiquity of internet enabled devices and the growing sophistication of online education resources, the landscape for education has changed not only how we learn but where and when as well. In response to this change many educators are reevaluating the ways in which they verify learning, and a growing number of employers are looking for better indicators of the skills and abilities of their prospective employees. One technology that has risen to address the issue of verified achievement across various modes of learning in this new climate is digital badges.

Digital badges are often described as “microcredentials”(Gamrat, Zimmerman, Dudek, & Peck, 2014). They function as a statement of achievement similar to a certificate or degree but are often much more granular in their representations of accomplishment (Gamrat et al., 2014). This is accomplished through the use of metadata that contains information on: “(1) a description of the tasks required by each activity, (2) evidence of the learner’s mastery, and (3) feedback provided by the expert practitioner.” (pg. 6). One advantage of using digital badges is that they can represent varying degrees of mastery and specialization within a learning program (Abramovich, Schunn, & Higashi, 2013). Utilizing digital badges may also change the achievement goals of a participant and influence the participant’s values and expectations for success (Gamrat et al., 2014). The growing potential and adoption of digital badges warrants a closer examination of their use and design across domains and disciplines.

Personalization

A major draw to the use of digital badges is the potential for personalization in

educational programs and assessment. Personalization is of particular note because of the positive motivation for learning it can produce (Gamrat et al., 2014). Flexible programs in which participants can choose their learning paths and level of involvement allows customization based on their personal needs, expertise, and/or the demands of their affiliate organization (pg. 10). Similarly, in programs such as scouting, a display of a participants earned badges “represents a type of curriculum vitae of their learning and allows others to learn both about what a scout knows and what the scout values” (Abramovich et al., 2013, pg. 219). The issuers of educational badges, whether an educator or educational organization, recognize skill, knowledge, or achievement through badges much in same way in which they award degrees or certificates; yet the recognition is much more particular (pg. 218). A badge display gives outsiders a more specific understanding of the learners’ competencies and values compared to more traditional achievement objects- such as certificates or degrees.

Choice

Gamrat et al. (2014) explored the use of a digital badge system in a self-regulated online environment. Their program, Teacher Learning Journeys (TLJ) was piloted as an approach to professional development (PD) that allowed participants to customize their experience based on their workplace needs, as well as on their own expertise and interests" (pg. 1). The researchers found that most participants chose learning paths that were sensitive to the needs and goals of their workplace, and customized their content selection based on their particular needs (pg. 8). Participants also “customized the level of assessment and the specific content depth to personalize the PD training for workplace constraints" (pg. 1). While some participants needed an in-depth understanding and mastery of a concept or skill, others may have only needed superficial understanding or exposure to fulfill their personal or organizational needs. Allowing

opportunity for this form of flexibility, and the inclusions of an assessment system which provided credit for the level of competency or skills demonstrated by participants, is important for instructional designers to consider when creating learning environments using digital badges.

Gamrat (2014) is a promising exploration of the use of digital badges. While researchers provided flexibility for participants to choose their programs, and their level of involvement, their program did not implement structured achievements within any particular subject or program of study (e.g., online teaching, course design, standards training, etc.). The overall positive response from their participants warrants further exploration into more complex iterations of their project.

Badge Design and Motivation

Digital badges are still a new phenomenon in the field of Instructional Technology. As such, effective design and implementation strategies remain an issue for researchers and instructional designers. Despite the novelty of the subject, we can begin to look at some existing studies that directly and indirectly relate to the design of effective digital badge systems.

Motivation is of particular note in the design of digital badges. However, not all motivation strategies are equal in effect. Abramovich et al., (2013) references 4 types of motivators in their creation of digital badges: *mastery approach goals*, *performance approach goals*, *performance avoidance goals*, *mastery avoidance*. In their description of these motivators, the researchers state “*mastery approach goals* reflect a desire to achieve mastery based on one’s own interest, while *performance approach goals* reflect a desire to perform demonstrably better” (pg. 219). Conversely, *performance avoidance goals* “reflect the desire to avoid the appearance of underperforming” (pg. 219). The researchers claim that while *mastery avoidance* goals may theoretically exist, they are not seen in most real-world contexts (pg. 219). Interestingly,

Abramovich et al., 2013 found that the oversaturation of badges in a program can dilute the motivational effect they have on performance outcomes: the more badges a student earned also resulted in a decrease in their concerns about performance (pg. 225). For badge designers, this indicates the importance of creating concise, meaningful badging systems and to avoid creating badges for trivial advances, especially advances related to participation. There is an essential need to consider the purpose of badges (participatory or mastery) and appropriate the requirements for each so that they are created in a way that is both meaningful and motivational for participants (pg. 230). Meaningful badging guidelines are therefore worthy of additional exploration.

Reward Systems and Structured Achievement

One domain that might inform a strategy of digital badge systems is found in video game design. The concept of structured achievements has seen widespread use in this area. Dickey, 2005 tested the use of game design methods, strategies, and devices in her study of the methods of user engagement. One important finding she reports is the role of narrative in designing educational materials. She claims “traditional design is often based on a linear timeline” and “that this may be attributable to the fact that books, films, or video often serve as the primary medium.” She then suggests that game-based design might prove to be a better model for instructional design; as player input in games changes the structure of the narrative to better represent their individuality (pg. 74). Dickey proposes that structuring learning programs with conditions that are consistent to the purpose of both the learner and the learning objectives allows instructional designers to create a “narrative” for participants. This narrative situates participants within a learning context within which they have the freedom to pursue learning paths and gain recognition for their success on their own terms (pg. 73).

Dickey's notion of narrative as a means to situate participants within a learning context is helpful for designing digital badge hierarchies or "skill trees" in which participants have the freedom and flexibility to choose which programs, workshops, events, etc. they want to engage. Moon, Jahng, & Kim, 2011 also lends credibility to the use of game reward systems in learning programs; specifically in order to promote self-regulated learning. Their research finds that "the reward system (in digital games) is designed similarly to an exponential learning model" (pg. 1). Moon also discovered a functional equation that simulates the motivational properties of reward systems in entertainment-oriented digital games in order to promote exponential learning in other domains. This is a promising study for the application of reward systems in badge design. However, as there are no existing empirical studies on this subject, it warrants further investigation to confirm speculation (pg. 13).

The proposed study will seek to address questions presented in previous empirical research by integrating concepts from goal setting and game design into the creation of a novel badging system. The badging system will be attached to an experimental professional development program piloted by a group of volunteer educators. Specifically, the research is centered on discovering the experiences of faculty in flexible learning programs where achievement is recognized through a structured system of digital badging.

Contributions to the Field of Instructional Technology

Digital badges are an emerging trend in the field of instructional technology. They present a new form of assessment in the form of granular "microcredentials" (Gamrat et al., 2014). Emerging research on the topic of digital badges is relatively new. As of this writing, there are only a few studies where digital badges are being used as a primary means of assessment or recognition in learning programs. Existing research is optimistic about the uses of badges in

designing more flexible and personalized learning experiences (Abramovich et al., 2013; Gamrat et al., 2014) with benefits that include higher motivation and stronger learning outcomes (Abramovich et al., 2013; Gamrat et al., 2014). However, there are potential drawbacks if they are not considerably designed (Abramovich et al., 2013). Learning programs could benefit greatly from the granular nature of badges, but more research on the topic is greatly needed.

Purpose Statement

The purpose of this investigation is to describe faculty experience in a flexibly structured digital badge achievement program for professional development. Digital badges will be earned upon the completion of a workshop and as proof of a participant's demonstrated ability. Some badges will act as prerequisites to "unlock" more advanced programs, and will also mark progress within a program of study (e.g., online course design, distance education, etc.). Since the proposed program will be flexible in design, all workshops (and thus badges) will be completely optional. At the conclusion of the study all participants will be able to transfer their badges to a personal badge repository of choice. An explanation of digital badges and their utilization outside the program will be provided.

Theoretical Constructs

This will be a phenomenological study that will not use theoretical constructs in its design. However, there are several theories that support the notion of using digital badges to enhance the learning experience. Of particular note are self-regulated learning theory and goal setting theory.

Self-Regulated Learning

A common definition of self-regulated learners describes them as active participants in learning who employ metacognitive, motivational, and behavioral self-management strategies to

achieve their goals (Barry J. Zimmerman & Martinez-Pons, 1990; B. J. Zimmerman & Pons, 1986). In other words, self-regulated individuals initiate and direct their efforts in attaining knowledge and developing skills. Self-regulated learning is of particular interest to educators because it has shown to be a strong predictor of academic success and motivation (Pintrich & De Groot, 1990; Yang, 2005; Barry J. Zimmerman, Bandura, & Martinez-Pons, 1992). For this study, promoting self-regulation behaviors will be a major objective of the implemented badge system. The resulting data will be analyzed for signs of the use or non-use of self-regulated learning concepts by the participants.

Goal Setting

Goal systems and feedback mechanisms have shown to increase subjects' performance, motivation, and self-regulation (Bandura & Cervone, 1983). However, general goals are much less effective (or even counter effective) than are specific, proximal goals in these regards. Therefore, it is important that distal goals are structured into specific and attainable subgoals in order to be effectively motivating in self-regulation (Bandura & Schunk, 1981). By combining goals and performance feedback, subjects display higher gains in both performance and effort (Bandura & Schunk, 1981). Additionally, knowledge of their perceived skills and abilities are benefited by goal systems; helping them to better self-regulate (Cheung, 2004).

The digital badges used in this study will be based on the basic principles of goal setting theory. Namely, dividing programs in to distinct categories and then structuring the badge framework into a logical sequence for completion of that category (e.g., online course design).

Research Question

How do faculty describe their experience with digital badges within a personalized learning context for professional development?

Research Design and Methods

Design

This will be a phenomenological study featuring 5-6 employee volunteers from Northern Illinois University who are in active teaching positions. The study will focus on the experiences of the volunteers with a badge system utilizing achievement hierarchies (skill trees) over the course of 2 academic semesters. The design of the badge achievement program will be flexible; i.e., participants will be able to complete workshops in both online and in face-to-face sessions when available and appropriate based on their own constraints and preferences. Their purpose is to achieve official recognition for demonstrated competency across various workshops that the Faculty Development Center and Instructional Design Center offers. The instructional programs will be set so that individual workshop achievements (recognized by badges) act as requisites in a “skills tree” (see Appendix A) denoting the progress of specialization in a larger program of study (e.g., online teaching, distance learning, hybrid learning, etc.).

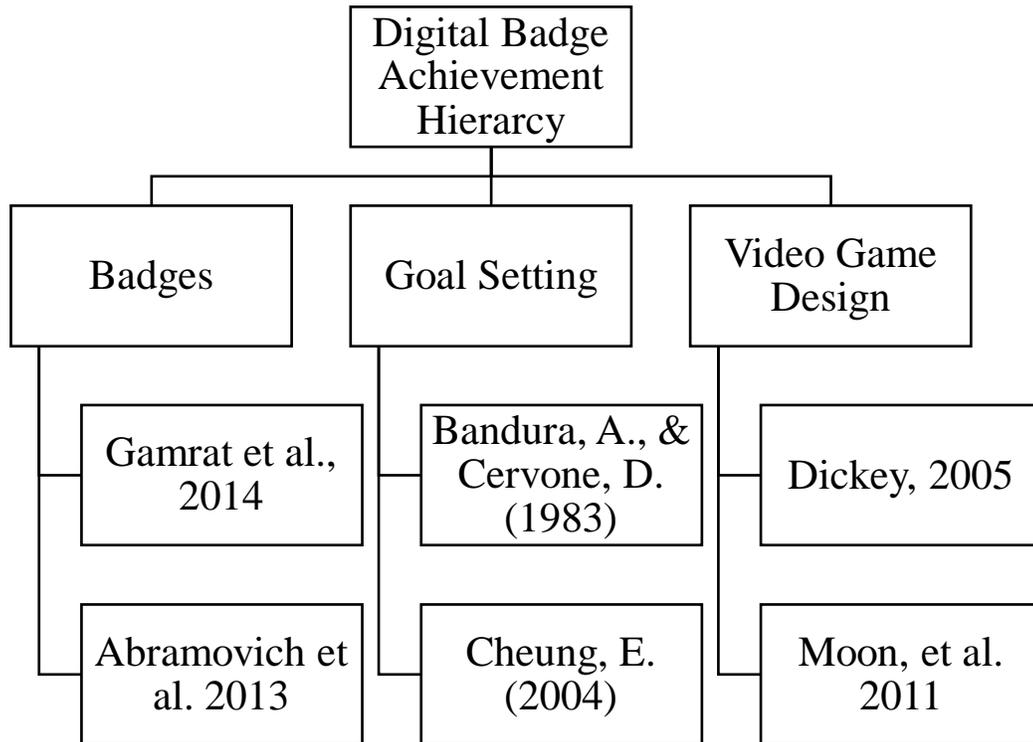
Study

The proposed study will take place over the course of two academic semesters. Participants will set personal goals describing their purpose seeking professional development at the beginning of the study and submit summative reflections as a requisite for completing each workshop and receiving an associated badge. This data will be used in the concluding interviews to prompt further elaboration and additional reflection of participants’ experience. Each participant will be interviewed by the researcher through a structured interview process designed to capture the participants’ experience with the digital badge system at the end of the study term.

Data Collection and Analysis

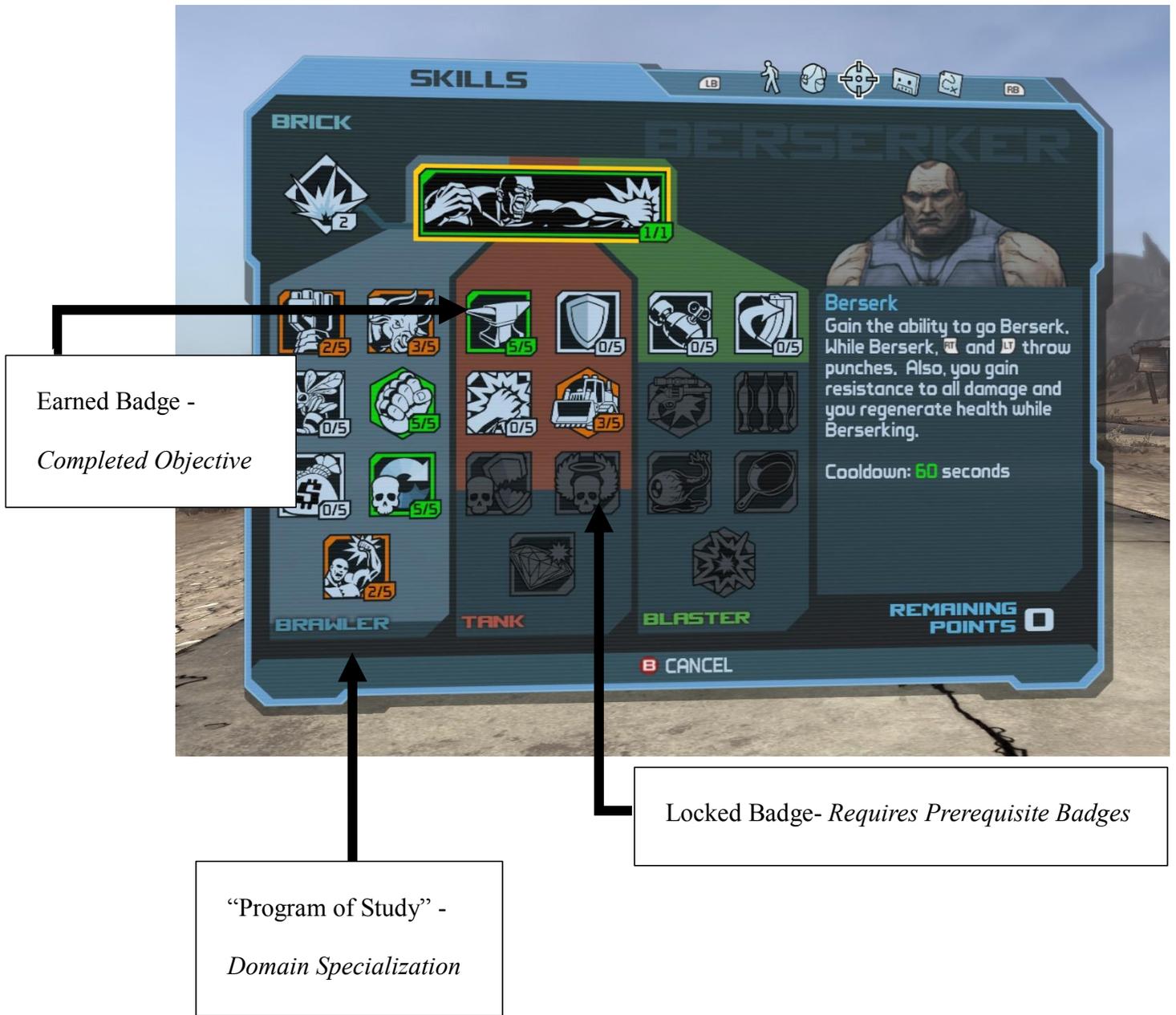
Data collection for this study will be gathered through semi-structured interviews and review of relevant artifacts from the study. The transcoding of the interviews will be conducted by the researcher with the results verified with the corresponding participant (Creswell, 2013). The researcher will code responses based on frequency of occurrence and look for emerging themes and patterns (Creswell, 2013). Additional data collected through participation in the study such as badges earned, certificate completion (or progress), initial goals, and reflection data will be used in triangulating a report of the results.

Literature Map



Appendix A

Video Game Skill Tree



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