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Rethinking workplace learning in the digital world: a case study of Open Badges

Bertrando Sharen Linn Eaglen

Pepperdine University

Graduate School of Education and Psychology

RETHINKING WORKPLACE LEARNING IN THE DIGITAL WORLD: A CASE STUDY OF OPEN BADGES

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Sharen Linn Eaglen Bertrando

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Kay Davis Ed.D. – Dissertation Chairperson

This dissertation, written by

Sharen Linn Eaglen Bertrando

Under the guidance of a Faculty Committee and approved by its members, has been submitted to and accepted by the Graduate Facility in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

Doctoral Committee:

Kay Davis, Ed.D., Chairperson

Mark Chen, Ph.D.

Judith Fusco Kledzik, Ph.D.

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VITA

EDUCATION

Pepperdine University, Malibu, CA — 2017
Ed.D. in Learning Technologies

California State University, Sacramento, CA — 2007
M.A. in Educational Leadership

University of California, Davis, CA — 1975
B.A. in Physical Education

PROFESSIONAL EXPERIENCE

Program Specialist — 2014-current
Sonoma County Charter SELPA

Research Associate — 2008-2014
WestEd, Sacramento, CA

Special Educational Specialist — 2001-2008
Local Education Agencies, Placer County, CA

Day Program Coordinator & Substitute Teacher — 1996-2001
French American International School, Portland, OR

Secondary Transition Educational Specialist — 1989-1993
Santa Barbara High School District, Santa Barbara, CA

Special Educational Specialist — 1984-1989
Santa Barbara County Office of Education, Santa Barbara, CA

PROFESSIONAL CREDENTIALS

Clear Administrative Services Credential — 2015
Brandman University, Irvine, CA

Educational Specialist, Physical and Other Health Impairments — 2005
San Francisco State University, San Francisco, CA

Educational Specialist, Moderate to Severe Handicaps — 1984
San Francisco State University, San Francisco, CA

Single Subject, Physical Education — 1983
California State University, Sacramento, CA

HONORS & AWARDS

Imaging Futures / Capstone, EDLT — 2014
Pepperdine University, Malibu, CA

ABSTRACT

The purpose of this collective case study was to explore digital badging in educational institutions as support for K-12 practitioners struggling to integrate technology into pedagogical practices. The researcher conducted a mixed-method study that captured perceptions about digital badges and follow-up interviews with selected badge users to explore their viewpoints further. The goal was to generate a detailed case description, identify participants' self-assessment of technological pedagogical content knowledge (TPACK), and define those attributes that are deemed important or not useful to *Open Badge Course* earners that participated in the study.

Ten individuals from a Northern California region completed the survey and four participated in an interview process. Results from the survey found that participants highly valued the convenience, accessibility, and ability to self-pace afforded by the course. They valued being able to set their own learning goals and to begin and work at their own level of expertise. The game-like features and personal achievement were motivating factors to earn and complete badges. The course experience allowed time for cumulative study to learn and implement technology into teaching. The course experience supported their understanding of technological pedagogical content knowledge (TPACK).

The interviews provided detailed information regarding perceptions and experience with the Open Badge Course. Six themes emerged from thematic analysis of the interview data: affordances of course content and course design, recommendations to sustain and improve the course, challenges of course content and course design, ways experience impacted/changed teaching, motivation for learning, and ways experience impacted/changed learning. Participant responses indicated that modifications were necessary for the course to be effective. The areas of

challenge included: a lack of timely assessment of learning, constraints from rigor and management of badge levels, lack of relevant or meaningful badges related to the grade level taught, and difficulties with mechanical/operational procedures to access and complete required activities.

Facing obstacles are not unique to digital badge project developers. The challenges identified in this collective case study provide valuable information for developers in redesigning future iterations of digital badge systems. Recommendations include how development of similar systems for informal professional learning within formal institutions of learning can be effective.

Chapter One: Introduction to the Study

> Not everything that counts, can be counted, and not everything that can be counted counts.
>
> –William Bruce Cameron, *Informal Sociology*, 1963, p. 13

Background and History

The preparedness of workers for a global economy is said to be dependent upon 21st century skills. The transformation to the digitized society of the 21st century or what Thomas and Brown (2011) call the "new culture of learning" (p. 18) is reminiscent of Dewey's (1900) characterization of education back at the turn of the 20th century when Dewey said, "That this revolution should not affect education in some other than a formal and superficial fashion is inconceivable" (p. 9). The new culture of learning reflects a dynamic world of constant change, global connectivity, and an almost seamless access to knowledge resources. As such, digital technologies, non-traditional learning spaces, and broad social platforms are changing how people learn in its form, content, and assessment (Davidson & Goldberg, 2009). Learning extends across numerous locations in broader networked and distributed environments that span time and space. Learning is inclusive, social, and participatory (The Mozilla Foundation, Peer 2 Peer University, & The MacArthur Foundation, 2011). For example, the nature of technologies in society and its diverse features and media forms are changing the ways in which knowledge is represented and how knowledge is sought, collected, and shared. These factors contribute to the changing ways in which people think, learn, and share knowledge (Grant, 2014; Green & Luke, 2006). This is where the conversation about digital badges[1] comes in to play.

[1] Digital badges have been referred to as "micro-credentials", "achievements", and "open digital badges". For consistency, the terminology used in this study is "digital badges" to represent the technology involved in Open Badges.

California Region 1 County Offices of Education and the Regional System of District and School Support[2] (Region 1) provides leadership, resources, and technical assistance to the schools in districts within the County Offices of Education within Del Norte, Humboldt, Lake, Mendocino, and Sonoma to increase their collective capacity to support students in meeting or exceeding the State's academic content standards. As part of Region 1's commitment to change the paradigm of professional learning by providing innovative ways for educators to select, display, and share their learning, its educational technology coordinators designed a badging system called *EduBadger* (Appendix A). EduBadger, a subset of digital badges that follows Mozilla's Open Badge Infrastructure (OBI) standard, offers an alternative approach to traditional professional development (PD) in educational technologies to support practitioners struggling to integrate technology into pedagogical practices. Digital badges are dynamic markers of learning defined by their social, academic, and technological relevance. Therefore, the opportunities they create for 21st century learners cannot be meet through conventional systems of credentialing (Grant, 2014; Olneck, 2014; Sullivan, 2013).

Two years ago, the educational technology coordinators of Region 1 designed an acceptable prototype and began to pilot their digital badge called EduBadger in the summer of 2015 offering it to participants selected through an application process. Thinking optimistically, the team anticipates full launch of EduBadger in 2017. The team's work is relevant for several reasons, three of which stem from:

1. The commitment to support the expansion and use of technology in the education system calling for technology integration in the K-12 classrooms;

[2] California Region 1 County Offices of Education and the Regional System of District and School Support will be referred to in an abbreviated term, "Region 1".

2. The realization that professional learning needs revamping from a one-size-fits-all model to meet the diverse needs of educators; and
3. The recognition that in a digital society it is time to acknowledge what counts as learning beyond what is reflected in a traditional credential, diploma, or certification.

First, the recently authorized National Education Technology Plan (NETP) and the adoption of the Common Core State Standards (CCSS) by the California State Board of Education show evidence of a fervent commitment to support the expansion and use of technology in the K-12 classrooms (U.S. Department of Education, Office of Educational Technology, 2016; California Assessment of Student Performance and Progress [CAASPP], 2014). The NETP and CCSS require advancement of effective use of technology to support student learning and teaching. As such, educational institutions need educators who possess technological expertise to meet these expectations (Council of Chief State School Officers & the National Governors Association Center, n.d.). Although the relationship between learning and the technology is becoming more and more a part of the education landscape, there is a bifurcation between dynamic technological advances and stagnant instructional methods (Redding, Twyman, & Murphy, 2013). The goal is to allow the education system to adjust to new avenues through which students learn and add value by capitalizing on and directing student use of technology. This goal can only be met if the practitioners themselves have knowledge and competencies to use educational technologies as common pedagogical practice and the confidence to do so.

Next, professional learning is often myopic, fragmented, and often not useful (Billett, 2014; Borko, 2004; Chao, 2001; Darling-Hammond, Wei, Andree, Richardson, & Orphanos, 2009; Schlager & Fusco, 2003). Since teachers must continue to develop skills and knowledge to

meet regulatory credentialing and certification as part of their workplace requirements, exploration of new professional learning systems that improve teachers' practice to bolster student achievement is warranted. In general, the educational sector agrees that investing in teacher PD is essential and that the predominant traditional model of a quick fix seminar, lecture, and conference driven PD needs a makeover (Ash, 2012b; Dede, Ketelhut, Whitehouse, Breit, & McCloskey, 2009). Yet, there is much discussion over how to tackle the task. As teachers are professionals with a range of expertise and experience within the subject(s) they teach (Borko, 2004), a one-size-fits-all approach does not reflect the learning necessary as teachers implement tools and content into their practice (Darling-Hammond, Porter, Garet, Yoon, & Bransford, 2005).

Lastly, credentials signal potential learning of knowledge and skills (e.g., grades, credit hours, degrees, and certificates; Arkes, 1999; Bills, 2003). However, traditional credentials do not and cannot recognize the full range of what people know, can do, or is valued (Carey, 2012; Foster, 2013; Grant, 2014; Olneck, 2014). Furthermore, most courses, degrees, or certification programs reward only completion of required tasks (Diamond & Gonzalez, 2014; Finkelstein, Knight, & Manning, 2013). Emerging research suggests that alternative forms of recognition of learning are needed and on the rise (Davidson & Goldberg, 2009; Gibson, Ostashewski, Flintoff, Grant, & Knight, 2013).

It is difficult to display discrete skills such as critical thinking, teamwork, and problem solving on a credential or certificate. Recognizing these granular skills are important to employees as well as employers. A recent report written for the Educational Testing Service entitled, *High School Reform and Work: Facing Labor Market Realities*, found that 69 % of employers valued competencies like teamwork, collaboration, problem solving, decision making,

and critical thinking that are not typically taught in schools, higher institutions, or formal professional growth trainings (Barton, 2006). Backing up the study's claim, findings from *Are They Really Ready to Work* indicate that these skills on all educational levels trump basic knowledge and skills represented by traditional educational credentials (Casner-Lotto & Barrington, 2006).

The efforts of Region 1's technology specialists to better organize the learning of adults in educational institutions to make the work more productive are commendable. The badge system, EduBadger, is intended to enable incremental, cohesive approaches to inservice PD. Its purpose is to teach K-12 educators how to use technological skills to advance students' media and technology skills addressed in the NETP and evident throughout the CCSS in both math and English/language arts standards. It presents a way to recognize achievements throughout PD for learners with diversified needs, interests, and expertise in contrast with the traditional "seat time" (Sullivan, 2013, p. 3) PD that often awards continuing education units (CEUs) based solely on completion of participation. Given local education agencies (LEAs) considerable investment in PD and the dependence on education transformation on providing effective PD, the knowledge base on what works must be strengthened. Optimizing resources and open learning platforms, Region 1 made an effort to find out if what works includes an alternative approach to traditional PD utilizing Mozilla's Open Badging Infrastructure (OBI).

Statement of the Problem

Although new technologies are changing how people learn, play, socialize, and work (Cox, 2012; Grant, 2014), in general, educational institutions were described more than five years ago as trapped in an antiqued epistemological model of learning in its form, content, and assessment (Davidson & Goldberg, 2009). This continues today with new research surfacing

suggesting that this traditional learning model alone is no longer adequate to prepare workers for the skills valued in the workplace today and in the future (Chao, 2001; Grant, 2014; Olneck, 2014). In response, agencies are reevaluating current models of training and investigating authentic ways to improve teachers' practice and accelerate student learning. The educational technology specialists in Region 1 made an investment in PD for teachers at a time when teachers need to continually stay current with their careers. They designed a digital badge as a way for teachers to get or keep up with technological skills mandated by local, state, and federal initiatives (CAASPP, 2014; U.S. Department of Education, Office of Educational Technology, 2016). The badge offers educational experiences reconsidering where and how learning takes place and then provides authentic workplace learning opportunities that support those new learning styles and context.

For EduBadger to be recognized as a viable alternative professional growth opportunity in the workplace within Region 1 and potentially beyond, it must be seen as valuable and credible by its earners (Olneck, 2012; Young, 2012). Teachers may value different activities and objectives of any given badge system. Design principles of a digital badge may hinder or support its viability as a form of credentialing professional growth beyond offering an online PD platform. As Grant (2014) warns:

> A badge system that mimics traditional systems without making any changes to underlying practices will have little transformative impact on learning, engagement, assessment, and opportunities. It may be technically functional, but will lack relevance to learners in other ways that no amount of technology can fix. (p. 6)

Well-designed badges can serve as indicators of what knowledge and competencies are valued, signifiers to assist earners to plan and chart a path, and identifiers of status mechanisms in the

learning process (Ahn, Pellicone, & Butler, 2014). As such, how might the preliminary earners' perceived affordances, challenges, and achievements influence its issuers' iterations to the design of the digital badge prior to its expansion? As researchers Hickey et al. (2014) postulate, digital badge systems are adaptable as their roadmap are constantly evolving to find the optimal practices that serve the project's goals.

Designing a relevant and purposeful badge system is a significant feat. There is not much research that examines how badges interact with professional growth opportunities for educators within agencies whose primary focus is to develop skills and knowledge to meet regulatory credentialing and certification as part of their workplace requirements. The problem becomes how to identify specific practices that align with the project's goal in order produce a well-designed badge prior to issuing it. University of Indiana researchers, Hickey et al. (2014), caution, it is not a matter of applying best practices but its features that define contexts that determine whether a particular practice is appropriate (p. 4). Mozilla's Carla Casilli (Casilli & Hickey, 2016) clarifies that project developers will most likely go through several iterations before identifying precisely tailored practices that serve the project's goal. Lessons learned from its preliminary rollout will refine its practices before expanding its launch.

Statement of the Purpose

This study does not intend to argue that conventional PD be eliminated but rather to recognize the potential value afforded by Open Badges to reframe current credentialing structures. Specifically, this study focuses on digital badges as an alternative approach to traditional PD in the workplace of educational institutions. It explores the utility of Open Badges as accolades to traditional offerings, not as a competitive means to conventional certification.

Research supports the educational gains of professional growth but alludes to missing components that potentially the digital badge could fill in (Diamond & Gonzalez, 2014).

The purpose of this collective case study is to explore the use of digital badging in the workplace of educational institutions as an alternative approach to traditional professional growth to support practitioners struggling to integrate technology into pedagogical practices. To explore these factors, the researcher conducted mixed-method design research that consisted of survey data from badge earners regarding their perceptions about digital badges and interviews with selected respondents to explore their viewpoints further to inform badge practices. The goal of this research is to generate a detailed case description, identify participants' self-assessment understanding of the relationships between technologies, instructional strategies, and content taught using Mishra and Koehler's TPACK framework (Mishra & Koehler, 2006) and to identify and define those attributes that are deemed important or not useful to EduBadger Course earners that participated in the study.

Research Questions

The scope of the research questions delves into the perspectives of digital badges as an alternative approach to traditional professional growth opportunities. The research questions are addressed considering both quantitative and qualitative data. The research questions are:

1. What are the earners' knowledge and skills to teach with technology?
2. What are the earners' perceived affordances of a digital badge approach for technological professional growth within the workplace?
3. What challenges do earners describe as a result of participating in a digital badge approach for technological professional growth within the workplace?

Study Design

A mixed methods case study design was used to allow the researcher to explore the research questions to generate a thorough case description. The mixed methods research design involves collecting both quantitative and qualitative data (Creswell & Plano Clark, 2011). Data were collected from several sources: survey data from EduBadger Course badge earners regarding their perceptions about digital badges, interviews with volunteer survey participants to explore their viewpoints further to inform badge practices, and a research journal to continually reflect throughout the research process. This research design used a case study approach "in which the investigator explores a real-life, contemporary bounded system" through "detailed, in-depth data collection involving multiple sources of information" (Creswell, 2013, p. 97). The case study was bound by the experiences of EduBadger Course badge earners within Region 1.

EduBadger serves as an alternative approach to PD for learning technology skills. To clarify, the issuers of a badge system in education incorporate their goals, badge definitions, procedures, and technology strategically to a learning program. They are situated within that program's specific context. The Design Principles Documentation Project of Indiana University's Center for Research on Learning and Technology (Otto & Hickey, 2014) provides an outline to categorize practices of badge design principles captured from the agencies awarded grants to develop badge content in the *Badges for Lifelong Learning Initiative* (Digital Media and Learning Research HUB, [DML] 2011). Its founders identified then recorded how each badge system enacted, modified, or dismissed those practices (Hickey et al., 2014). As Grant (2014) posits, "Whether badges become impactful for learners depends in large part on how these badge systems are designed and implemented, and how they both conform to and transform existing systems" (p. 8).

Delimitations of the Study

This study is mostly descriptive to better understand the nature of EduBadger's design considerations as it relates to making it a viable alternative to traditional professional growth within the workplace. The study was conducted within a specific area of California Region 1, located in the northwestern portion of the state. The study focused on one content area – learning new technological skills and one population – public school educators.

Role of the Researcher and Assumptions

The researcher's place of employment is located within one of the County Offices of Education within Region 1. The researcher knows some of the educational technology specialists involved with the EduBadger Course project. Methods were designed to protect the identity of individuals as well as practices to ensure voluntary participation. The researcher also has been actively engaged with digital badge activities and is familiar with some of the developers. To minimize effects of the researcher's biases, various practices were designed and implemented within the study's procedure.

Assumptions include that the researcher can provide a process of data gathering that enables participants' willingness to share personal experiences involving their participation with EduBadger Course for PD and provide honest answers. Second, this study assumes that the learning focus of the badging infrastructure under study is one that provides for the improvement of PD platforms to help educators to develop skills with educational technologies.

Significance of the Study

This study could help increase acceptance and creditability of Open Badging as complements to certification in the workplace, specifically educational institutions. The educational technology specialists that created and piloted EduBadger will be informed of the

findings. It is hoped that the findings can inform design iterations and decisions regarding when EduBadger is available to a wider market.

This study is also important because of the paucity of research on the use of digital badging in the workplace. Educational badges are already being implemented by many organizations such as Mozilla (The Mozilla Foundation, Peer 2 Peer University & The MacArthur Foundation, 2011) and the Khan Academy (Crotty, 2012) but little research concentrates on digital badging in the workplace of educational institutions. Inquiry is needed to better understand the complex phenomenon of Open Badges from the perspectives of developers, educators, and organizations that are actively involved or considering developing, implementing, or financially supporting an Open Badge.

This study will inform future research on how learning activities afforded by the digital badge ecosystem support educators and other professional learners in a variety of workplaces. Moreover, the study helps future utilization of a digital badging system within the context of what design considerations aid in the development of similar systems for professional and personal learning interests. Finally, the exploration of digital badges extends the current case studies and calls for further research to enhance the understanding of the ecosystem's characteristic effects on technology-enhanced workplace learning.

Conceptual Foundation

For the purposes of this study, the conceptual foundation is drawn from the design features of the digital badge design system defined by Hickey et al. (2014), the theoretical rationales of constructivism and constructionism, and Mishra and Koehler's (2006) technological pedagogical content knowledge. Hickey et al. (2014) enhanced the understanding about badge system design through the Design Principles Documentation Project (DPD). The team applied

design ethnography to 30 Badges for Lifelong Learning (DML, 2011*)* systems and documented how each of the projects morphed from its embryotic state to fully functional design principles. The DPD project identified over 40 design principles that act as guideposts to agencies thinking about designing Open Badge systems.

Constructivist learning focuses on constructing new knowledge while engaging in meaningful experiences and creating artifacts (Papert, 1993). Several research studies reported that a constructivist environment could complement learning technology, creating authentic learning opportunities in an experimental learning environment (Becker & Ravitz, 2001; Moersch, 1998). Seymour Papert (1993) suggested that the interaction between the student and technology provides learning opportunities where the learner actively manipulates ideas and constructs knowledge. When the goal is to develop higher-order thinking skills, problem-solving skills, visual presentation skills, use alternative forms of assessment, or to involve the student in his or her performance evaluations, constructivist models are more likely to use technology and align better with those goals (Johnston & Barker, 2002). Instructional practices integrating technology can change from being teacher-centered to more student-centered or constructivist design learning. Technology tools are used for tasks that require higher cognitive processing and finding solutions to authentic problems.

Constructionist learning theory expands Piaget's (1978) theory of constructivism where students are actively learning, taking into consideration the students' prior knowledge and experiences (Ng, 2015). Constructionist learning emphasizes a student-centered approach where something is created, such as an artifact, as the knowledge is gained. The artifact can be a concrete object such as a poem, song, or art piece. In the digital world, an artifact can be a wiki, glog (graphical blog), or a video of a branch of learning. In a constructionist environment,

learning and teaching are constructed in interactions between the facilitator and learners as they engage in the design and discussion of learning artifacts (Kafai, 2006). Ways that digital badging could orchestrate constructionist learning environments that foster collaboration are discussed in Chapter Five.

Teacher facilitation of student learning requires content knowledge, content-specific pedagogy, and the ability to integrate technology; all of this forming what Mishra and Koehler (2006) refer to as TPACK. Effectively integrating technology into teaching and learning is dependent on teachers who implement and modify curricula within the classroom (Koehler & Mishra, 2008). Educators who develop an understanding of TPACK will have a knowledge domain in which to align pedagogical knowledge (PK) of constructivism and constructionism.

The use of technology in LEAs provides students with a framework to gain skills relevant to increased academic success and access to future career pathways. Educators understanding of technology affect the use of technology in the classroom. Digital badges have the potential to support educators to sharpen their skills on specific classroom abilities such as engaging in technology practices. Further discussion of the conceptual foundation and its relevance to digital badging is provided in the literature review in Chapter Two.

Key Definitions

The following terms have been defined for this study:

- *Badge system*: A system that encompasses the goals, badge definition, procedures, and technology specific to a learning program as it is situated within the program's specific context (Otto & Hickey, 2014, p. 2).
- *Constructionism*: A learning theory that addresses the building of knowledge to include an artifact, which represents knowledge and allows learners to present and

revisit the artifact they created through collaborative discussion (Clinton & Rieber, 2010; Kafai, 2006).

- *Constructivism*: A learning theory associated with student-centered practices and places emphasis on the active roles of learners in constructing their own knowledge (Richardson, 2003).
- *Credly:* A free platform that complies with Open Badges Infrastructure (OBI) standard with built- in tools to create a badge and populate metadata to issue it and a universal way for a learner to earn and showcase his/her badges (e.g., Mozilla backpacks, LinkedIn, Facebook, etc.; Tracey, 2014).
- *Educational technologies*: Technologies used for improving learning, instruction, and/or performance (Spector, 2016, p. 221).
- *Formal learning*: Instruction that typically occurs in association with a recognized educational institution or training organization that involves structured/designed courses and programs of instruction (p. 221).
- *Informal learning*: Organized activities in face-to-face or online settings other than formal instruction in which a number of the following features are especially salient: voluntary participation, relatively equitable power relations in negotiating goals and means, enjoyment of the learning activity for its own sake, intense engagement with tasks, flexibility of goals and in re-purposing resources, unpredictability of some significant learning outcomes, and improvisation and innovation within and concerning the activity (Lemke, Lecusay, Cole, & Michalchik, 2015, p. 3).
- *Lifelong learning***:** The ability to continuously acquire new knowledge and skills, monitor one's own learning needs, and learn from one's mistakes (Casner-Lotto &

Barrington, 2006).

- *Mozilla Open Badge Infrastructure*: A nonproprietary, free software developed by the Mozilla Foundation and an open technical standard any organization can use to create, issue, and verify digital badges (The Mozilla Foundation, Peer 2 Peer University & The MacArthur Foundation, 2011).
- *Online Learning*: Access to learning experiences using some form of technology that allows for connectivity and flexibility to promote varied interactions (Moore, Dickson-Deane, & Galyen, 2011).
- *Open Educational Resources*: The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes (UNESCO, 2002). Open indicates that any person can legally and freely use, adapt, copy, and re-share materials. Some primary examples of OERs are lectures notes, assignments, textbooks to curricula, syllabi, projects, tests, software, streaming video, audio, and animations.
- *Professional Development*: The processes and context-specific activities that are designed and delivered to enhance the professional knowledge, skills, and attitudes of educators (Ng, 2015, p. 27).

Summary

This chapter provided the emerging research of the background and history of Open Badges. The chapter then introduced the problem, the purpose of the research, and the research questions to guide the study. The study design and delimitations of the study were addressed along with the significance of the study and the conceptual foundation. Finally, to clarify the

research, the key definitions were defined. Chapter Two further explains the conceptual foundation for the study and literature regarding the history, affordances, and challenges of Open Badging. Evidence-based practices for PD are shared related to the components of online PD and learning educational technologies. Chapter Three will expand on the research design and methodology of the study. The instrumentation for the survey and interview will be presented along with the selection of participants and the procedures followed to conduct the research. Chapter Four will present the findings from the survey and interviews. Chapter Five will present the conclusions and future recommendations based on these findings.

Chapter Two: Conceptual Foundation and Related Literature

Chapter Two further explains the conceptual foundation for the study, the motivation behind the need to integrate technology in K-12 PD, and barriers faced. Components of PD in the digital age and effective key core features are discussed. The chapter concludes with a review of pertinent literature that supports the study of Open Badging and its background and history.

The conceptual foundation comes from research about the efficacy of digital badges defined in the Badges Design Principles Documentation Project Interim Report (DPD; Hickey et al., 2014), the theoretical rationales of constructivism (Piaget, 1978) and constructionism (Papert, 1993), and technological pedagogical content knowledge ([TPACK] Mishra & Koehler, 2006).

Research of Digital Badges

The DPD Project Interim Report (Hickey et al., 2014) introduced design practices found across the 30 recipients of 2012 Badges for Lifelong Learning Initiative (DML, 2011*)*. Hickey and his research team identified emerging practices from awarded projects and organized them into four areas: (a) recognizing learning, (b) motivating learning, (c) assessing learning, and (d) studying learning. These practices are intended to be used as guideposts for organizations who are designing badge systems to strategically select design principles that enhance or align with the targeted educational context in which their badges will function. Hickey et al. (2014) propose three components for thinking about research of badge design systems: systematicity, purpose, and evidence.

Systematicity. Traditionally, research collects evidence with the intent of verifying and building upon current research. In contrast, the 30 projects are generating badging practices that are currently nonexistent in research. The DPD project captures informal knowledge as it arises from the efforts of digital badge developers to produce well-functioning badge systems.

Purpose. Traditionally, there are two types of assessments: summative and formative. Summative assessments are static measures of progress such as an overall snapshot. Formative assessments are dynamic measures that can provide guidance towards the desired outcome. Hickey et al. (2014) postulate that there is another type of assessment called transformative that examines how learning ecosystems transform around badges.

Evidence. Badges are unique in that they contain direct links to evidence of learning. This evidence is the core of learning. Earning a badge solely for participation would negate the purpose of issuing a digital badge (e.g., earning credit hours). It is not about the badge but, what the badge represents – its claims, evidence, and assessments. Hickey et al. (2014) argue that information embedded in the digital badge has vast "potential for summative, formative, and transformative research on learning" (p. 52).

Hickey et al. (2014) used these components for thinking about research to generate possible research designs. As researchers begin to use the evidence in digital badges to systematically analyze and refine their learning ecosystem, Hickey et al. (2014) predict that "digital badges might ultimately transform the entire learning analytics movement" (p. 57). The badge research designs are illustrated in Figure 1 below.

Purpose	Using Conventional Evidence	Using Evidence in Badges
Summative	1. Research OF Badges	4. Research WITH Badges and OF Badges
Formative	2. Research FOR Badges	5. Research WITH Badges and FOR Badges
Transformative	3. Research FOR Ecosystems	6. Research WITH Badges and FOR Ecosystems

Figure 1. Possible badge research designs. Reprinted from "Badge Design Principles Documentation Project. January Interim Report," (p. 53) by D. Hickey, R. Itow, K. Schenke, C. Tran, N. Otto and C. Chow, 2014. Copyright 2014 by the authors. Reprinted with permission.

This case study contributes to the research for badges, systems, or ecosystems using a formative approach. Studying learning with digital badges is new and extends the boundaries of traditional educational research. The researcher is inquiring about the role digital badging plays in educational institutions as support for practitioners struggling to integrate technology into pedagogical practices. It explores what badge-related activities are deemed important or not useful to Open Badge Course earners that participated in the study.

Constructivism and Constructionism

In practice, a constructivist learning environment tends to involve activities of the following five types: projects that employ a variety of skills and diverse tasks, group work, problem-solving that requires thinking and planning, reflective thought through writing, and other tasks that require meaningful thinking (Ravitz, Becker, & Wong, 2000). Several research studies report that a constructivist environment complement learning technology, creating authentic learning opportunities in an experimental learning environment (Becker & Ravitz, 2001). In a technologically designed setting, learning happens when the learner interacts with multi-dimensional material projected on the screen. In turn, the learner "self-directs his/her learning by actively analyzing, evaluating, making decisions, and creating while manipulating the digital material at hand" (Ng, 2015, p. 84). The learner activates his/her prior knowledge to understand the content matter technologically displayed. In a constructivist learning environment, the educator facilitates or scaffolds the learning to make the content accessible for the learner to be actively engaged throughout the learning process. Scaffolding is closely associated to Vygotsky's (1978) concept of the zone of proximal development (ZPD), where optimal learning occurs just beyond what the learner can do on his/her own. The educator with more knowledge facilitates the learning as necessary (Clinton & Rieber, 2010).

Constructionism is a pedagogical approach to instruction formally introduced in the work of Papert and Harel (1991). Seymour Papert's theory of constructionism is closely linked to Jean Piaget's constructivist learning theory (1978). Papert and Harel (1991) contend that students are motivated to learn when they are constructing artifacts that are visible to others and can be used by others. As with constructivism, students are actively learning and learning by doing that takes into consideration student prior knowledge and experiences. While Piaget addresses students building knowledge in their heads, Papert extends that knowledge to include a tangible product or artifact representing that knowledge that can be shared and revisited (Clinton & Rieber, 2010).

According to Papert (1993), constructionism consists of two components: making knowledge and making objects. The making of objects or artifacts is what distinguishes constructionism from other learning theories. Papert's theory of learning guides the educator to engage the learner in making by doing, constructing a sequence of learning (Noss & Clayson, 2015). As students engage in constructionist learning, they are making tangible objects in a social context that can virtually be shared anywhere/any time (Kafai, 2006).

The Course uses a constructivist approach to learning as earners build knowledge and create their own projects using technology tools. The learning is evident in the making – learning by doing (Kafai & Resnick, 1996). While the course in its current iteration does not support a constructionist approach to learning, the potential is there. A future badge system could provide synchronous and asynchronous platforms in which earners could share and discuss projects created with others, allow for facilitation by experts, and provide spaces for self-reflection.

Technological Pedagogical Content Knowledge (TPACK)

Mishra and Koehler (2006) believe that the development of TPACK in educators needs to be a "critical goal" (p. 1046) of teacher education programs. Technological Pedagogical Content

Knowledge (TPACK) is an enhanced framework of PCK (Pedagogical Content Knowledge) from the works of Shulman (1986) that incorporates technology as a necessary piece. Shulman (1986), identifying a link between the pedagogy, content, and knowledge, argues that authentic learning in the digital age occurs when pedagogy and content connect to relevant experiences (Smith, 2013) as educators develop a willingness to integrate technologies within their curricula.

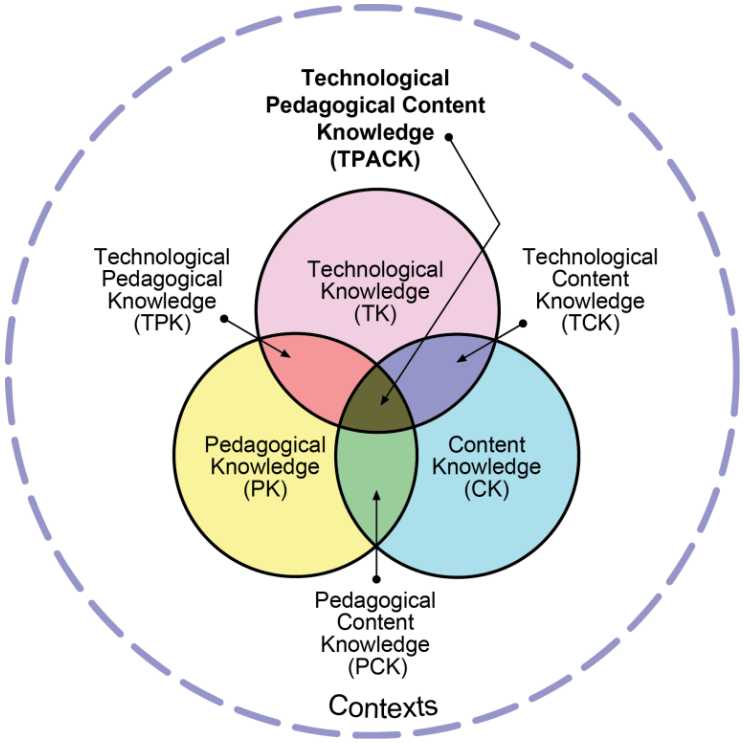

Figure 2. Knowledge domains of the TPACK framework. Reprinted from *Using the TPACK Image* (http://matt-koehler.com/tpack2/using-the-tpack-image/). Copyright 2012 by tpack.org. Reprinted with permission.

TPACK is composed of seven domains and describes the type of information that most effective educators require in order to use technology in the classroom. The knowledge domains of TPACK are shown in Figure 2. Content knowledge (CK) is the ability of the educator to address and present the concepts and facts to support the subject at hand (Smith, 2013). Understanding the theoretical concept of how to teach is addressed in the pedagogical knowledge (PK) domain of the framework, for example using a constructivist instructional approach (Smith,

2013). PK specifies precise pedagogy to encourage students to build knowledge which aligns with constructivist and constructionist approaches to learning. Educators who understand the utility of technology as teaching tools exhibit technology knowledge (TK). Mishra and Koehler (2006) caution that this is an ongoing process as technology continues to change.

The overlap of CK, PK, and TK requires educators who know how to teach with any given technology resulting in TPK (Smith, 2013). Mishra and Koehler (2006) warn that effective teaching with technology is not mastered by a siloed approach, typically witnessed for tackling specific content areas. Teaching content knowledge (CK), pedagogical knowledge (PK), and technological knowledge (TK) require a synchronized approach where all three domains are considered in conjunction with the context in which teaching occurs.

With awareness of TPK, educators can strategically select technology tools that address a precise content, exhibiting TCK (Mishra & Koehler, 2006). Finally, educators who recognize the optimal way to instruct a certain content based on the specifics of that content and appropriate ways to address parts of the whole exhibit PCK (Smith, 2013). For example, educators' understanding of PCK results in student creating authentic artifacts reflective of Piaget and Vygotsky's constructivist theory. According to Mishra and Koehler (2006) TPACK happens when educators feel confident and comfortable using technology where all three domains of CK, PK, and TK intersect and the technology knowledge is aligned to PK and linked to CK. As Ng (2015) clarifies, educators have mastered TPACK when they are able to facilitate students' challenges such as technology issues "without too much effort and hence will not be distracted from the core duties of teaching" (p. 45).

In the subject of educational technologies within the K-12 public school system, there is emphasis placed on students to gain 21st century skills along with educators guided by aligned

instructional pedagogy. To effectively integrate educational technologies into instruction, K-12 educators must have well-developed technological pedagogical content knowledge (TPACK) (Mishra & Koehler, 2006). In a TPACK classroom, the teacher carefully chooses a specific technology tool considering the specific classroom context, content area of study, its availability, appropriate use by the students and learning goals of the lesson, and its added value to the learning experience. The teacher focuses on these high yield integrations, rather than for the sole purpose of the integration of technology (Hofer et al., 2015).

The following lesson adapted from Hofer et al. (2015) is an example of a primary grade teacher taking a constructivist approach using technology tools to allow students to actively build understanding. While the students have access to printed and electronic text and hand held letter manipulatives, the teacher also utilizes tablets as portable devices and a magnetic letter board app so that the students can learn to read through practice with manipulation. He works individually and with small groups of students during literacy instructional time. Each student has a tablet and is familiar with its operational features and the app prior to the lesson. He observes as his students are reading text. He notices they are working hard to make sense of certain words or features of words. Using their tablets, the teacher has the students make the words from the text using the app. The students work on words and build their phonics skills and knowledge of sight words. He later expands the activity to authentic writing tasks where students use the words to make sentences and share them with their peers. One peer may notice that the word she creates looks different than the same word of her peer. The students engage in discussion about which word is correct. The teacher extends that learning having students spend time in small groups practicing skills previously learned. As the teacher facilitates the learning, the students are actively constructing words and socially interacting with their peers promoting a

constructivist learning environment.

Reasons to Incorporate Technologies in Education

Educational reform, indicative of new initiatives, requires teachers to take on new skills that will change their practice. One is the emphasis of teachers to gain technology skills and integrate technology into pedagogical practice. A recent commitment by education authorities supports the expansion and use of technology tools in K-12 classrooms exemplifying the adoption of standards for technology use by administrators, teachers, and students (International Society for Technology in Education [ISTE], 2003). Research shows that staff development and improved performance and quality results in continuous improvement critical to an organization's success and survival (Browell, 2000). Acknowledging that PD is an essential component to accomplish these challenges, educational leaders are exploring new and innovative ways to motivate current and future educators while they learn about technology.

Educational institutions and policy makers tout three reasons why students need to be technology savvy: (a) to support learning that results in successful achievement, (b) to develop technological skills needed to compete in the digital world, and (c) to become lifelong learners and responsible citizens (Ng, 2015).

Supporting learning. Ng (2015, pp. 5-6) cites the literature that supports student learning with digital technologies:

- To enhance students' motivation and cognitive development growth;
- To provide a vehicle for students to demonstrate what they know and are able to do through the multi-modalities afforded by digitized technologies;
- To provide a means to communicate and collaborate;
- To accommodate students' individual interests, skills, and experiences by

increasing their self-management and self-assessment;

- To enable research through the collection, collation, analysis, and display of primary data collected through authentic research or maneuvering of simulated data in virtual laboratories; and
- To enable informal learning through ubiquitous access to information afforded by mobile devices, the Internet, learning management systems, and virtual communities.

Development of technology skills. Ng (2015) argues that there is not a uniform technological toolkit that defines which skills are necessary to succeed in the 21st century. The emphasis has traditionally been targeted towards student development of higher order thinking skills such as problem-solving, collaboration, and communication. In the digital age this includes digital literacy – the understanding and ability to use technologies to master these skills.

Lifelong learning and responsible digital citizens. A unique study conducted by the Conference Board, Corporate Voices for Working Families, Partnership for 21st Century Skills, and the Society for Human Resource Management, looked at the readiness of new candidates entering the workforce. Knowing how employers view these candidates is a step towards helping them and the U.S. economy to succeed in the global market. One of the essential learning skills identified was lifelong learning as workers must constantly retool, be flexible, and continue to learn (Casner-Lotto & Barrington, 2006). This implies that educators must enable students to engage in self-directed learning processes leveraging technology to enable continuous and lifelong learning (Ng, 2015). The research of Ertmer and Ottenbreit-Leftwich (2010) proclaim that self-efficacy may be more important than skills and knowledge among educators who implement technology in their classrooms.

Barriers to Integrate Technologies in Education

The effectiveness of technology integration depends on teachers' ability to simultaneously consider the targeted content, teaching strategies, and available technology within their learning environment (Koehler & Mishra, 2008). If teachers are to effectively integrate technology for the improvement of student learning, PD courses must provide opportunities for teachers to develop the abilities, strategies, and awareness related to teaching with present and future technologies. In her book, *New Digital Technology in Education*, Ng (2015) shares her literature review of studies that focused on barriers to the effective integration of digital technologies in teaching and learning over the last two decades (Cox, Preston, & Cox, 2000; Ertmer & Ottenbreit-Leftwich, 2010; Snoeyink & Ertmer, 2001; Yuen & Ma, 2002). Barriers identified from research were:

- Lack of resources;
- Lack of institutional leadership and technical support;
- Lack of educators' confidence and skills in using technology;
- Lack of TPACK;
- Lack of time to prepare lessons integrating technologies;
- Lack of educators' belief in and negative attitudes towards using technology in teaching; and
- Inadequate PD (p. 18).

In conclusion, Ng's (2015) findings indicate that not much has changed over the last two decades in contrast to the rapidly growing and evolving digital technologies.

Professional Development in the Era of Technology

In the 1990s as availability and access to computers and the Internet increased, so did the

need to prepare for PD for learning how to integrate technology into methods courses and field experiences (Ertmer & Ottenbreit-Leftwich, 2010). However, these initial efforts on technology integration preparation for teachers focused on the acquisition of technical skills associated with current and emerging technologies. Teacher education programs offered instructional technology courses that focused on the affordances and constraints of selected technologies without consideration of their pedagogical purpose (Koehler & Mishra, 2008). Course readings and skill-based projects highlighted current and emerging technologies that might or might not exist in current and future classrooms. This skill-based approach resulted in what Mishra and Koehler (2006) refer to as content neutral emphasis on software and hardware with a wide application to differing subject areas and levels of education. The skill-based approach ignored the learning environment in which teaching occurs. Additionally, Mishra and Koehler (2006) argued that the rapidly evolving capabilities and power of these digital technologies diminish the likelihood that they too will become embedded like former educational technologies. These traditional approaches of teaching educators how to integrate technology focused on the development of technological skills failed to consider strategies for applying technology or the suitability of tools and techniques for certain content. Furthermore, these course experiences disregarded the local context in which teaching occurs. Consequently, teachers felt ill equipped to teach with technology because the course experiences did not provide adequate and appropriate learning experiences to prepare them to simultaneously consider subject matter, pedagogy, and technology in decision making (Abbitt, 2011).

Adoption of the CCSS and the NETP mandate advancement of effective use of technology to support student learning and teaching (CAASPP, 2014; U.S. Department of Education, Office of Educational Technology, 2016). There is strong evidence to support a

TPACK approach to technology integration to education (Ertmer & Ottenbreit-Leftwich, 2010; Mishra & Koehler, 2006). Similarly, Abbitt (2011) insists that educational institutional administrators must continually develop and evaluate teacher preparation models that best develop TPACK in teachers and identify experiences that lead to the development of TPACK. Ng (2015) warns that for this to happen, educators must be willing to commit to PD to learn about technology in a strategic, well-designed plan that results in successfully using technology in their teaching.

Professional Development Elements for Effective Professional Learning

As educators are required to regularly incorporate technologies into their teaching and student learning, PD around technology integration is a priority. According to the U.S. Department of Education ([DOE], 2003), parents and most educators consider technology a critical part of providing a high-quality education. For this study, PD encompasses the processes and context-specific tasks that are designed and implemented to enhance professional knowledge, skills, and attitudes of educators (Ng, 2015).

From the literature on PD programs for educators, Ng (2015) cites six common PD elements that are pertinent to technology teaching and learning. These six elements are:

- Focus on educator's practice that is linked to student learning outcomes;
- Address individual educator and/or institution's needs;
- Evidence-based PD;
- PD programs that engage educators in the learning process;
- PD programs that develop professional learning communities (PLCs); and
- Duration of PD (pp. 28-31).

Focus on educator's practice linked to students' learning outcomes. PD aligned to the educational institution's goals to support student learning help identify the technologies necessary for educators to learn and adopt into their teaching. For example, the CCSS specifically address the use of technology in the K-12 classrooms making it easier for educators to plan and prepare lessons that incorporate technologies.

Individual educator's and/or institution's needs. In recognizing the diversity of K-12 educators, PD programs that address educators' individual needs is a priority. It is likely that educators will represent a range of knowledge, skills, interest, and experience using technology both in their professional and personal lives.

Evidence-based professional development. Effective PD in the digital age should be informed by research on effective learning and teaching with educational technologies. Educators must have knowledge about: (a) emerging traits and technology-driven habits of students, (b) learning theories to inform educators how their students learn with technology, (c) effective research-based pedagogies, (d) classroom-management that reflects technology-enhanced settings, and (e) formative and summative assessment tools appropriate for technology driven teaching and learning that include using technology tools for assessment.

Professional development that engages educators in the learning. The PD itself should model effective practices for integrating technology into teaching and learning. Educators need ample time to use and explore technology tools. Activities that include teamwork, discussion, and reflection should be delivered in the same manner the educators teach their own students.

Professional development develops communities. Effective PD that supports collaboration subsequently provides further networking opportunities where colleagues and

experts with common interests share concepts about the development of content-specific technologies. For example, in PLCs, peer learning is valued by educators who view the learning and sharing as a legitimate practice. PLCs and other communities are important pieces to effective PD (Darling-Hammond et al., 2009; Schlager & Fusco, 2003).

Duration of professional development. Research has shown that one shot PD is not effective (Ash, 2012b; Dede et al., 2009). There is general agreement in the research literature that more intensive and longer PD (e.g., spread over time) that extends beyond the walls of the educational institution is more effective than short bursts of training (Desimone, Porter, Garet, Yoon, & Birman, 2002).

How these six elements identified are orchestrated relies on the goals of the PD, the skills of PD providers, and the expected outcomes of the educators.

Evidence-based "Core features" of Professional Development

The dearth of research regarding effective PD to teach technological skills and the study for Open Badges is almost nonexistent. Research from Desimone et al. (2002) provides a conceptual framework to explain the components of effective PD. This framework identifies five evidence-based "core features" (p. 15) of PD that contribute to teacher practice (Diamond & Gonzalez, 2014). This framework is relevant to the study of Open Badging. Diamond and Gonzalez (2014) explored an online PD program and accompanying badge system entitled *Who Built America Badges: Common Core Professional Development from the American Social History Project (WBA).* WBA was one of the 30 award recipients of The MacArthur Foundation, HASTAC (Humanities, Arts, Science, and Technology Advanced Collaboratory), and Mozilla Foundation Badges for Lifelong Learning competition launched in 2011 and one of the four badges that involved PD. Advances in technology have created avenues to support educators'

learning outside of traditional classrooms. Online learning is one of the fastest trends in the use of educational technology (Ng, 2015). WBA Badges for History Education is an online PD learning community. History teachers practice and master the skills of effective history teaching and design materials to support students to master Common Core literacy skills. The badge system blends research-based effective practices and captivating history content. Figure 3 illustrates the five core features of the PD that contribute to improvements in educator practice.

The WBA study conducted by Diamond and Gonzalez (2014) found these features helpful for ongoing competency-based PD systems among history and social studies educators. The analytical framework of these five core PD features may be useful to further identify the affordances of a badge system that educators might value if digital badge courses become acceptable forms of credentialing.

PD feature	Description
1. Content focus	**A sustained focus on a teacher's subject area,** connected to standards, curriculum, instruction, assessment, and knowledge of how students learn in that content area
2. Active learning	**Teachers should be actively involved** in the PD activities, engaged in activities such as looking at student work, receiving feedback on teaching, giving feedback to peers, or participating in lesson studies
3. Duration	**PD activities should be sustained over time** and focused on content, curriculum, and student activities
4. Collective participation	Teachers from the same grade level, subject area, or school should **engage in PD activities together**
5. Coherence	**PD activities should be consistent** with other professional development, existing knowledge and beliefs, and with school, district, and state reforms and policies

Figure 3. Evidence-based features of professional development. Reprinted from *Digital badges for teacher mastery: an exploratory study of a competency-based professional development badge system,* (p. iv*),* by J. Diamond & P. Gonzalez. Copyright 2014 by The Education Development Center, Inc./Center for Children & Technology. Reprinted with permission.

Informal and Formal Learning

Another characteristic of online learning is the ability to learn anytime/anywhere within informal and formal environments. Work-related learning is commonly viewed as informal learning when conducted in the workplace. In contrast to formal learning, it lacks hierarchical structure and formulation. To its benefit, this type of learning supports assessments by authorities from many unconventional contexts, including peers and even the learner him or herself. In higher-education and educational agencies, such as county offices of education, learning is viewed as formal since it takes place under the domain of an established institution regardless of whether the delivery of instruction is campus-based, online, or blended (Thorpe & Edmunds, 2011). Deliverers of formal instruction perceive to hold the power of professionally vetted knowledge in various fields of study, passing on only what is true. To this extent, it has value to society.

For this exploratory study, the researcher accepts the findings of Malcolm, Hodgkinson, and Colley's (2003) research on the interrelationships between informal and formal learning. Their study concluded that all forms of learning have characteristics of each other. As multi-dimensional forms of learning are readily available inside and outside educational institutions and the workplace, the definitions of informal and formal begin to unravel. The question is not how informal instruction and learning and formal instruction and learning are different but how they complement each other (Malcolm et al., 2003; Svensson, Ellström, & Aberg, 2015; Thorpe & Edmunds, 2011). Informality can support formality in learning and vice versa. It is about exploring the interconnected ways in which informality and formality are constructed and impact learning.

The Design Principles Documentation Project (DPD)

As previously shared, Hickey and his team of researchers identified the general design principles for badge systems by investigating the specific practices designed for each project under study. Individual project's practices include "system design features that take into account the contextual affordances of their setting, the goals of the project, and the underlying theories of learning from which they arise" (Otto & Hickey, 2014, p. 3). As the researchers grouped alike practices, general principles emerged that reflected the functions of recognizing learning, motivating learning, and assessing learning (Hickey et al., 2014). These three design principles, identified by the DPD project, capture more informal knowledge as badge systems progress through their launch and refinement phases (Appendix B)[3]. The following provides an in-depth look at these principles to better understand their utility in studying Open Badging.

Badges for recognizing learning. The education model of the 20th century supposes that teaching is necessary for learning to occur. However, 21st century learning afforded by digital technologies, non-traditional learning spaces, and broad social platforms make it possible for learning to occur anywhere, anytime, from anyone, on any device (Thomas & Brown, 2011). As the amount of learning taking place in informal and non-traditional environments has greatly increased, so has the need to recognize learning spaces outside the conventional educational system (Casilli & Hickey, 2016; Grant, 2014; Randall, Harrison, & West, 2013). More universities and institutions are making course materials openly available online, using Open Educational Resources (OERs), and offering massive open online courses (MOOCs). These

[3] The badge design principles have been revised since the release of the final report in May 2017: *Where badges appear to work better. Final report of the Design Principles Documentation Project.* Indiana University. Center for Research on Learning and Technology by D. T. Hickey and J. E. Willis III. http://bit.ly/2DPDfinalreport

affordances bring together new interpretations and expansions of what learning is in the digital age (Green & Luke, 2006).

The new culture of learning acknowledges that learning takes place across multiple spheres of adults' life in diverse spaces (Grant, 2014). Arne Duncan, in a speech regarding learning in our digitalized world, stated:

> Today's technology-enabled, information-rich, deeply interconnected world means learning not only can – but should – happen anywhere, anytime. We need to recognize these experiences whether the environments are physical or online, and whether learning takes place in schools, colleges, or adult education centers, or in after-school, workplace, military, or community settings. In short, we must begin to see schools, colleges, and classrooms as central points – though still very important ones – in larger networks of learning. (Duncan, 2011, paras. 14-15)

In agreement with Duncan, academic scholars, such as Ito, Jenkins, and Seely Brown have alluded to the amount learning that is occurring outside of conventional spaces, implying that formal educational institutions will need to adapt to a dynamically different world of ever changing technology, ingenious educational practices, and pioneering learning content delivery in order to stay current (Davidson & Goldberg, 2009).

Badges for motivating learning. Badges can be used as intrinsic and extrinsic motivational tools. What initiates and directs individuals' learning throughout their lives is far from being fully understood. However, as the practice of Open Badging continues across multiple organizations, research shows badging may a significant role to play in encouraging sustainable learning through improved autonomy and motivation (Randall et al., 2013).

Badges as an intrinsic motivator. Intrinsic attractions include the potential of badges to

enhance autonomy and self-regulation. According to Pintrich and DeGroot, (1990), as cited in Randall et al. (2013), self-regulation is one of the best predictors of student performance. Self-regulated learning theory emphasizes the significant part that learners play as active participants of their own learning. Many badges offer multiple entry points to complete a badge and offer feedback and guidance. By providing guidelines or learning pathways, badge earners can set their own goals, plan, organize, self-monitor, and self-evaluate (Fontichiaro & Elkordy, 2015; Randall et al., 2013). This can be very motivating to earners (Goligoski, 2012). The supple and modular curricular design of badges affords learners more autonomy and agency to demonstrate how and what they learned, and where and when they learned it.

Badges as an extrinsic motivator. As an extrinsic indicator such as a type of credential earned in "gamification" (p. 9), badges are used to encourage individuals to participate, act, or pursue tasks (Deterding, Dixon, Khaled, & Nacke, 2011). According to Deterding et al. (2011), gamification is defined as the use of game design elements in nongame contexts. Examples include levels, scores, and points to motivate players to continue a game. The activity of acquiring a badge alone can drive the acquisition of knowledge and skills (Abramovich, Schunn, & Higashi, 2013). Hamari (2015) contends that the use of digital badges for gamification can result in behavioral changes where earners create habits that continue after earning the badges. Skeptics point to research showing that giving out extrinsic motivators such as rewards that learners already do intrinsically minimize the overall motivation learners feel for those activities and undermine engagement. Devedžić and Jovanović (2015) argue that "motivation displacement" (p. 606), a term coined by Deterding et al. (2011), leads to a decline in the interest level of present performance and diminishes motivation for the given tasks on future occasions. Henry Jenkins, professor and digital learning pioneer, thinks badges contribute to the current

gamification of education. Dr. Jenkins foresees badges potentially becoming "just another points system that undercuts the motivational structures" (Ash, 2012a, para. 29). Deci's (1971) study found that intrinsic rewards lost their value when external rewards were awarded to young learners. Extrinsic rewards can have negative consequences on individuals' motivation (Abramovich et al., 2013). Yet, recent research has demonstrated that under certain circumstances and when rewards have more information than controlling value, the negative consequences could be negated (Filsecker & Hickey, 2014).

Badges as a social practice. From the socio-cultural lens, motivation is connected to an individual's sense of belonging and identity within a community. The OER movement along with other arising web-based resources is creating various forms of open participatory learning ecosystems. Within these ecosystems, learning is inclusive and participatory (Finkelstein et al., 2013; Olneck, 2014). One such system is Open Badges. Badges are conduits to communication. They can nurture the development of community and an individual's sense of belonging and identity within that community. Many advocates of badging feel that badging can increase learner motivation through a sense of belonging to a community. According to a study by Williams, Karousou, and Mackness (2011) badges have the potential to motivate learning by supporting novel practices, those based on participatory learning approaches and peer-based learning communities (Jovanović & Devedžić, 2015). The ability for earners to display and share their badges could also be a motivating factor. Wenger (2009) explains that digital tools are part of most communities or habitats. These habitats are not just a configuration of technology, but also dynamic, mutually defining relationships dependent of the culture of the community. They are positioned to share knowledge and expertise while building networks and potentially transforming practice.

Badges for assessing learning. An essential component of the badge system is assessment. A badge system cannot function without one. The premise of an Open Badge is recognizing learning. Hence, badges represent assessment of that learning. According to Gee (2011), assessment is at the core of human learning. If a certain skill or competency is important to a society, it is assessed. Our current education system leans towards quantifiable methods to assess learning that are objective and can be replicated (Schmidt, Geith, Hakley, & Thierstein, 2009). While this can work for some 21st century skills, others require additional methods. Grant (2014) believes, "Like many social systems that predate the Internet, most of our existing systems of certifying knowledge lag behind massive shifts in how we work, play and learn" (p. 24).

In the current accountability structure, assessment is used as a tool for summarizing what learners have learned and for ranking them. For instance, grades, degrees, credentials, or certifications are considered types of summative assessments of learning. Within LEAs, assessment is typically used to competitively evaluate students, teachers, and schools. Within the mandates of federal initiatives and accountability, policymakers often equate it with results on high-stakes standardized assessments that allow for comparisons of results between schools and often between teachers within schools (Koretz, 2008). Within higher education institutions awarding grades and diplomas, it is used as means of social status (Collins, 2011; Olneck, 2012). In the workforce, it is used as a competitive means to stratify employees into groups for job advancement (Baker, 2011).

Formal education systems depend on assessments to validate learning that are stable, familiar, and can be replicated (Hager, 2004). This type of credentialing, largely authorized by schools, colleges, and universities, provides stability – enabling learning to be incorporated into

curricula. But today's environment calls for assessing learning that extends outside of the traditional course or classroom wall. The modernist practices in higher education were developed over a century ago. Many of these were patterned after the efficiencies of an industrial model that no longer holds the same relevance in the digital age. The college "credit hour" (Brown, 2013, p. 30), measures of seat time spent in the classroom, is a prototypical example of an outdated practice that continues to hinder educational reform. Although proxy for it, credit hours were never intended to be a measure of student learning. Highly respected executives from institutes of higher learning, business, independent foundations, and policy makers make a strong case that this system of quantifying learning is no longer sufficient (Brown, 2013; Business-Higher Education Forum, 2003; Davidson & Goldberg, 2009; Finkelstein et al., 2013; Grant, 2014; Green & Luke, 2006; Sullivan, 2013). Working towards an innovative way to certify learning, the Carnegie Foundation for Advancement of Teaching (founder of the credit hour) publicized that it received funding to investigate a different way to validate learning time. The funding, additionally backed by the MacArthur Foundation, is exploring competency-based degree programs along with Open Badging certification (Brown, 2013). New ways to certify learning are needed. Open Badges are a promising solution for dissatisfaction with the prevalent standardized tests as measures of knowledge. This is exemplified by Peer 2 Peer University's badging system that utilizes an alternative way to assess learning through an entirely based peer-to-peer led learning process (Hickey et al, 2014).

There is no question that formal credentials from schools and universities signal knowledge and skills to others (Bills, 2003). Although, when everyone has a credential or diploma, these artifacts are increasingly less relied upon as proof of skills and achievement (Goligoski, 2012). Knight articulates:

> For example, I have a bachelor's degree that's the same credential owned by many different people I went to school with. We all took very different pathways, but we all have the same degree, and there's no real or verified way for me to show that I specialized in these things or took these pathways. (Bowen & Thomas, 2014, p. 22)

Proponents of digital badging, such as Carey (2012), Brown and Bills (2011), and Olneck (2012) allude to a "crisis of credentialing" (Collins, 2011, p. 248) where a degree is a matter of supply and demand such as criterion for job attainment rather than yielding economic gains. Over the past quarter of a century, the elite held college degrees, representing over a fifth of the U.S. population. Today, over half of United States population of aspiring students is headed towards earning bachelor degrees (Collins, 2011).

Digital Badges as Emerging Credential Systems

There is a movement to consider alternative means to certify knowledge and skills outside the traditional educational system. A well-sponsored and strategic effort to grow digitized certification of knowledge and skills is expanding from higher education institutions, governmental agencies, foundations, and industry (Alliance for Excellent Education, 2013; MacArthur Foundation, n.d.; Sullivan, 2013). Acknowledging alternatives to conventional learning, Mozilla's Open Badge project (Knight et al., 2014) foresees the development of an Open Badge ecosystem that documents learning accomplishments using an online platform that demonstrates an employer's workplace skills and shares an employee's competencies. This online electronic portal system has the potential to be utilized as a complement to the dominant certificating system (Bowen & Thomas, 2014; Gibson et al, 2013; Olneck, 2014). The system offers flexible learning opportunities in contrast to traditional in-class training, means to develop specific workforce skills, and ways to build on customized needs, interests, and expertise.

When adamant digital badge supporters include former United States Secretary of Education Arne Duncan, former President Bill Clinton, and NASA administrator Charles Bolden it is difficult to perceive the Open Badge movement as just a trend (Crotty, 2012; Sullivan, 2013). Since their debut in 2010 at a conference sponsored by the Mozilla Foundation, digital badges have gained momentum in a range of settings from public and private K-12 institutions, higher education agencies, and private and public work sectors (Finkelstein et al., 2013; Gibson et al., 2013; Sullivan, 2013). Examples within the K-12 public and private institutions include New York Public Schools (DIG/IT), Chicago City of Learning (After School Matters), and Providence, Rhode Island School District (ELO). Their popularity expands to higher education institutions and other organizations interested in supporting learning using open digital badges to guide, motivate, and validate formal and informal learning. Four years ago, Madison College (Madison, Wisconsin) was first to initiate the issuance of digital badges for students completing specific noncredit classes to affirm learning. In addition, badges are currently in use or in development at institutions, such as Massachusetts Institute of Technology (MIT), Carnegie Mellon, the University of California–Davis, Purdue University, Seton Hall, and Yale University. The largest advocates for badges are industry and education reformers, rather than traditional educational institutions (Young, 2012). Agencies beyond the realm of higher education issuing badges include the National Aeronautics and Space Administration, the National Oceanic and Atmospheric Administration, the U.S. departments of Veterans Affairs and Education, the Young Adult Library Services Association, the Corporation for Public Broadcasting, the Smithsonian, EDUCAUSE, and Disney-Pixar (McIlvenny, 2015; Sullivan, 2013).

Background and Recent History of Badges

The idea of badges to certify competencies is not novel. Centuries ago, they were

indicators of political allegiance and heraldic symbols for medieval knights signifying the successful completion of a pilgrimage (McIlvenny, 2015). Later iterations included a visual way to show rank, merit, and achievement, such as the Boy Scouts of America, Girls Scouts of America, and the United States Army (Gibson et al., 2013). Youth organizations, the military, and others outside of formal education settings have long used badge systems to acknowledge what an individual knows, has done, or has become (Randall et al., 2013).

Badges transformed from fabric, sticker, or metal emblems to icons earned and displayed for others to admire in the virtual world such as gaming (McIlvenny, 2015). Increased interest in badging has been prompted by the application of game environments and game elements to educational experiences and assessment (Young, 2012). Online games sometimes use badges to motivate and to help players establish identity and authority in massively multiplayer spaces. More recently, digital badges are cropping up for similar reasons within educational agencies and social networks (e.g., Khan Academy, Codeacademy, and Foursquare).

Mozilla maintains an open wiki where badge issuers can add their organization (Knight et al., 2014). As of this study, over one hundred organizations are displayed with many more in the process of issuing badges. Organizations that issue badges come from a range of various sectors both formal and informal educational institutions, multinational corporations, industry associations, non-profit organizations, and agencies interested in awarding credentials for individuals' learning experiences across an array of environments as a way to develop competencies in the workforce (Ahn et al., 2014).

What Is in a Badge

There is a clear distinction between digital badges distributed by organizations, such as Khan Academy, Codeacademy, and Foursquare and digital badges afforded by Mozilla's Open

Badges Infrastructure (OBI). OBI digital badges depend on technology to relay and validate competencies gained earned in traditional and non-traditional settings (Young, 2012). Digital badges utilize technology to validate their credibility by linking metadata to their graphic icons. This intentional affordance makes digital badging unique. There is no means in which to verify, share, or display these badges outside of the content in which they were created (Catalano & Doucet, 2013). An Open Badge is visually shared online. OBI is meant to be open by name and design (Watters, 2013). Its infrastructure is open source. As such, its code is available on GitHub, which means developers can download it, modify it, and contribute their own code. OBI intends to permit institutions, groups, and individuals to issue their own badges. Mozilla does not want to dictate what competencies or skills count toward badges or decide who gets to issue them (Grant, 2014). Mozilla's mission is to define the underlying technology standard. As Sunny Lee, a product manager for OBI, clarifies, "so we can pull badges out of a siloed environment and make them interoperable" (Watters, 2013, para. 7).

Before looking at the structure of the badging system it is important to address two common misconceptions about badging. Fundamentally, Open Badges do not have criteria for their learning platforms. The system of modality is boundless. Badges can be totally delivered offline, online, or through hybrid platforms. The other misconception is that the innovation is the badge itself. The innovation is the badge system. To give an example, in the case of EduBadger, it is the badge system that supports and signals PD activities that teachers value.

Mozilla Open Badges include metadata that is housed within the digital image. The metadata provides evidence of the learner's competencies and specific knowledge that common digital badges do not (Brandon, 2013). Metadata can link badges to standards and competency-based frameworks, providing a way to validate the authenticity of the badge (Foster, 2013).

Technology is utilized to link meaningful metadata to the graphic icon, making it multi-dimensional. The supporting technologies provide accessible and ongoing means for individuals, teachers, learning institutions, organizations, and employers to verify the authenticity, validity, source, and value of the earned badge.

The metadata or stored information reflects the "Open Badges" (p. 4) standard created by Mozilla Foundation (Alliance for Excellence in Education, 2013). The Open Badges standard offers baseline validation conveying an individual's core academic content knowledge and other skills gained though specific courses, programs, or projects (Grant, 2014). At a minimum, an OBI compliant badge assertion metadata fields must include: name of the recipient, issue date, badge title or name, image uniform resource locator (URL), description, criteria to earn, and the issuer (McIlvenny, 2015). This is shown in Figure 4.

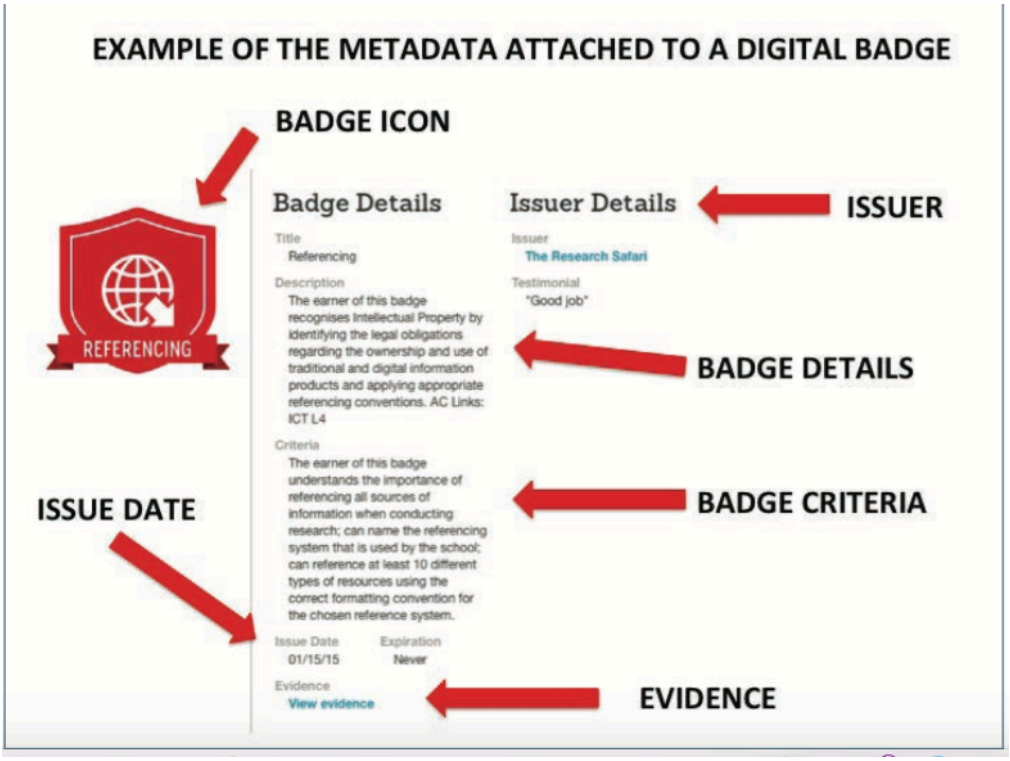

Figure 4. Example of the metadata attached to a digital badge. Reprinted from "Open badges – glorified award stickers or valuable learning credentials, (p. 31)," by L. McIlvenny, *Access (Online), 29*(1), 30-40. Copyright 2015 by the author. Reprinted with permission.

The capacity to store information is virtually limitless, such as the criteria applied to issuing the badge, the process for evaluation, and even showcasing an earner's portfolio, or hyperlinking it to other sources. The validity of the badge increases as the quality and detail of this information is heightened (Alliance for Excellence in Education, 2013).

Mechanics of a badge. As an electronic credential, the governance of a badge is dependent on an ecosystem consisting of: (a) the issuer, (b) the earner, and (c) the consumer (Alliance for Excellent Education, 2013; Finkelstein et al., 2013; Sullivan, 2013). A badge issuer can be an individual, education system, institution, employer, community, or group that establishes a set of competencies and assessments to evaluate if the earner has mastered the necessary skills for the badge. An earner is an individual who desires to learn new skills and documents his or her accomplishments through an interoperable platform electronically available to selected consumers. This interoperable online platform is possible through Mozilla's OBI. Unlike other digital credentials, Open Badges can be shared via social media and displayed on any website that uses Mozilla's OBI. Like the issuer, the consumer can be an individual, education system, institution, employer, community, or group that has a need for, or interest in the individual with the skills and achievements symbolized by the electronic icon.

In certain circumstances the issuer could also be the consumer. As an example, a nonprofit public educational agency such as a County Office of Education could: (a) internally offer badge certificates to its current employees (e.g., certificated and classified staff) to gain specific valued added skills and knowledge, (b) externally offer badge certificates to attract qualified future applicants to build capacity, and/or (c) market badge certificates to enhance the agency's products and services.

Open Badges are meant to function within ecosystems that incorporate issuers, earners,

and consumers. The worth of a badge and the validity of its assertions are built collectively by all the participants in that ecosystem (Casilli & Hickey, 2016). These considerations play a critical role in the dynamics of the foundational structure of the badge.

Digital badge platforms. Digital badge designers use platforms to issue their badges to their earners. Some of these badge building websites include Achievery (http://achievery.com), Badges OS (http://badgeos.com), and Class Badges (http://www.classbadges.com). A commonly used badge building website is called *Credly* (http://credly.com; Tracey, 2014). The system is built from the ground up around Open Credit, the universal framework for issuing, earning, and displaying and rewarding achievement in the form of digital badges. Open Credit allows the issuer to integrate all features of digital badge and credential management into their own sites or applications. Credly has inbuilt tools, populates all the necessary metadata, and allows uploading of the recipients' details. Since Credly is compatible with OBI standard, recipients can send their Credly badges to their Mozilla backpacks or repositories for earned Open Badges. Mozilla Backpack is an authorized data repository where learners can collect, manage, and display their badges. Sharing badges using the Mozilla Backpack allows learners to then link their badges to public collections of badges (Casilli & Hickey, 2016; Goligoski, 2012; Grant, 2014). (See Figure 5.)

This feature is unique as the earner maintains control of his or her badges, rather than the issuer as with traditional certifications of learning (e.g., LEAs, industry entities, and professional associations). Additionally, since the framework is based upon learning opportunities expanded by digital technologies, the badge can be "stacked" (Alliance for Excellent Education, 2013, p. 3) to demonstrate multiple accolades to be shared with as many consumers, as determined by the earner. The participants can choose to share their certification with others outside of their

ecosystem by tying it to the broader Mozilla Open Badges Framework (http://openbadges.org).

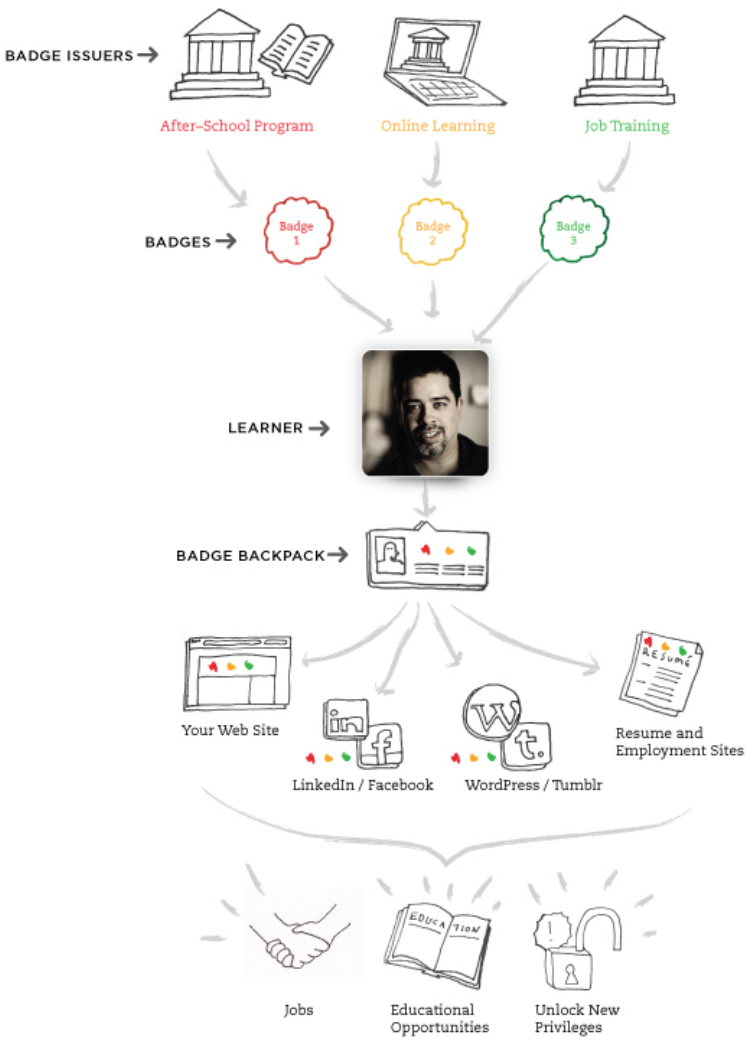

Figure 5. An infrastructure map of Open Badges. Reprinted from "Motivating the learner: Mozilla's open badges program, (p.2)," by E. Goligoski, *Access to Knowledge: A Course Journal, 4(*1). Copyright 2012 by Mozilla Open Badge Team. Reprinted with permission.

The value and relevance of a badge. Educational credentials, which include digital badges, denote learning. Whether as a grade, degree, or certificate, they represent claims about learning. As do paper certificates or symbols, digital badges document accomplishments from specific skills to a set of competencies. Moreover, as with a physical certificate or credential, a

digital badge can be based on vast assessment methods and credentialing processes. Nevertheless, there are many ways in which digital badges differ from physical certificates and credentials. In comparison to their physical counterparts, digital badges are dynamic, made possible with technology. In addition to signify its issuer's judgment, the badge makes evidence on which the judgment is based transparent. For example, employers may view a college degree as abstract information about what a potential job applicant knows and can do because the degree cannot communicate with certainty the specific skills a person has (Bills, 2003; Grant, 2014; Olneck, 2012). A study conducted by Arkes (1999) concluded that it is plausible that the value of a degree to employers is that it represents the potential of its earners. The logic is that students who progressively benefit from schooling are more likely to graduate, hence hold unobservable attributes, such as motivation, character, and perseverance. In turn, to the employer, these attributes are associated with greater performance and productivity.

For proponents of badges in education, the potential advantages include providing credentialing which might reflect a finer-grained and nuanced reflection of a person's skills or experience. Badges might then represent a way to improve the information complexity issues of traditional credentials. Rather than guessing a person's skills from a single credential, stakeholders can gather a nuanced picture of a person's skills through a collection of smaller credentials. This is largely the goal of the Open Badge initiative (MacArthur Foundation, n.d.), with the openness of the platform allowing for greater granularity of skills recognized. Alternative approaches to credentials such as Open Badges are envisioned to reimagine education and learning more generally, specifically by transcending conventional paradigms of academic credentialing and educational assessment (Casilli & Hickey, 2016). In turn, digital badges transform the way society in the 21st century imagines learning and practices assessment

and credentialing by transforming accomplishment-related artifacts into digital ones (Riconscente, Kamarainen, & Honey 2013).

Future Badge Design Implications

Educational agencies are challenged to explore learning opportunities beyond traditional training. Due to the promising appeal of studying Open Badging for the learning of research, regarding what a well-designed Open Badge system for PD in educational technology looks like is up to interpretation. The DPD project unveiled that none of the 30 highlighted projects stayed the same and many of these projects failed because of a dysfunctional badge system (Hickey et al., 2014). The developers were unsuccessful in managing the claims, evidence, and assessments linked to their badges. Whether Open Badge systems can be accepted among educators as an alternative approach to traditional professional growth around educational technology is yet to be explored. As more research explores the utility of the digital badge system, the DPD project findings will provide guidance for agencies at the initial planning stages of negotiating the values, principles, and features of its system.

Summary

Chapter Two further explained the conceptual foundation for the study. Relevant learning theories of constructivism and constructionism were considered as they relate to the implementation of technology such as digital badges. The EduBadger Course incorporates a constructivist approach where the earner is consciously engaged in creating artifacts that involve technology in the making as knowledge is gained. Motivation behind the need to integrate technology in K-12 PD and barriers faced were addressed. Components of PD specific to integration of technology tools in the K-12 educational institutions were discussed along with evidence-based features of effective PD related to the teaching and learning of technologies. The

chapter concluded with a review of pertinent literature that supports the study of Open Badging, and the background and history of Open Badging. Chapter Three will discuss the methods and the design of this collective case study.

Chapter Three: Research Methodology

As educators must continually develop skills and knowledge to integrate technology in the K-12 classrooms to boost student achievement as part of national and state requirements, PD is essential. However, LEAs are faced with limited time to offer PD and offer PD that meets the needs of educators that come with a vast range of knowledge, skills, and experiences. With that said, there is a need to explore PD platforms beyond long-standing conventional settings such as classroom based PD. The purpose of this mixed-methods study is to explore the use of digital badging in the workplace of educational institutions as an alternative approach to traditional PD in the field of educational technologies. The goal of the research is to obtain a comprehensive understanding of the utility of the EduBadger Course within LEAs as a viable PD from the perspective of its earners. The study presents an in-depth collective case description and identifies case-based themes from the data.

Study Design

Mixed methods research design was chosen to explore this research study for the "purposes of breadth and deep understanding and corroboration" (Johnson, Onwuegbuzie, & Turner., 2007, p.123). As Creswell and Plano Clark explain, "The central premise is that the use of quantitative and qualitative approaches, in combination, provide a better understanding of research problems than either approach alone" (p. 5). Greene, Caracelli, and Graham (1989), as cited in Creswell and Plano Clark (2011), identified five reasons for using mixed methods design: triangulation, complementarity, development, initiation, and expansion. For the purposes of this study, the researcher seeks convergence, corroboration, and correspondence of results from both the quantitative and qualitative data through triangulation. In other words, quantitative

and qualitative research are combined to triangulate findings in order that they "may be mutually corroborated" (Bryman, 2006, p. 106).

Case study design. According to Creswell (2013) there are five types of qualitative inquiry: narrative research, phenomenology, grounded theory, ethnography, and case study. Creswell (2013) points to the importance for researchers to identify their approach to qualitative inquiry "to present it as a sophisticated study and to offer it as a specific type so that reviewers can properly assess it" (p. 69). This research design used a case study approach "in which the investigator explores a real-life, contemporary bounded system" (Creswell, 2013, p. 97) through "detailed, in-depth data collection involving multiple sources of information" (p. 97). Case study research provides an opportunity for the researcher to collect multiple sources of different types of evidence with a methodology that requires triangulation of data. For this study, the case study was bounded by the experiences of EduBadger Course badge earners within Region 1.

Creswell (2013) continues to explain that case studies are defined by the size of the bounded case. Furthermore, Dr. Creswell distinguishes case studies in terms of intent of the case analysis: the single instrumental case study, the collective or multiple case study, and the intrinsic case study. Collective case study (Stake, 1995) design can provide a structure to gain insight into the issue of interest across subjects, which allows comparisons within and between cases (Baxter & Jack, 2008). This research inquiry is considered a collective case study, as the researcher uses multiple cases to show different perspectives from the earners of EduBadger Course badges. For this study, in-depth description and analysis of four cases provide robust understanding of the utility of the EduBadger Course within one geographical region.

Research questions. The scope of the research questions delves into the perspectives of digital badges as an alternative approach to traditional professional growth opportunities. The

research questions for this study are as follows:

1. What are the earners' knowledge and skills to teach with technology?
2. What are the earners' perceived affordances of a digital badge approach for technological professional growth within the workplace?
3. What challenges do earners describe as a result of participating in a digital badge approach for technological professional growth within the workplace?

Role of the researcher. For this study, researcher biases and insights reside in her own experiences as a teacher, researcher, administrator, and doctoral student. The researcher believes that exploring nontraditional professional learning pathways is needed and should be actively supported by the workplace, including educational institutions. This researcher believes strongly that educators should have the flexibility to define their pathways towards their own professional growth beyond the traditional formal means of training and credentialing. Our current system of validating learning is static and narrowly focused. As defined by Green and Luke (2006), what counts as learning in the context of global cultural and economic change calls for re-examining how definitions and understandings of learning are being reshaped. The emphasis on learning, instead of training, is evident in major trends in contemporary research. This researcher agrees that the medium of learning is transforming. Therefore, the imminent utility of educational institutions requires a deep epistemological appreciation of what a digital society offers as an exemplar for a learning institution. Traditional transfer models of learning face thought provoking challenges from new models that account for the way people learn. Surprisingly, with favorable policy environments at the federal, state, and local levels, growing access to open and any time course materials and increasingly abundant technology tools, the level of technology development in our educational institutions is still alarmingly low. For teachers struggling to

continually accomplish complicated feats, such as mastering new technologies, effectively integrating technology into pedagogical practice, and dealing with the longstanding shortcomings of conventional PD, exploring solutions have merits. Open Badging offers a potential solution. Over time, Open Badging could support professional learning programs to credential teacher development, systematically supporting gradual improvements to teaching practice, and shared and interactive formal and informal learning environments.

Because of personal values, attitudes, beliefs and assumptions about the world and nature of knowledge, the researcher made a conscientious effort to systematically reflect on her behavior and thoughts, as well as, on the phenomenon under study. The researcher accomplished this by following the advice of Lincoln and Guba (1985) on maintaining a research journal to build trustworthiness of the study. The researcher heeded the advice of Gray (2009) to embrace reflexivity to the extent that it was in line with her attitudes towards epistemology and principles of research design and practices.

Sources of Data

Individual teachers and district administrators were the primary source of data. Their viewpoints and perceptions about technology use within their pedagogical practices were key foci of this study. In addition, their experiences with a staff development program called EduBadger provided important insights for district decision makers. The researcher recorded reflections in a journal throughout the study procedures which also was considered a source of data.

Site selection and program. The geographical region served by Region 1 was the site of this study. As a key part of the process of determining where and from whom data will be collected, a site is selected that meets the criterion of being most likely to provide the

information that the study seeks (Lincoln & Guba, 1985). The researcher sought to understand the nature of Open Badging within an educational institution from the perspectives of its earners and therefore, purposefully selected an educational agency that designed and was in the initial stages of implementing a digital badge system as a unique PD opportunity. The efforts of the educational technology specialists within Region1 to design and develop an Open Badge system, EduBadger, presented a prime opportunity for understanding increased acceptance and creditability of Open Badging as alternatives to certification in the workplace of educational institutions. Region 1 covers five County Offices of Education: Del Norte, Humboldt, Lake, Mendocino, and Sonoma County Offices of Education respectively. Region 1 is investing a significant amount of time and money in inquiring about alternative forms to traditional PD so, it is important to evaluate the utility of the program. In addition, the availability of access and the researcher's familiarity with the organization are two other contributing factors for the site and program selection. The researcher is familiar with the organizational structure of county offices of education and employees within its agency since the researcher is employed by a county office of education within Region 1.

Subject selection. Participant selection involved a purposeful sampling process. Initially EduBadger was offered to forty teachers that were accepted through an application process in June 2015 to participate in beta testing of the Open Badge program. Since then, access to participate has expanded to over one hundred teachers and administrators within the counties of Region 1. The target population was composed of K-12 certificated teachers and administrators employed by two county offices of education within Region 1. All members of this target population were invited to participate in the survey process provided they had successfully completed at least one EduBadger Course badge. This criterion ensured that participants of the

targeted population had at least minimally engaged as earners of a badge. The total number of qualified participants for this study was 57 teachers and administrators.

Researcher reflective journal. The researcher maintained a research journal consisting of memos containing thoughts, comments, insights, new issues, and emerging questions. The researcher reviewed these memos a day or two after each interview. This process allowed for reflection of the interview itself in terms of the number and type of prompts needed to facilitate the interview, information shared beyond the extent of the questions asked, and additional nuances discussed that potentially may be of value to the study. These memos helped the researcher to make meaningful connections between theory and practice, to consider the study holistically, and to guide the interview process.

Data Collection Strategies and Procedures

Since the study is a mixed-methods design, data collection strategies and procedures involved two methods to address the quantitative component and the qualitative component. First, a survey was used to collect quantitative data, followed by interviews of volunteer participants to collect the qualitative data.

Survey instrument. Gray (2009) touts that surveys are one of the most popular methodologies in research because they allow for the collection of significant amounts of data from small to large populations. While surveys typically provide data that can be generalized from a sample to a population, for the purpose of this case study, the goal was to generate deep, rich case description. The use of an electronic process provided ease of use for the subjects and could provide anonymity for those who were not willing to participate in an interview process. The focus of the survey was to identify and measure participants' beliefs about using digital badges as an alternative to traditional professional growth opportunities. Subjects were invited to

complete a self-administered electronic survey administered through *Qualtrics,* a survey administration tool. An email was sent by an Educational Technology Coordinator in Region 1 to all 57 qualified EduBadger Course earners (Appendix C). The email contained a link to the study informing them of the purpose of the study and an informed consent (Appendix D). The survey was initially opened for two weeks, however, due to a low response rate, the survey was extended another week. The Educational Technology Coordinator sent two follow-up emails during the data collection: a reminder of the opportunity to participate in the survey and another to announce the extended timeline to complete it. At the completion of the survey, the participants were thanked for their time and participation.

Due to limited research on PD as it relates to technology integrated teaching and learning and the nascent nature of Open Badging, much of the survey instrument for this study was developed by the researcher. However, the survey items were anchored to previous peer reviewed studies and reports from Darling-Hammond et al. (2009), Desimone (2009), Garet, Porter, Desimone, Birman, and Yoon (2001), Hickey et al. (2014), Ng (2015), and Schmidt, Baran et al. (2009). The survey was multifaceted and entailed four sections: demographic and description questions; EduBadger Course PD design characteristics; knowledge of instruction and technology; and open-ended questions. The first three sections, prior to the open-ended questions, were on a 5-point Likert-scale. For the third section, the researcher modified a survey from Mishra and Koehler's (2006) conceptual framework for educational technology (TPACK) based on Shulman's (1986) formulation of pedagogical content knowledge. The complete survey developed for this study and its components can be found in Appendix E.

Interviews. To further explain the survey responses, survey participants were asked if they would be willing to be contacted for a follow-up interview. If they agree, they were linked

to a new form which provided consent information including intention to audiotape the interview and a request for contact information in order that interviews could be scheduled (Appendix F). The 30-minute interview consisted of three demographic questions and 14 open-ended questions. Open-ended questions allowed the researcher to facilitate the interview in the direction of the research study while allowing the case subjects to share their unique views and experiences. The interview questions can be found in Appendix G.

The purpose of the interview sessions was to explore, explain, and clarify the responses obtained from the survey data. For the interview process, the researcher used several prompts when necessary to initiate the conversation as well as to keep the interview focused on the research topic. The interviews were conducted using a landline telephone and recorded using an audio recording device. Participants were offered choices of times and location to be interviewed in accordance with district policy and personal preference**.**

Validity and reliability of instrumentation. Regardless of the type of inquiry, the researcher must follow certain procedures to ensure the validity of the data, results, and interpretation of one's research study. In this mixed methods design study, the researcher believes that using different types of procedures for collecting data and obtaining information through different sources can augment the validity of the data and interpretations.

Content validity of the survey was established through use of an expert panel to confirm the content was relevant to the conceptual framework and could also lead to the development of interview questions. Panelists were invited via email to complete the validation process using a form administered through Qualtrics. The panel consisted of individuals with instructional and curriculum expertise in educational technology. Three panel members were Region 1 technology coordinators, two of which created the EduBadger Course*,* and three were former EduBadger

Course earners from the beta test. None of the panelists were participants of the study. Two panelists commented that the survey was too long. One panelist advised eliminating the third section addressing the earner's knowledge of teaching and learning adapted from *The Survey of Preservice Teachers' Knowledge of Teaching and Learning* (Schmidt, Baran et al., 2009). However, since this portion of the survey was essential to address the research question regarding the earners' knowledge and skills to teach with technology and eliminating other items could jeopardize the value of the survey to the study, it was kept intact.

The third section of the survey, Earner's Knowledge of Teaching and Learning, was adapted from an existing instrument. The *Survey of Preservice Teachers' Knowledge of Teaching and Learning* (Schmidt, Baran et al., 2009) was written so that each knowledge domain of the TPACK framework is represented in the survey. Designers, Schimidt, Baran et al. (2009), constructed an initial pool of 44 items that was distributed to three nationally recognized TPACK experts for content validity analysis (Schmidt, Baran et al., 2009). Each reviewer rated the extent that an item addressed one of the seven TPACK constructs while offering comments and suggestions. Designers reviewed comments, revised existing items, and added items to create a 75-item survey to be tested for construct validity and reliability. Due to a smaller sample size, construct validity was established with a factor analysis of items organized by each domain of knowledge instead of on the instrument as a whole. Designers also calculated internal consistency for each construct. Using these data, designers removed 28 items that negatively affected the construct validity and reliability of each TPACK construct. A second factor analysis and test of internal consistency produced a final survey consisting of 47 items. Designers concluded that the instrument was a valid and reliable instrument for measuring preservice teacher's self-assessment of the seven TPACK constructs.

Schmidt, Baran et al. (2009) provide information for how to score the survey and maintain a database of the survey's use with its multiple translations. Schmidt and her colleagues encourage researchers to use them or modify them. The survey is available free for use if the researcher provides a description of intended use to Dr. Schmidt for purposes of tracking the instrument tool's use in research (p.1). The researcher emailed the author with a description of her intended usage including research questions, population, site location of her research, and a copy of the Institutional Review Board (IRB) letter of approval from Pepperdine Graduate School of Education and Psychology (Appendix H).

To ensure the survey's reliability, the survey was piloted with a small group of colleagues familiar with survey design and technology. A link to the survey was sent to the pilot survey participants requesting an approximate week turn around to respond. The researcher reviewed the responses to ensure the survey's functionality. To ensure reliability of the interview process, a pilot interview was conducted with colleagues familiar with Open Badging which confirmed the appropriateness of interview questions, process, and probes.

Human Subjects Considerations

This study was conducted according to the ethical, federal, and professional standards set forth by United States regulations (45 CFR 46.101) and by Pepperdine University to protect human subjects. Approval for this study was requested and received in the Summer of 2016 from the IRB responsible for reviewing research applications from Pepperdine Graduate School of Education and Psychology (Appendix I.) The research activity was determined to meet criteria for Exemption. The study procedures involved participants in a survey and an interview, with minimal possibility of physical or mental harm to the participants. The survey and instruments themselves focused only on the practice of Open Badging as an alternate approach to traditional

PD and therefore, unlikely to bring to mind traumatic experiences for the participants. Informed consent was provided electronically. The study participants were informed of their choice to participate as well as to opt out of the study at any time. All electronic records were stored on a password-protected external hard drive and kept secure by the researcher. Identity of individual participants was protected by the assignment of a pseudo name used with both the survey data and interview transcripts. The log of codes was stored separately from the data to ensure no identifiable information would be available in the event of a confidentiality breach.

Data Analysis

Creswell and Plano Clark (2011) define the following four key decisions in choosing a mixed methods design: (a) the level of interaction between the strands, (b) the relative priority of the strands, (c) the timing of the strands, and (d) the procedures for mixing the strands (p. 64). For this study, the level of interaction between the strands was interactive. There was direct interaction between the two sets of data since the methods were mixed prior to the final interpretation. Answering the research questions was dependent on both quantitative and qualitative data. More emphasis was placed on the interview data with the survey data playing a secondary role. The researcher chose to focus on qualitative findings understanding the importance of hearing participant voices about their experiences as earners of EduBadger Course badges. The qualitative approach allowed for rich descriptions and interpretation between earners. The researcher collected and analyzed the quantitative data during a single phase of the research study prior to the end of 2016. Qualitative interview data were captured following the survey data analysis. Qualitative analysis was performed and findings merged with quantitative findings to answer the research questions. The researcher drew conclusions that reflected the combination of results from both types of data. As there is little empirical understanding of using

Open Badges for PD, the mixed methods approach served as the ideal design for exploration of new phenomena.

Analysis procedures. The quantitative data were exported from the Qualtrics system and copied to a separate *Excel* spreadsheet. Descriptive statistics was used to describe the quantitative data of the participants' perceived affordances and barriers to the adoption of EduBadger as an alternative approach to traditional professional growth to support practitioners to integrate technology into pedagogical practice. Variances of the responses regarding the affordances and challenges of the EduBadger were determined. Figures and tables were developed representing this data.

The qualitative data captured via open-ended survey items and through the interview process was transcribed using *HyperTRANSCRIBE*. The transcribed data were imported into *HyperRESEARCH* for coding and analysis. Using inductive open thematic coding process (Glaser & Strauss, 1967), qualitative data were reviewed multiple times to identify emergent thematic categories along with notes taken during the interview. The frequency of themes within the aggregate data were calculated as part of the quantitative descriptive statistics. Thematic coding was organized in graphic and narrative format representing themes and direct statements from the subjects.

Lincoln and Guba (1985) write that data analysis takes place through the naturalistic inquiry process. A researcher collects data and analyzes it while still in the field to better direct subsequent data collection efforts. As part of the internal validation process for interpreting results, the researcher reviewed notes within a day or two after each interview. In addition, important issues brought up by the interviewees were documented in a reflective journal.

To further ensure internal validity, the researcher followed Glaser and Strauss's (1967)

constant comparison method. This method provided general guidance in analyzing qualitative data and in generating grounded theory. Constant comparison method consisted of four stages: (a) comparing incidents applicable to each category, (b) integrating categories and their properties, (c) delimiting the theory, and (d) writing the theory. The researcher used HyperRESEARCH to document the process of implementing the constant comparison method with fidelity for analysis of qualitative data. To ensure reliability in the coding process, the researcher sought out the use of a recently graduated doctoral student familiar with HyperRESEARCH and qualitative analysis to cross check and compare the codes for inter-coder agreement. The use of an additional coder assisted the researcher to refine the code descriptions and ensure reliable interpretations of the data.

According to Merriam (1988) validity of conclusions are improved when data collection is triangulated. In this research, triangulation of the quantitative and qualitative data occurred following initial independent analysis of the two forms of data to arrive at conclusions for the study. The researcher considered a data analysis practice in which the researcher built evidence for a theme from several sources or several individuals. In this study evidence was built from an initial code or theme from the multiple sources of data: completed surveys, research journal, and interviews.

Summary

This mixed-methods study incorporated a collective case design to explore the use of digital badging in the workplace of educational institutions as an alternative approach to traditional PD in educational technologies. The goal of the research was to obtain a comprehensive understanding of the utility of the EduBadger Course within LEAs as viable PD from the perspective of its earners. Chapter Four presents the research findings and Chapter Five

presents the study conclusions with discussion of implications and recommendations for both practice and scholar.

Chapter Four: Findings

This chapter describes the findings from both the quantitative and qualitative results of the study. The quantitative findings from the survey provide descriptive statistics of the survey participants followed by findings generated from the EduBadger Course content and design principles. These findings are categorized into three areas: recognition of learning, motivation for learning, and assessment of learning to capture the participants' perceptions about EduBadger Course PD design characteristics. The third section of the survey captures the earner's self-reported knowledge and skills to teach with technology. The findings are organized by the seven domains of TPACK. The open-ended questions provide more detail about the earner's EduBadger Course experience and are addressed individually.

The qualitative findings from the survey further explain the survey responses collected through semi-structured interviews. The findings consist of participant demographic information and initial exposure to and experiences with the EduBadger Course. Explanation of participants' roles, perception of their level of technology skills, and views regarding teacher support systems are shared. Thematic analysis of the findings is presented and the emergent themes generated from the data are discussed.

Survey Findings

The survey component of the study was designed to answer the research questions:

1. What are the earners' knowledge and skills to teach with technology?
2. What are the earners' perceived affordances of a digital badge approach for technological professional growth within the workplace?
3. What challenges do earners describe as a result of participating in a digital badge approach for technological professional growth within the workplace?

The targeted population was composed of K-12 certificated teachers and administrators. An invitation to participate was sent to a total of 57 participants employed by two County Offices of Education within Region 1 that had completed at least one EduBadger Course badge. Ten participants, representing 17.5% of the target population provided consent and completed the online survey. The survey consisted of nine teachers and one administrator employed within two county offices of education**.** The number of years in education was relatively evenly distributed. The largest number (40%) was in education five to nine years, followed by 10 to 20 years (30%) and over 20 years (30%) Most participants' primary subject specialty was teaching in the elementary grades (70%), followed by secondary grades in the humanities (10%) and social studies (10%), and one was in administration (10%).

The survey included four parts: (a) 10 participant demographic and descriptive questions; (b) 26 Likert scaled statements regarding the participant's perceptions about EduBadger Course PD design characteristics; (c) 27 Likert scaled statements to capture the earner's self-reported knowledge and skills to teach with technology; and (d) five open-ended questions to provide more detail about the earner's EduBadger Course experience. An email with an invitation to participate in the electronic survey was sent by a Region 1 Educational Technology Coordinator to all qualified EduBadger Course earners. The survey was open November 7, 2016 and closed on December 2, 2016. An online survey software, Qualtrics, was used to collect the responses.

Description of the survey participants. The teachers and administrator were asked how many and what type of EduBadger Course badges and quests they completed. A badge is designed to learn a new educationally based technological skill accessed through online modules. As online modules and activities are successfully completed, badges are earned. A quest is a special achievement which consists of earning two or more specific badges. Badge completion

ranged from one to 13 with the highest percentage (30%) of participants completing 10 badges and another 20% completing two badges. Quest achievement ranged from zero to four with an equal number of participants completing either one or two quests and one individual reporting four achieved quests (Figure 6).

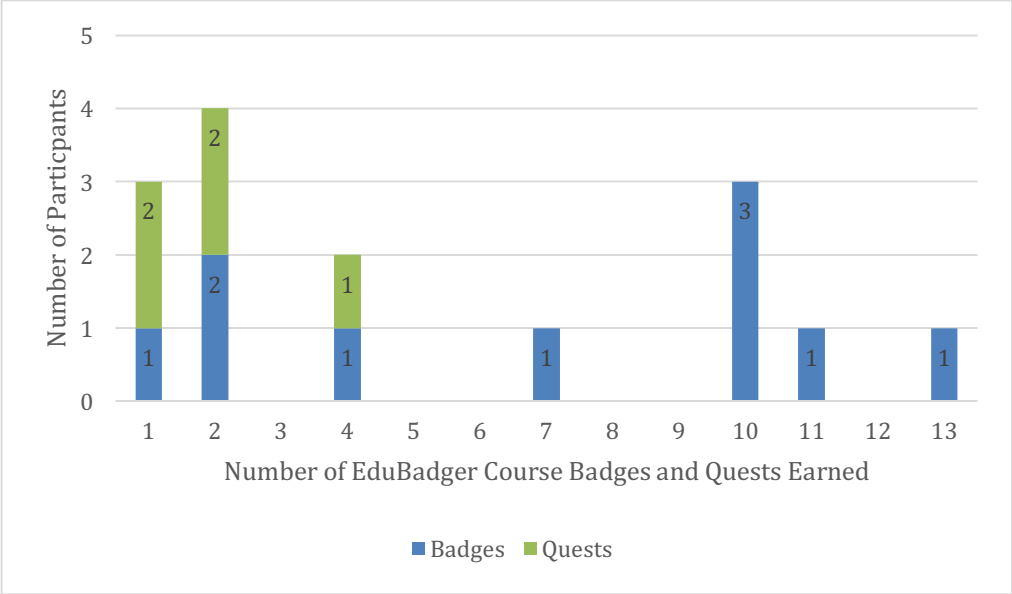

Figure 6. Total number of EduBadger Course badges and quests earned *(N* = 10)

Four questions asked participant's perceived utility of the EduBadger Course (Figure 7).

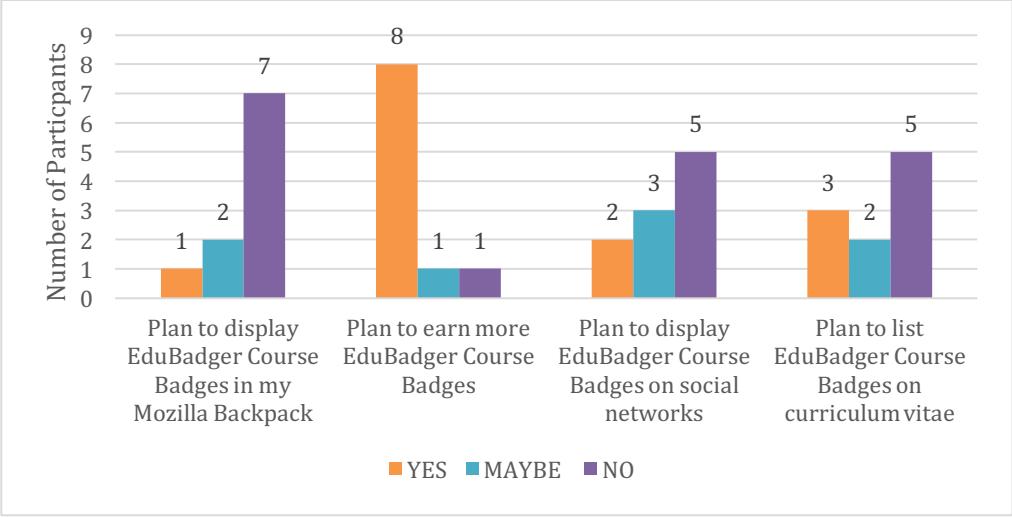

Figure 7. Perceived utility of the EduBadger Course badges (*N* = 10)

Eighty percent (*n*=10) of the participants did report their intention to pursue more EduBadger Course badges. However, regarding displaying their badges on social network sites, half indicated they would not. Only two participants (20%) said they would display their EduBadger Course badges. Indicating badge completion on their curriculum vitae showed similar results though one more individual (30%) indicated she/he plans to do so.

EduBadger course PD design characteristics. The section of the survey specific to the characteristics of the Course was primarily based on Badge Design Principles Documentation Project January Interim Report (Hickey et al., 2014) and from the research of experts in the field of professional learning. Tables 1-3 provide detailed results. Mean ratings for the survey items in the three categories ranged from: 1 = strongly disagree (SD), 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA) with a higher rating representing more participants agreeing and/or stronger agreement.

Recognition of learning. Twelve items focused on how the EduBadger Course experience influenced learning. Self-paced learning had the highest mean rating (M = 4.7) with all 10 participants either agreeing or strongly agreeing. Anytime/anywhere professional learning and PD in general, also had all participants agreeing or strongly agreeing with the mean rating of 4.6. The results were the same for PD being important. Ninety percent agreed that being able to set your own learning goals (M = 4.4), along with time well spent completing the EduBadger Course (M = 4.3), and being able to begin work at their level to learn and work at their level of expertise (M = 4.2) were important aspects. Eighty percent agreed that activities aligned with school/district improvement priorities and goals were important to their learning and instruction (M = 4.2) and that the training materials and activities helped them to gain targeted technological skills (M = 4.0), along with, recognition of achievement by school or district administration

(60%; M = 3.6). Only 40% agreed that participating helped them to achieve PD goals (M = 3.5) as well as recognition of achievement by a credited university (40%; M = 3.3). Only 20% agreed that being able to earn educational credit units (M = 3.2) was an important feature. (See Table 1.)

Table 1

Frequency and Mean Rating for Survey Statements for Recognition of Learning (N = 10)

Survey Item	SD	D	N	A	SA	Mean Rating
Being able to work at my own pace	0	0	0	3	7	4.7
Being able to participate in PD anytime/ anywhere	0	0	0	4	6	4.6
PD is important to me	0	0	0	4	6	4.6
Being able to choose my own learning goals	0	0	1	4	5	4.4
Time spent completing Course was well spent	0	0	1	5	4	4.3
Course activities aligned with school/district priorities and goals	0	0	2	4	4	4.2
Being able to begin and work at my own level of expertise	1	0	0	4	5	4.2
Training materials and activities helped me to gain targeted technological skills	0	1	1	5	3	4.0
Recognition of achievement by administration	1	1	2	3	3	3.6
Participating helped me to achieve my PD goals	0	1	5	2	2	3.5
Recognition of achievement by a university	1	2	3	1	3	3.3
Being able to earn educational credit units	1	0	7	0	2	3.2

Note: Ratings weighted: 1 = strongly disagree (SD); 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA).

Motivation for learning. Eight items focused on motivation for learning. Eighty percent of the participants agreed that the leaderboard encouraged them to compete with other badge earners (M = 4.0), followed by personal achievement (70%; M = 3.9), and by earning points to compete with other earners (60%; M = 3.6). Only half of the badge earners agreed that the leaderboard encouraged them to collaborate with other earners (M = 3.6) and to virtually network with other educators outside of their district (M = 3.2). Just as many disagreed that

monetary compensation was a motivational factor, while 30% agreed that it was a factor (M = 2.7). Forty percent agreed that earning points encouraged them to meet their personal goals (M = 3.2) and to virtually network with other educators within their district (M = 3.2). (See Table 2.)

Table 2.

Frequency and Mean Rating for Survey Statements for Motivation for Learning (N = 10)

Survey Item	SD	D	N	A	SA	Mean Rating
The leaderboard encouraged me to compete with others	0	0	2	6	2	4.0
Personal achievement was an important aspect	0	1	2	4	3	3.9
Earning points encouraged me to compete with others	0	2	2	4	2	3.6
Leaderboard encouraged me to collaborate with others	0	1	4	3	2	3.6
Earning points encouraged me to meet my goals	0	2	4	2	2	3.4
Encouraged me to virtually network with others within district	1	1	4	3	1	3.2
Encouraged me to virtually network with others outside of district	1	1	3	5	0	3.2
Monetary compensation was an important aspect	3	2	2	1	2	2.7

Note: Ratings weighted: 1 = strongly disagree (SD); 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA).

Assessment of learning. Seven items focused on assessment for learning. Eighty percent of the participants agreed or strongly agreed that time for cumulative study of learning how to use technology tools and the training materials and activities helped them to gain targeted technological skills (M = 4.0). Seventy percent of the participants agreed or strongly agreed that the Course increased access to innovative learning opportunities (M = 3.8) and allowed time for cumulative study of learning how to implement technology into their teaching/instruction (M = 3.8). Similar results showed participants agreed that the criteria required to earn a badge was rigorous (M = 3.7). Half of the participants (50%) agreed that the process used to evaluate their

work was rigorous (M = 3.6) and that the rubrics accurately assessed their learning while half of the participants neither agreed nor disagreed (M = 3.6). (See Table 3.)

Table 3.

Frequency and Mean Rating for Survey Statements for Assessment of Learning (N = 10)

Survey Item	SD	D	N	A	SA	Mean Rating
Allowed time for cumulative study of learning to use technology	0	0	2	6	2	4.0
The training materials and activities helped me to gain technological skills	0	1	1	5	3	4.0
Increased my access to innovative learning opportunities	0	1	2	4	3	3.8
Allowed time for cumulative study of learning to implement technology into teaching/instruction	0	2	1	4	3	3.8
The criteria required was rigorous	0	1	2	6	1	3.7
The rubrics accurately assessed learning	0	0	5	4	1	3.6
The process used to evaluate my work was rigorous	0	0	5	4	1	3.6

Note: Ratings weighted: 1 = strongly disagree (SD); 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA).

Knowledge of instruction and technology. The third section of the survey focused on the participants' overall understanding of technological pedagogical content knowledge or TPACK. An adaptation of the *Survey of Preservice Teachers' Knowledge of Teaching and Learning* (TPACK) was used. The original survey by Schmidt, Baran et al. (2009) was developed to measure preservice teachers' self-reported perceptions about their own overall understanding of technological pedagogical content knowledge (TPACK) and grouped into seven knowledge domains: technological knowledge (TK), content knowledge (CK), pedagogical knowledge (PK), pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and technological pedagogical

content knowledge (TPACK). The self-reported scores reflect the data from eight of the 10 survey participants. The survey requires answering all survey questions for each of the seven domains. Because two of the 10 participants did not complete this section, they are not reflected in the TPACK data. Schmidt, Baran et al. (2009) provide instructions to score the survey. Each participant's item response is scored with a value of 1 assigned to strongly disagree (SD), all the way to 5 for strongly agree (SA). For each construct, the participant's responses are averaged. For example, the six survey questions under technology knowledge (TK) are averaged to produce one TK score. Table 4 represents the data as the average/means scores of each participant for each of the seven constructs.

Table 4.

Participants' Mean Ratings for Knowledge and Skills to Teach with Technology (N = 8)

Participant	1	2	3	4	5	6	7	8	Mean Value
Technological Knowledge (TK)	2.8	4.0	5.0	3.1	4.5	5.0	3.8	4.0	4.03
Content Knowledge (CK)	4.5	4.0	5.0	2.5	4.0	5.0	4.0	4.0	4.13
Pedagogical Knowledge (PK)	3.8	4.8	4.7	3.7	4.0	5.0	4.0	4.0	4.25
Pedagogical Content Knowledge (PCK)	3.0	4.0	4.0	4.0	4.0	5.0	4.5	4.0	4.06
Technological Content Knowledge (TCK)	4.0	4.0	4.0	3.0	4.0	4.0	4.8	2.0	3.73
Technological Pedagogical Knowledge (TPK)	4.0	3.4	4.4	3.9	4.0	4.1	5.0	3.1	3.99
Technological Pedagogical Content Knowledge (TPACK)	4.0	4.0	5.0	4.0	4.0	4.0	4.0	4.0	4.13

Note: Values are the mean of reported scores for each participant on the weighted 5-point scale. (1 = strongly disagree (SD), 2 = disagree (D), 3 = neither agree nor disagree (N), 4 = agree (A), 5 = strongly agree (SA).

Technological pedagogical content knowledge (TPACK). The TPACK domain included one survey item: the EduBadger Course helped me to instruct lessons/trainings that appropriately combine the content that I teach/instruct, technologies, and instructional approaches. TPACK was the only domain where all participants' (100%) self-reported that the EduBadger Course experience supported their understanding of technological pedagogical content knowledge (M = 4.13). Pedagogical knowledge (PK) had the highest mean rating of 4.25 with a range of individual subject means from 3.7 to 5.0. Content knowledge (CK) had a mean value of 4.13, where one participant's self-reported score as 2.5 but all other participants self-reported scores were 4.0 and 5.0. Similar results were reported for pedagogical content knowledge (PCK; M = 4.06) where one participant's self-reported score was 3.0 and others ranged from 4.0 to 5.0. Participants self-reported score for technological knowledge (TK) was a mean of 4.03 with a range of scores from 2.8 to 5.0. The lowest self-reported individual score was a mean of 2.0 with the highest mean of 4.8 in the domain of technological content knowledge (TCK) with an overall group mean of 3.73. Participants' overall self-reported score for technological pedagogical knowledge (TPK) was a mean of 3.99 with the smallest distribution mean rating scores from 3.1 to 5.0. (See Table 4.)

Open-ended survey questions. Participants were asked to respond to five open-ended questions designed to capture a deeper perspective of their experience as earners of EduBadger Course badges. Responses are shared below organized by question focus.

Best liked from participation. The participants were asked to share what they liked best from participating in the EduBadger Course experience. Three participants liked that they could learn and work at their own pace. Two participants liked that it could be done on their own time and "earn college credits for doing it." Another participant mentioned the leveled badge

offerings. The participant cited, “I felt success at Level 1 and then was able to use those skills as I moved up.” Another participant liked choice, the ability to “choose the ones best suited to my own needs and classroom needs.” Two participants mentioned “the variety of different challenges” and “trying new things.” One participant liked the “gaming style of the badges and earning points” and another liked “exposure to new education technology.”

Least effective aspect of participation. Four of the participants criticized the turnaround time to award badges. Participants objected to waiting for approval for their work before allowing them to move to the next challenge. A discouraged participant wrote, “I have a few badges that have not been approved by the administering instructors. This is frustrating to me because I like to see my progress and complete the game style like earning points.” Another participant wrote, “Months later and I still don't have feedback on stuff” while another commented, “Not getting my badges approved has been a challenge because I didn’t get feedback from the instructors. I like knowing there might be something I can work and improve on.” A participant suggested, “It would have been more effective if the grading was done quicker.”

Other participants questioned the value of earning some badges. One participant argued that for some badges, “badge completion required purchasing an app.” Another mentioned, “I don’t have access to iPads at my site and they are required for a few badges.” One participant argued that “much of the technology was not accessible to the age group of students” she taught and another wanted “more badges that would be more applicable to K-2.”

Challenges experienced. Several participants identified technical challenges experienced to complete some badges, such as “dealing with various devices”, “syncing across devices to upload items”, and following “confusing” directions that “did not always work the way they

were explained." Another shared frustration with lack of support to solve technological issues.

> When I don't really understand something, I don't have a lot of people I can ask. Everyone is busy and have their own thing going on. You are not together in a class so everyone isn't doing the same things.

A participant cited that these challenges "would be difficult for someone to troubleshoot on their own" which will "hinder people who are uncomfortable with technology from using the EduBadger system."

Overall benefits. Overall benefits shared by the participants included: exposure, practice, networking, increased personal knowledge, the "enjoyment of being creative while exploring new things", and being able to use them in their classrooms "the very next day." Others mentioned affordances, such as working independently, the ability to self-pace, choice of learning targets, and having fun. A few participants liked the benefits of receiving monetary compensation and being able to earn college credits.

Impact on technology skills and ability. The participants shared positive impacts on their technology skills and abilities after participating the Course. Comments included:

- More confidence using apps and programs;
- More experience using various programs;
- Increased personal knowledge of different educational technologies;
- Being able to do and create projects that their students can do as well; and
- Being prepared to teach students the skills they need.

One participant summarized, "I can continue to improve my knowledge of technology and its various applications to find the best use for them with my various lessons and topics I teach in my classroom."

Interview Findings

The purpose of the interview was to explore the respondents' individual experiences with the EduBadger Course using a collective case study design approach. Four interviews were conducted and analyzed. Collective case study (Stake, 1995) design can provide a structure to gain insight into the issue of interest across subjects, which allows comparisons within and between cases (Baxter & Jack, 2008). Thus, the use of collective case studies is beneficial for identifying and studying the perspectives of EduBadger Course earners employed within county offices of education.

Each of the four individuals interviewed was given a pseudonym to protect their individual identity. Some demographic information as well as their description of their initial exposure and experience with the EduBadger Course is provided. Explanations of their role and perceptions of their level of technology skills including views regarding teacher support systems are included. Following the introduction of each of the four individual cases, the thematic analysis findings are presented considering the collective stories of these four teachers. Six themes emerged from the data:

1. Affordances of course content and course design;
2. Recommendations to sustain and improve the course;
3. Challenges of course content and course design;
4. Ways experience impacted/changed teaching;
5. Motivation for learning; and
6. Ways experience impacted/changed learning.

Case descriptions. The following provides brief case descriptions of the participants interviewed to expand upon their individual teaching and professional development experiences

and technology expertise to gain more in-depth perspectives of their EduBadger Course experiences.

Case #1: Sarah. Sarah is a third-grade teacher and an instructional coach for second and third grade teachers. She works in a Google Apps for Education School. She initially learned about the EduBadger Course through informal office conversations with one of the Region 1 technology specialists that pioneered the course. At the time of this study, she had earned well over 10 badges and regarded her technology ability to be proficient both before and after the EduBadger Course experience. Sarah considers herself one of the lead people at her school to help others with technology for her grade level. She comments, "I have some teachers that I showed them things, and they were like, "Ah, I wouldn't have been able to this if you wouldn't have showed me how." When asked if learning about educational technology was a reason for participating in the course, she states, "Yes, I love the technology part. I am one of the teachers in my district that kind of is better at technology within some in my third-grade group." Sarah feels strongly about the importance of technology in the classroom. On a regular basis, the teacher uses iPads. She mentions:

> I have eight iPads, but I don't think that is enough for myself so I wanted more. So, I asked another teacher and she gave me her eight iPads. So, now I have 16 and I have 26 students. I think it is really important for you to have the technology to use the badges because if you don't then, it's going to be a challenge if you don't have the access to the technology to run your kids through the things that you have learned.

Sarah reports that she did have a support system available so that if she got stuck she could always ask questions. In addition, she is familiar with Open Badging. She had completed online courses and earned an Open Badge prior to her experience with the EduBadger Course. Sarah had attended a CUE conference within the past two years and received first place in Chrome Warrior.

Case #2: Jane. Jane is a kindergarten teacher and a member of her school site's technology committee. Participation in the Course is a district initiative. She explains, "My county and district were offering it to teachers who wanted to get more information on educational technology related things and they told us that we would get a $500.00 stipend to go along with that.".

When asked about her self-rating of technology skills on a scale of 1 to 3, Jane replies: "I would be a three." When asked if she had support staff if she got stuck completing a badge, she says, "Not really, not up here." She later adds, "I am one of the people that others go to. If I had gotten stuck on this, I am not sure who I would have gone to." She further comments:

> I keep up with technology through kind of networking and talking to my other friends who are teachers and if they know something that is really interesting, they will share it with me. And I will do some research on that.

Jane also states that her school "has pushed out using Google Docs and the Google platform to everybody" so she has had a lot of experience with Google tools. In addition, her school has a one-to-one Chromebook ratio. When further asked to define her source of technology supports and means to gain skills, she clarifies, "Some within my district. A lot of it is outside my district with friends that I have made in other places."

Jane earned 10 badges and had previously completed online courses. She did not have any knowledge about Open Badging before beginning the course.

Case #3: Maye. Maye is a teacher on special assignment (TOSA) for the elementary schools within her district. Her district has a plan to go one to one with devices per student, but for now, "every day there are very few classes that this is happening." And there are new computer labs at each site. She was initially introduced to EduBadger through the Digital Age Learning Leadership Academy (DALLA), the first initial course offered. Maye started using

EduBadger over a year ago. She shares a benefit of EduBadger in her role as an instructional coach to support other teachers.

> Our teachers hadn't been exposed to a lot of things that were on EduBadger. It was nice that I was getting a little preview and then I could direct them to what I thought they needed in their classroom or within their own personal professional development.

Maye rated herself as a 1.5 prior to the EduBadger Course experience and a 2.5 afterwards. She explains that she had a little bit of experience with technology before starting EduBadger. Maye completed two badges and admits to being a novice as far as Open Badging is concerned.

Case #4: Gwen. Gwen is a second-grade teacher. When asked about her self-rating of technology skills on a scale of 1 to 3, Gwen states, "I would say a three. I was maybe a two beforehand." Colleagues come to her for help with technology "quite frequently". She adds:

> Technology is a really big part for me both in the classroom and out of the classroom It is just something that has, more or less, kind of always been a part of my life in some way and I really try to push it out in the classroom.

Gwen has one-to-one Chromebooks in her classroom that she uses at least twice a day. She also uses Google Docs daily.

Along with Maye, Gwen was also initially introduced to EduBadger through the Digital Age Learning Leadership Academy (DALLA). Her district adopted EduBadger as an incentive to motivate teachers to "maybe go a little bit further beyond, you know, then just your regular professional development." As with Jane, she was offered a $500.00 stipend for completing 10 badges. She completed 10 badges to earn the stipend. Unlike the other participants, this was her first experience doing online coursework but she "didn't find it to be too challenging."

As with the other participants, colleagues quite frequently come to her for help with technology. Gwen says, "I am one of the younger people on my staff and people come to me

with a lot of tech issues." As far as support for technology issues, there is one technology specialist to support the entire district and a Help Desk that staff can email quick questions. Gwen gets around using them.

> Mostly, I try to avoid them because I don't always feel that I am getting the answers I am looking for. And usually I can find that, oh, I can probably Google this and somebody else has probably had this same problem. And as long as I am not messing with school property, I am not going to worry about it too much.

Thematic Analysis

The four interviews provided detailed information regarding perceptions and experience with the EduBadger Course. The thematic analysis resulted in 86 passages being coded. Six themes emerged from the interview data and each had several sub-themes. Table 5 provides a frequency distribution of the coded passages grouped by theme. Subtheme distributions are presented as part of the discussion of each theme.

Table 5.

Frequency Distribution of Coded Passages Grouped by Theme (N = 86)

Theme	Count
Affordances of course content and course design	28
Recommendations to sustain and improve the course	17
Challenges of course content and course design	13
Ways experience impacted/changed teaching	11
Motivation for learning	9
Ways experience impacted/changed learning	8

Affordances of course content and course design. Affordances within a course are defined as perceptions of relevance and ownership of learning and engagement. When the subjects were asked about the benefits or affordances of the professional development course

(PD), they identified the following six aspects of the EduBadger Course content and design as being effective in supporting their learning. (See Table 6.) Each is described and direct quotes are provided.

Table 6

Frequency Distribution of Coded Passages Grouped by Subtheme: Affordances of Course Content and Course Design (N = 28)

Subtheme	Count	Number of Subjects Represented
Convenience of online learning	10	4
Constructivist learning style	5	2
Choice of learning content	4	4
Content related to district initiatives	4	4
Leveling of badges	3	3
Potential course credit	2	2

Convenience of online learning. The respondents uniformly applauded the convenience afforded by EduBadger Course's online PD platform for its unique ability to be self-paced, happen anytime/anywhere, and the ability to go back to review the content. Sarah states, "I loved learning like that. So, I could be home Saturday morning and just, you know, go through all of the different things that they asked you to do." Jane affirms, "I definitely liked that it was self-paced so I could work at it at two in the morning if I was having insomnia or something. It gave me something to do." Although Maye is used to deadlines and without them "remembering to do it was a challenge", she liked the timeliness of it because she could learn whenever she wanted to or needed to because "sometimes we are just full and we can't learn anymore and sometimes we are just ready to learn something new." She continues to add:

> I could do it in the morning when I got up, or do it at night when I got home. I could do it during the day. It's like the ease of it. I could do it whenever I wanted and it was, I guess, differentiated is the right word, because it wasn't in an all in one big chunk.

And finally, Gwen comments, "I like learning at my own pace, and typically, and this sounds really kind of funny, actually with the technology I can fly right through it." She continues to share, "Well, I really liked that I could just explore on my own time. So, that was one of the big things for me that I could work on it at my own time." She adds, "If you want to take two months on one badge, you can, or whatever you want. And I have told people that I really enjoyed just being able to do it at home, my own pace, my own time."

Maye summarizes:

> For teachers that enjoy professional development or need professional development or are looking for new tools to have in their tool belt, it is a valuable way to set your own pace for professional development.

Another affordance mentioned in the interviews was the fact that online platform allows the learner to go back and review the material if needed. Sarah explains:

> Usually on every single badge you get a tutorial or instructions. If I didn't understand it the first time, I could go back and redo the video or read the directions again. So, I liked that part of it.

Constructivist learning style. The EduBadger Course uses a constructivist approach incorporating activities utilizing varied forms of technology. From Sarah's perspective she, "really liked how it was set up." She further states, "It was more hands on where I could do it myself." When asked to elaborate on the reason, she gave a detailed explanation comparing her EduBadger Course experience to a previous PD.

> We had that kind of professional development where it was kind of like, a teach me something in 20 minutes, where you kind of immerse yourself in something, then see the learning, then you would go out and try to do it with your teachers. So, I loved the way it was set up. I loved learning like that.

Like Sarah's response, Maye states, "If it was just a listen to an educator and then have to do a paper or something like that, it would be difficult for me because I am a hands on learner." She further elaborates:

> None of the badges are sit and get kind of badges. You learn and then you have to do something to reinforce that learning. The good part was that I was actually making something as I was learning. I was creating. So, what EduBadger is great about, I get a little bit of learning and then I have to do something. Then I get a little bit of learning, then I have to do something a little bit harder. That is what is good for me.

Choice of learning content. Choice was another affordance that was identified. Sarah, Maye and Gwen share similar previous PD experiences. Sarah states, "Mostly, they are at a school site because they want you to be accountable so that they want to make sure you are going on a certain day." Sarah likes the affordance of choice that the EduBadger Course provides. She shares:

> They have that YouTube one on there that I am just, I have no interest. YouTube like stuff and slicing video and I am, "I don't want to do that." So, yeah, I love that the fact that I get to choose what my professional development is like so that makes it nice.

Maye agrees with Sarah.

> Sometimes when you get professional development from your district, it's what they want you to have. Or even when you go to conferences, it is very specific to what the conference is about. So, I liked that I could choose. I could choose whatever topic I wanted to work on whether it was Google or Padlet or a new tool. I could choose. The choice was important to me.

Similarly, Gwen says:

> So, when I go to a technology training, I don't always look forward to them, because, just like in a classroom, you are going to tailor your training to the lowest in the classroom, probably, so that no one gets left behind. Especially when you are talking about training staff that can go and train their students.

Jane liked that the badges were all based on technology. She says, "In the ones that I didn't have prior experiences with, they were valuable, because it made me slow down and take the time to

really explore all of the options that were available."

Content related to district initiatives. The incentive to participate in the EduBadger Course is evident within the participants' districtwide initiative to increase teacher's technological knowledge and skills to integrate technology into pedagogical practices. As previously mentioned, Sarah and Maye work in Google Apps for Education schools while Jane and Gwen have one to one Chromebooks. Sarah and Maye's district even provided stipends to teachers as incentives to enhance their knowledge and skills to use technology tools and integrate them into daily teaching practice. The participants referenced the relevance between the purpose of the EduBadger Course and district initiative to increase educator's TPACK.

Sarah mentions that she:

> Really liked the Thinglink badge and kind of liked, the Google Drawing badges because we are a Google Apps for Education school. So, those are some of the things. I like to, I don't know much about so, I like to get in there and learn more about them.

Gwen feels that if she is expected to use technology in the classroom then her students need to know more about technology. Her experience with the initial EduBadger Course, DALLA, is what really started her "wanting to do more with EduBadger." It inspired her to learn more about technology to be able to use it in the classroom and to teach her students about technology use and safety.

Leveling of badges. Most of the EduBadger Course badges are leveled. Leveling was a positive feature that was cited by three subjects. Sarah explains:

> They kind of go on the levels. So, Level 1 is pretty basic, Level 2 is kind of harder, and Level 3 is harder than that. I like how they are leveled because if you don't know a lot about technology that Level 1 might be pretty hard and it might be just as challenging for them as Level 3 would be for me. So, I like that they have the levels.

Jane also likes the levels, "How it started at an easier level then you did more and more complex

things throughout the program." Maye adds, "And there were stages so it wasn't like three or four hours at a time. I could do Level 1 then, I could do Level 2 when I was ready then, Level 3."

Potential course credit. The availability to earn University credits for completing EduBadger Course badges was identified by two participants as an affordance even if the participant did not benefit directly from it. Sarah did earn credit saying, "I love to get credit." Even though Maye "didn't need to" because she was a veteran teacher, but some of her colleagues "liked it because they could get units. It was an easy way for them to get units."

Recommendations to sustain and improve the course. Clear and specific recommendations were made to sustain and improve the EduBadger Course. Recommendations addressed four areas: support to teach basic technological skills to novice learners, badges targeted to lower elementary grades, more badges, and timely feedback (See Table 7.)

Table 7.

Recommendations to Sustain and Improve the Course Sub-themes (N = 17)

Sub-themes	Count	Number of Subjects Represented
Support to teach basic technological skills to novice learners	9	3
Badges targeted to lower elementary grades	3	2
More badges	3	2
Timely feedback	2	2

Support to teach basic technological skills to novice learners. Although the case study participants could navigate the EduBadger Course activities and complete them successfully, three participants expressed concerns for other teachers at their school and district being able to do the same. Jane describes these teachers as "scared of technology", "don't even want to try",

"struggling to even check their email on a regular basis", and have a "hard time when they open their Chromebooks and the computer doesn't turn on automatically." Jane says:

> As a younger person completing the badges, I had no challenges with the technology aspects of completing the course. But I know that out of the other teachers in my school, I am the only one, or there is one other teacher who is my age who completed them, but none of the other teachers were even willing to try because even the most simplest of them were too difficult technology wise for them to accomplish. So, I know that is a struggle at my school site but the people who really should be doing it to get the technology experiences, are too intimidated to even attempt it.

She adds:

> And now that I pull up the leaderboard, I see that a few other people have attempted but only earned one or two badges but, then stopped. The difficulty with them approaching technology kind of made a lot of people just go, "Well, it's not even worth it." I don't think that people that are new to technology would have had the skills to be able to troubleshoot some of the issues.

Jane stated that her district does offer basic technology training but from Jane's perspective, "We run into the same problems of people who are doing those trainings. These are the people who are so comfortable with trainings that they don't realize how basic the basic technology needs to be." Maye mentions that she would like to "expose" and "turn" teachers on to EduBadger "because there are a lot of teachers who would benefit being able to do this." Gwen also mentions experiencing similar challenges associated with a wide variance of staff technological knowledge and skill in her district.

> So, I think that it is more that I find frustrating is that, really at this site, we are dealing with a lot of different levels. We are talking about people that maybe even check their emails once a week if they are lucky. And we are talking about the people who, at the other end of the spectrum that, not just email, who are teaching their kids coding and who are going above and beyond and doing way more with the technology than you would expect even at fifth grade.

To encourage novice teachers to participant in the EduBadger Course Gwen suggests creating a "level below Level 1 or make Level 1 easier or make additional levels so that it does reach those people that are so intimated by technology."

Badges targeted to lower elementary grades. Jane and Gwen would like to see badges that would be more applicable to younger grades such as kindergarten through third. Jane explains, "there wasn't anything that was simple enough that my kindergarteners could be creating." From Gwen's viewpoint:

> Even if it was more of a web-based application, like learn how to use this program and get your kids signed on or logged in or view this site in a student's view so that you know what kids are looking at. For me, when I sign my kids up on a new website I always create a student account just because I want to see what they are looking at. I already know what I am looking. Ah, and then the kids say to me, "How do I do this, and how do I do that." And I don't' know unless I create a student account. So, I think it would be nice to have some badges or something around those lines that, you know, explore this site as a student kind of playing in their sandbox, so to speak.

More badges. Sarah and Maye would like to see more EduBadger Course badges available. The need is there. Maye explains, "Some of colleagues have done every badge available. New badges would be nice. The same ones have been up a long time." Her colleagues suggest offering more badges in Google because they are a Google Apps for Education District. Sarah adds:

> I like the challenge part of it, so if they did something more with Google Docs, or maybe even Google Classroom or the Google Drawing. I like Thinglink or PicCollage, any of those things. I like the SAMR that they did. I had taken a course before and learned about SMAR so, that one was kind of familiar to me but, I would like to learn more about that. If they could ramp up the difficulty or add one more level of something to do.

Maye suggests offering additional levels to some badges and gaming.

> WeVideo, that is something that is new and they just have a Level 1 on it. Oh, maybe using MindCraft in the classroom. Gaming, implement gaming and some ideas for what you could do. That might be a good one. I know a lot of teachers that are interested in that.

Timely feedback. Sarah and Maye address the issues with the timeliness of reviewing work and awarding the badges. Maye pointed out that "the people who are running EduBadger

are very busy so it sometimes takes a while for a badge to be awarded." Sarah suggests that:

> Somebody needs to actually be there to approve the badges and give the feedback because it can be such a fast-paced kind of professional development. If they're going to offer something like this, there needs to be somebody on it all of the time.

Challenges of course content and course design. Challenges within a course are defined as difficulties or constraints. When the subjects were asked to share challenges or difficulties or constraints experienced during PD course, three elements of the EduBadger Course content and design were identified. (See Table 8.)

Table 8

Frequency Distribution of Coded Passages Grouped by Subtheme: Challenges of Course Content and Course Design (N = 13)

Subtheme	Count	Number of Subjects Represented
Criteria for badge levels	6	3
Feedback and approval	4	2
Relevance of learning activities to classroom applications	3	2

Criteria for badge levels. Although participants indicated that they liked the way some of the badges were leveled or scaffolded from basic to more complex, there is room for improvement. Sarah feels that she "could have been challenged more." She says, "I like that they have the levels. I don't know that there wasn't enough." From Jane's perspective, she likes "the leveling aspects on some of them where it worked." She explains:

> Even starting on the Google Drawing Level 1, I ran into frustration. Well, I struggled especially with the Google Drawing badge because they wanted us to draw a self-portrait and the things that I wanted to do as part of my self-portrait weren't possible with the Google Drawing software but eventually, I made it work. I just wasn't very happy with the results. So, I felt that maybe, maybe not all levels were created equal. Like, the Level 1 on one program was extremely

> easy to get through and Level 1 on a different program, just because of the program, maybe, wasn't as easy to walk yourself through.

Maye also believes more levels should be offered. She says:

> There is just so much new stuff out there and I think that some of them, I know that they want to keep them as a 1, 2, 3, but there are some things that could go to Level 4 or 5 on them to make them even more, you know, deep and rich and building on what we learned on the other levels.

In contrast, Gwen thought the *Edmodo* badge was "super easy. Just sign up for an Edmodo account and get approved into the group. That one was almost ridiculous."

Feedback and approval. The lack of timely feedback was another area of frustration identified by two participants. Sarah states:

> Well that's kind of part of my sore thing with EduBadger is that I earned quite a few but I didn't receive them. So, I think at the time I was doing them, there was like 13 or 14 or maybe it was 15 or some number. I had like 12 of them, so 12 out of 15, but they weren't approved yet, so I would go on and I would do it, but I wouldn't actually get the badge for it.

Sarah continues:

> I still have things out there that haven't gotten approved. And you know, I like that gratification where I have, you know, I like to check the boxes and go, "Okay, you've done that, now what can I do?" So, when I looks like I haven't done what I have done it, I am like, "Hey, I did that. I want to get credit for it."

Delay of awarding badges was Maye's one compliant. She argues that:

> It might slow some people down. We are in an instant gratification society, so if they have to wait a couple of weeks to be validated for the work that they did, it would probably be less likely that they would go back in and work on it.

Relevance of learning activities to classroom application. The teachers interviewed taught at the early elementary levels. Jane and Gwen found that many of the badges offered were not relevant to their students. Jane "struggled because a lot of the activities were things that" she could see "upper grade levels accomplishing in their classrooms" but she could not. There wasn't a lot that was something my kindergarteners could ever accomplish." She goes on to say:

> If did use it in my classroom, it would be something that I would do to show to the kindergarteners but not something that I could engage kindergarteners in doing their own creating. Which I think is kind of the goal, is to eventually get it out there so that the students are creating these things.

As a second-grade teacher, Gwen shares the same concern regarding the badges offered.

> I liked them. I felt that they were valuable. However, I felt like they would have been more valuable at a different grade level. Second grade, like I said, we pretty much stick to about 10 different web-based applications. I don't go too far into things. So, I felt that some of these apps, and especially the ones that were specific to iPads that we don't have in the classroom. Those, I tried to avoid because I wanted to do something that would hopefully be of use to me.

Ways experience impacted/changed teaching. When asked how the Course experience impacted/changed their teaching the teachers indicated that the experience impacted/changed their teaching in multiple ways. (See Table 9.)

Table 9

Frequency Distribution of Coded Passages Grouped by Subtheme: Ways Experience Impacted/Changed Teaching (N = 11)

Sub-themes	Count	Number of Subjects Represented
Implement things learned	7	4
Differentiating instruction	2	1
Improvement in use of instructional strategies	1	1
Feedback and assessment	1	1

Implement things learned. All of those interviewed expressed that they would use what they learned in their teaching. As an instructional coach, Maye believes:

> There were tech tools that I could take straight to my classroom or to my teachers. There were things that were kid friendly so, once I knew how to use them I could push them out to teachers or students that I was working with.

Sarah also utilizes what she learned to support other teachers.

> Like I said, at the time I was doing EduBadger I was an instructional coach for second and third grade. So, I would take what I know and then I could go show all of my second and third grade teachers, which was about 26 of them, so they got exposed to everything that I got exposed to.

For Jane, the experience made her "think a lot about ways to get technology" into her classroom more. She could "see herself creating books for her class" or having her class "work in a small group to create books that they wanted." She adapted Book Creator, Google Slides, and WeVideo down to the kindergarten level, creating clips of her students reading books. She "put it all together" herself to show their parents.

Gwen likes to learn new things, especially with technology. She wants to enhance her knowledge and skills in order to support other teachers not as technologically savvy as she is.

> I am one of the younger people on my staff and people come to me with a lot of tech issues. So, I feel that maybe if I explore a little more on my own maybe, when somebody comes to me and says, "Oh, I have this problem," then I felt that I can help them. Not that I am obligated to, but it's just how I feel.

Differentiating instruction. Sarah benefited from the badging experience by teaching her students different ways to do something. She explains what she liked about the badges.

> From what I get from the EduBadger badges, is mostly like how I can teach my kids or how they can do something in a different way. So, like you probably know, it is a little more technology based so, I have all of this technology that I can then send out to my kids or show them on different aspects.

To give an example, she says her students love using iPads, learning new apps, and learning different ways to show how they know something. She shares:

> That is always a good thing when they can have just one more tool in their belt to show me what they know. Because sometimes they get their favorites and they will want to do just that one thing. So, it's always nice for them to have options.

Improvement in use of instructional strategies. Gwen had her second graders use Google Docs and Google Slides last year and they did very well. She reflects:

> It kind of made me stop and go, "Okay, we really need to do this one step at a

> time and everybody move your mouse to, you know, to this new document or whatever" so that is it something that they are really learning and not just me clicking for them.

Feedback and assessment. Maye used a technology tool that she learned to collect feedback from her teachers. As an example, she states:

> I was able to use Padlet in my trainings for teachers to provide feedback on my trainings or to create and then post to a Padlet that we all had access to. So, I'll learn something here then take it to a training and either get or like I said, use it to get feedback.

Motivation for learning. Both self-motivation and extrinsic motivational factors were identified as reasons for participation in the EduBadger Course experience. (See Table 10.)

Table 10

Frequency Distribution of Coded Passages Grouped by Subtheme: Motivation for Learning (N = 9)

Sub-themes	Count	Number of Subjects Represented
Self-motivation	5	4
Extrinsic motivational factors	4	4

Self-motivational factors. As previously addressed in the case descriptions and exemplified by Sarah's statement, "I love that kind of stuff", technology was a high interest topic for all teachers in the case study. Maye added, "the joy was or the good part was that I was actually making something as I was learning." They were self-motivated to participate in the PD to learn more about technology. As with Jane, Gwen is "one of two people" at her site that "was actually willing to try this." They expressed personal joy from learning technology. Sarah says, "I loved going through the challenges and checking off those boxes, creating all of the things that

I created so, I was pretty proud of that." And Jane struggled but persevered to earn a challenging Google badge.

> They wanted us to draw a self portrait and the things that I wanted to do as part of my self portrait weren't possible with the Google Drawing software but eventually, I made it work. I just wasn't very happy with the results.

For Gwen, the experience brings status.

> As far has having done this, I found it to be valuable and I felt like it kind of set me apart from the rest of the staff because, in a way, this was a little above and beyond. This wasn't required. It was something that was introduced to the entire district. Some people took it and ran with it. Some people said, "Oh, I am going to pass on this."

Extrinsic motivational factors. Extrinsic factors were also identified as motivational factors for the participants. As previously mentioned, Jane and Gwen's districts offered $500.00 stipends if they completed ten EduBadger Course badges. Although the EduBadger Course was part of a district initiative, participation was not required. They each earned 10 badges to receive monetary compensation. Sarah and Jane also liked the competition aspect of the badges. They both made references to the leaderboard, a visual display of badges earned by the participants in their districts. Sarah says, "I did like the leaderboard because I like doing those kind of challenges. So, I like that instant gratification and I like the competition part of it and seeing where I am at on the leaderboard." Jane also appreciated the leaderboard. Jane says, "With the one other co-worker, I was able to see, it was fun to try to, you know. I am friends with her, so we would compete almost to get more badges and points."

Ways experience impacted/changed learning. The interviewed participants cited several ways in which the EduBadger Course PD experience impacted or changed their learning. (See Table 11).

Table 11

Frequency Distribution of Coded Passages Grouped by Subtheme: Ways Experience Impacted/Changed Learning (N = 8)

Subtheme	Count	Number of Subjects Represented
Deeper understanding of content	3	1
Increase comfort level with technology tools	3	1
New ideas to implement	2	2

Deeper understanding of content. For Sarah, the EduBadger Course experience enhanced her learning, taking it to a deeper level. The experience helped her to "take a little bit more risk" than she would have if she was "just exploring it on her own."

> I love the fact that some of them were some things I have done already, so then I could go back and kind of delve deeper into to it. One of them is the Book Creator. I have heard about the apps and seen it a few times but I have never actually myself did a book myself. And so, I liked that part of it, where I get to go in a dig a little deeper even if I know a little bit about it already. I get to go and challenge myself and learn new things in different ways.

Increase comfort level with technology tools. As a teacher on special assignment, Maye understood that it was essential to increase her technological knowledge and skills and "be more comfortable with this sort of thing" to support her teachers. She admits:

> Oh, I am really weak in this and see something new to me. WeVideo is something that is new to me. So, I am probably going to go in and do WeVideo Level 1 just so I can know about WeVideo. Because it's on EduBadger, teachers are probably or administrators see that this is something that they want them to use so, I want to be versed on it.

She adds. "And I am looking at the badges like Padlet or Google Book Creator, that is something that my kindergartener teachers use. So, I need to know it before I can push it out to them."

New ideas to implement. For Jane and Gwen, the experience introduced them to new things. The badges that Jane did not have prior experience with were valuable to her learning. She comments, "because it made me slowdown and take the time to really explore all of the options that were available." Gwen as well expressed that she is willing to try new things.

> Um, for me, the technology, like I have said, I have always enjoyed but, I kind of stuck to the things that I know whether it is web-based applications or anything else. I kind of stick to what I know and I understand that it is fairly common for a lot of people. But, then after doing the EduBadger, I felt like, "Hey I could branch out a little bit and I could do this." Even though I don't like the Google Drawing app, I could still use it. And I found a couple of other applications that I could use within the classroom as well.

Summary

The responses from the survey, open-ended questions, and interviews of EduBadger Course badge earners generated key findings that contributed to the understanding of Open Badging as a worthwhile PD offering in LEAs to enhance educator's technological competencies. A sample of 10 educators responded to the request to participate in the Open Badge survey. Four of the educators agreed to participate in follow-up interviews.

The findings from the quantitative data reflect participants as a collective group according to the data from the survey sections which included: description of survey participants, the EduBadger Course PD design characteristics, knowledge of instruction and technology, and lastly, open-ended survey responses. The descriptive data generated a general profile of the participants. The participants were experienced teachers, except for one administrator. As a group, they earned a diversified number and range of badges. In general, the participants were avid course fans but had little interest in recognizing and/or displaying badge achievements elsewhere. The data from the PD design characteristics and generated from the open-ended responses found that the participants valued PD, valued that the course was aligned to district

priorities, and valued the attributes associated with online learning, such as self-paced and the convenience of anytime/anywhere access. They appreciated many of the course design principles that provided autonomy, such as choice and personalized goal setting along with a variety of learning pathways that progressively 'chunked' the learning. The benefits of a constructivist approach to learning was evident in their survey and open-ended responses. Recognition of achievement from external sources, such as districts or universities, were not priorities. Common issues from the participants dealt with assessment, such as lack of and slow turnaround to award achievements, badges offerings not purposeful to the grade levels taught, and mechanical difficulties. Regarding TPACK, the earners had a good grasp in the areas of content knowledge (CK), pedagogical knowledge (PK), and pedagogical content knowledge (PCK) within the subjects taught. Although the participants agreed that the course helped them to learn technological pedagogical content knowledge (TPACK), identified areas of need focused on technology, such as technological content knowledge (TCK) and technological pedagogical knowledge (TPK).

Thematic analysis from the interviewed participants resulted in 86 passages being coded. The qualitative findings from this exploratory study showed the emergence of six themes related to the use of digital badging in the workplace of educational institutions to support practitioners to integrate technology into pedagogical practices. The six themes were: affordance of course content and course design, recommendations to sustain and improve the course, challenges of course content and course design, ways experience impacted/changed teaching, motivation for learning, and ways experience impacted/changed learning.

Chapter Five reviews the purpose of the study, conceptual foundation, and methods used. It restates the research questions and the findings before addressing the conclusions. Study

limitations and closing comments are presented and implications and recommendations for further study are provided.

Chapter Five: Study Conclusions and Recommendations

This chapter reviews the issue and purpose of the study, its underlying conceptual foundation, and the methods used to answer the research questions. Discussion of finding implications are organized by the conclusions of the study followed by recommendations for both practice and scholarship. Study limitations and arguments for internal study validity are presented along with a few closing comments.

Study Issue and Purpose

The purpose of this collective case study was to explore the utility of an Open Badge, EduBadger, to be recognized as a viable alternative professional growth opportunity LEAs to improve educators' technological knowledge and skills. The goal of this research was to generate a detailed case description, identify participants' self-assessment understanding of the relationships between technologies, instructional strategies, and content taught, and to identify and define those attributes that are deemed important or not useful to EduBadger Course earners that participated in the study. Feedback is necessary "about the system early in the process" (Grant, 2014, p. 44) to iterate the badge system to enhance its purpose for its intended audience. Since EduBadger is still novel, it most likely will go through several iterations of refinement as it expands. Research questions include:

1. What are the earners' knowledge and skills to teach with technology?
2. What are the earners' perceived affordances of a digital badge approach for technological professional growth within the workplace?
3. What challenges do earners describe as a result of participating in a digital badge approach for technological professional growth within the workplace?

Overview of the Conceptual Foundation

The conceptual foundation for this study comes from the features of the digital badge design system as defined by the Design Principles Documentation (DPD) Project and the theoretical frameworks of constructivism and constructionism and technological pedagogical content knowledge (TPACK). The design principles identified by the DPD Project (Hickey et al., 2014) provide the structure to determine the affordances and challenges of the EduBadger Course experience from the perspectives of its earners. Relevant learning theories of constructivism and constructionism are considered as they relate to the implementation of technology such as digital badges for professional learning in the topic of educational technologies. The EduBadger Course incorporates a constructivist approach where the earner is consciously engaged in creating artifacts that involve technology in the making as knowledge is gained. While the means to construct something in a social context is missing, the potential to use a constructionist approach is apparent. Lastly, Mishra and Koehler's technological pedagogical content knowledge (TPACK; 2006) is used to address the effectiveness of the EduBadger Course experience to support the integration of educational technologies into K-12 instruction from the earners' perspectives.

Review of Methods

A collective case study design using mixed methods was used to allow the researcher to explore the research questions to generate a thorough case description. Data were collected from multiple sources: (a) survey data from Edubadger Course badge earners regarding their perceptions about digital badges (b) interviews with volunteer survey participants to explore their viewpoints further to inform badge practices and (c) a journal consisting of the researcher's memos containing thoughts, comments, and insights, new issues, and emerging questions. Due to

limited research on professional development (PD) as it relates to technology integrated teaching and learning and the emergence of Open Badging, much of the survey instrument for this study was developed by the researcher. The researcher drew questions for this section of the survey from the research of experts in the field of online PD, TPACK, and digital badging design principles. The survey consisted of four parts: (a) 10 participant demographic and descriptive questions; (b) 26 Likert scaled statements regarding the participant's perceptions about EduBadger Course PD design characteristics; (c) 27 Likert scaled statements to capture the earner's self-reported knowledge and skills to teach with technology; and (d) five open-ended questions to provide more detail about the earner's EduBadger Course experience. For each Likert scaled statement the participants indicated their level of agreement on a 5-point scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). A self-administered electronic survey administered through Qualtrics was sent via email from an Educational Technology Coordinator to all 57 EduBadger Course badge earners that completed at least one badge within two of the five county office of education within Region 1. The email contained a link to the study informing them of the purpose of the study and an informed consent. Data were collected anonymously and confidentially via Qualtrics. A total of 10 participants completed the survey. The data were imported into an Excel spreadsheet to allow for analysis of the findings.

To further explain the survey responses, survey participants were asked if they would be willing to be contacted for a follow-up interview at the end of the survey. If they agreed, they were linked to a new form, which provided consent information including intention to audiotape the interview and a request for contact information for interviews to be scheduled. The interview consisted of three demographic questions and 14 open-ended questions. Four interviews were

conducted and recorded using a digital recording device and conducted using a landline telephone with speaker capability. The interviews were transcribed by the researcher using the software program, HyperTRANSCRIBE and reviewed for accuracy. The transcribed data were then imported into HyperRESEARCH for coding and analysis. Using inductive open thematic coding process, qualitative data were reviewed multiple times to identify emergent thematic categories along with notes taken during the interview. The frequency of themes within the aggregate data were calculated as part of the descriptive statistics. Thematic coding was organized in graphic and narrative format representing themes and direct statements from subjects. (See Appendix J for codebook.)

Summary of Findings

Due to the study's small participant response, the results cannot be generalized to a larger population. The findings offer a view of the experience of this specific group with digital badges for professional growth in educational technologies. The findings reveal the affordances and challenges of the course experience from the viewpoints of the participants of this study. Acknowledging these affordances and challenges can help the designers of the digital badge in its refinement process as it expands to support more LEAs.

The quantitative findings from the survey provided descriptive statistics of the survey participants followed by findings generated from the EduBadger Course content and design principles and research on PD that focused on educational technology skills in the context of curricular needs. These findings were categorized into three areas: (a) recognizing learning, (b) motivating learning, and (c) assessing learning to capture the participants' perceptions about EduBadger Course PD design characteristics. The third section of the survey captured the earner's self-reported knowledge and skills to teach with technology. The findings were

organized by the seven domains of TPACK. The open-ended questions provided more detail about the earner's EduBadger Course experience and were addressed individually.

The qualitative findings from the semi-structured interviews showed the emergence of six themes related to the use of digital badging in the workplace of educational institutions to support practitioners to integrate technology into pedagogical practices. The six themes were: (a) affordance of course content and course design, (b) recommendations to sustain and improve the course, (c) challenges of course content and course design, (d) ways experience impacted/changed teaching, (e) motivation for learning, and (f) ways experience impacted/changed learning.

Conclusions are supported by the findings as evidenced in the data collected through the online survey and interviews conducted with EduBadger Course participants and the research journal. Conclusions are organized and discussed as they pertain to each of the research questions. The findings are expanded upon and associated to existing literature.

Research Question One Conclusions

Research question one asked, "What are the earners' knowledge and skills to teach with technology?"

Conclusion #1: EduBadger course experience contributed to the development of TPACK. The EduBadger Course content is educational technologies itself and is open to administrators and teachers from all education majors from K-12, making it difficult to teach TPACK that are specific to each content area (e.g., mathematics, English, science, and social studies). TPACK is a type of knowledge that supports content-based technology integration. TPACK requires educators to consider content, teaching strategies, and available technology simultaneously within their learning environment (Koehler & Mishra, 2008). This kind of

decision-making stems from prior learning experiences. Prior knowledge of content knowledge (CK), pedagogical knowledge (PK), and pedagogical content knowledge (PCK), contributes to educators' TPACK. Participants had sufficient knowledge to address and present the concepts and facts to support the content they teach, to understand the theoretical focus of how to teach, and to recognize the optimal way to instruct a specific content based on the breadth of the content and appropriate ways to address parts of the whole. The research of Abramovich et al. (2013) found that prior knowledge of these skills leads to higher badge completion and willingness to complete badges.

The survey participants agreed that they possessed the ability to master the knowledge needed to instruct with technology, that the training materials and activities helped them to gain targeted technological skills, and that activities allowed time for cumulative study of learning how to implement technology into teaching. However, teaching of technology is not in isolation. The purpose of the learning activities of the EduBadger Course was twofold: to teach the content of technology and to support educators in connecting curriculum badge learning goals with content age specific learning activities and appropriate complemental technology tools. The Course experience provided "exposure to new technology", increased "personal knowledge of different education technology", and engagement "to try new things". The EduBadger Course experience extended the learning taking "it to a deeper level" to explore "a little more and maybe take a little bit more risk." The Course experience enhanced participants' ability to master the knowledge needed to instruct with technology.

According to Voogt et al. (2013), TK can predict educators' technology-related self-efficacy and connect to their use of technology in the classroom. Self-efficacy refers to one's confidence to complete a task. Participants became "more confident using the apps/programs

included in the training", "comfortable with technology", and explored the use of technology that they "might not have tried without doing it" first. A study by Wozney, Venkatesh, and Abrami (2006) found that one of the two greatest predictors of educators' technology use were teacher confidence in the ability to use technology to meet instructional goals. To summarize, the EduBadger Course participants understood the processes and utility of technology as a teaching tool as exemplified by their TK in the TPACK framework.

The beauty of the TPACK survey tool is that researchers can use it to identify and measure specific domains (Rahmany, Sadeghi, & Chegini, 2014) therefore, those specific areas of need can be addressed. The TPACK data identified two domains of technology instruction for further inquiry: which tools align with content and appropriate technology and an awareness of the existence and capabilities of technology for use in teaching and learning activities. Traditional approaches of teaching CK, PK, and PCK do not apply for educators attempting to integrate technology because they do not consider strategies for suitable technology tools for specific contents. Inservice educators have existing CK, PK, and PCK on which to build (Harris & Hofer, 2011). What they typically lack is technology knowledge and the ability to connect the technology being used and the subject content being taught (Hew & Brush, 2007). Research Question 3 addresses possible implications of survey data collected addressing the domains of TCK and TPK.

The participants unanimously agreed that the EduBadger Course experience enhanced their technological pedagogical content knowledge. Mishra and Koehler (2006) have argued that teachers with a well-developed TPACK make instructional decisions that reflect consideration of content, pedagogy and technology. Participation in the Course led to perceived positive impact of technology skills and ability to support integration of educational technology in the classroom

(TPACK). As one survey participant summarizes, “Training materials helped me to gain technological skills, activities allowed time for cumulative study of learning how to use technology tools, and how to implement technology into my teaching.”

Conclusion #2: EduBadger course experience motivated earners to continue learning a variety of technological skills. The constructivist approach, access to levels of badges, and game like design features were motivating factors to gain technology skills.

***Constructivist approach*.** The EduBadger Course uses a constructivist approach incorporating activities utilizing varied forms of technology. The constructivist approach goes beyond using technology to speed up teaching the same thing, the same way. It allows for the adoption of new and “better approaches to instruction and/or change the content or context of learning” (Lawless & Pellegrino, 2007, p. 581). Participants cited that the Course was “engaging and fun”, they “could take something new learned and incorporate it”, and they could “create projects” that “kids can do as well.” The Course participants understood how to use technology to facilitate meaningful learning, learning which enables learners to construct deep and connected knowledge, that can be applied to real situations.

***Leveling of badges*.** Most the EduBadger Course badges are tiered or leveled. The levels of micro-achievement can function as stepping stones or assessment points in the earners’ learning progression. The earned achievements represent the degree that earners have accomplished learning goals, assessing the growth in earner’s skill development (Hickey et al., 2014). While the badges themselves are not divided into levels, the badge achievement is based on the level of difficulty and skill required. For example, in Level 1, the educator is the learner to gain basic knowledge of the technology tool, Level 2 is the application in the classroom or learning environment of the newly learned technology tool, and Level 3 is the application in the

classroom or learning environment of the newly learned technology tool and its more advanced features. The leveled system provides a framework to scaffold earner learning to gain increasingly more complex skills and knowledge.

Leveling of EduBadger Course badges motivated the learners. It is evident in the survey open-ended survey items, and interview item responses. Participants agreed that being able to begin and work at their own level of expertise was an important aspect of participating in the EduBadger Course. By adding tiers to a badging system, earners can "find benchmarks in their learning and mark smaller accomplishments within a badge" (Hickey et al., 2014, p. 74) before tackling Level 3 and/or moving on to a Quest. Leveling of badges allows for a learning trajectory that is visible to both the earner, issuer, and consumer of the badge.

Game like design features. The EduBadger Course employed the use of game inspired feedback loops to keep earner interest by encouraging active participation through the creation of a game. These game design features included a leaderboard and a point system. The EduBadger Course automatically displays the earners' badges and points on the EduBadger's website so that the users can see which badges their colleagues earned. The participants of the study agreed that game like design features encouraged them to compete with other EduBadger Course earners. According to Zicherman and Cummingham (2011) as cited in Ahn et al. (2014), from a gamification view point, an inherent assumption is that an external icon such as a badge, can act as a motivator to encourage individuals to participate, act, or pursue tasks. The features of the leaderboard and using a point system to award badges created competition among members of the group. These features were deemed favorable by the participants. Critics of digital badges argue that motivating learning through gamification of technology place focus on the points rather than the ideas in the game (Resnick, 2012). This viewpoint is supported by the work of

Deci (1971) who argues extrinsic motivators inhibit intrinsic engagement in learning activities. More research is warranted into the learning conditions that are assumed effective but are not well understood in practice (Wang & Hannafin, 2005).

Research Question Two Conclusion

Research question two asked, "What are the earners' perceived affordances of a digital badge approach for technological professional growth within the workplace?"

Conclusion #3: EduBadger course experience increased access to learning opportunities. The affordances of convenience and customization offered by the Course contributed to increased access to learning opportunities.

Convenience. EduBadger Course earners value the PD because of its convenience. This affordance is a core feature of online learning environments. EduBadger Course PD offers the convenience of an anytime/anywhere learning environment and the ability to self-pace. The research of Grant (2014) alludes to a "new culture of learning" (Thomas & Brown, 2011, p. 18) where learning takes place across multiple spaces in tandem with former Secretary of Education Arne Duncan's (2011) philosophy regarding learning in our digitalized world, postulating the "need to recognize these places in schools, colleges, or adult education centers, or in after-school, workplace, military, or community settings" (para. 14). Maye recommended during the interview that LEAs take advantage of what she called, "pajama time professional development."

Online learning can provide unrestricted access to materials giving learners more time to play with technology which builds self-efficacy (Somekh, 2008). In addition, it gives learners the ability to review materials when needed, such as videos, tutorials, and presentations.

Customization. Customization was an affordance captured through survey open-ended responses and the interview reflections. Customization allows learners to choose what they need

to meet their goals. Gamrat, Zimmerman, Dudek, and Peck (2014) argue that customization through technology enhanced learning promoted by the workplace is important to learner empowerment.

To summarize, comments from participants validate research advocating for new forms of traditional PD. New forms of PD can provide targeted enhancements of the skills each educator needs in a way that more traditional PD cannot (Dabner, Davis, & Zaka, 2012). As Borko (2004) proclaims, a one-size-fits-all approach does not reflect the learning necessary as teachers implement tools and content into their practice (Darling-Hammond et al., 2005). Prominent scholars, such as Ito, Jenkins, and Seely Brown (Davidson & Goldberg, 2009; Grant, 2014) acknowledge the increasing amount of learning taking place outside of traditional formal settings. Research for online learning advocates that learners are freer work at their own pace, learn actively, and review materials more often than in face-to-face courses (Leh & Jobin, 2002).

Research Question Three Conclusion

Research question three addressed, "What challenges do earners describe as a result of participating in a digital badge approach for technological professional growth within the workplace?"

Conclusion #4: Modifications are necessary in order for the EduBadger course to be effective. Participants identified key challenges during the Course experience: frustration with lack of timely assessment of learning, constraints resulting from the rigor and management of badge levels, lack of relevancy of badges offered, and difficulties with mechanics/operational features of badges. Changes are necessary to ameliorate them.

Earners experience frustration with lack of timely assessment of learning. *EduBadger Course* badges recognize some type of learning, but for that learning to have merit, it must be

assessed (Hickey et al., 2014; Olneck, 2014). There was general agreement that one of the biggest challenges during the Open Badge Course was lack of timely feedback. The credibility of a badge is diluted for the earner (educators), the issuer (Region 1) and the consumer (institutions of higher education and LEAs) when it is not assessed (Grant, 2014; Olneck, 2012; Young, 2012). Furthermore, without it, its value is no different than a certification of completion of "credit hours" (Brown, 2013, p. 30). Participation badges may serve a purpose (Grant, 2014) but the EduBadger Course badge earners were not interested in achieving badges for the sake of achieving badges. Most educators surveyed and interviewed valued the materials and the activities and 80% intend to earn more EduBadger Course badges.

Earners expressed constraints resulting from the rigor and management of badge levels. As previously explained, there are three tiers or levels of EduBadger Course badges to learn a specific type of educational technology tool requiring the completion of progressively more complex tasks. The challenge is making sure that the learning required at each badge level consistently follows the same criteria established for that level of the badge. For example, earners expect that similar skill level criteria to master Padlet Level 1 is comparable to master Pixlr Level 1 and Thinklink Level 1 and so on. This was not the case for many participants. These factors influence how earners are motivated to participate in the badge system (Hickey et al., 2014). Lack of establishing clear expectations is problematic. Without agreement, as to what Level 1, Level 2, and Level 3 is or how it can be measured, makes it difficult to determine when successful completion of the badge has taken place (Davies, Randall, & West, 2015). When there is inconsistency, the rigor of the badge system is questioned. The criterion for each level of the badge must be consistent, clearly communicated, and transparent. When a learner obtains a

badge, others can understand how the badge was achieved and what knowledge, skills, and experience the earner gained.

The tiered or leveled structure is an advantage for the earner because the learning is scaffolded. Mastery of a complex concepts such as the domains of TPACK can be broken down into smaller, obtainable knowledge components or skills. The participants address a prominent concern addressed in the literature. Educators lack sophisticated knowledge and skills to foster effective technology integration (Kadijevich, 2012).

The interaction between content, pedagogy, and technology along with the learner and context is complex. Design considerations affect learner motivation (Schenke, Tran, & Hickey, 2014). Leveling allows flexibility to meet the needs of diverse learners. Creating multiple pathways to earn the same badge is a viable option for consideration. Strategic consideration of the granularity of achievements represented at each level of the badge leveling may encourage reluctant learners to develop new technological skills and knowledge (Devedžić & Jovanović 2015).

Earners complained that badges were not relevant or meaningful to them. The results of the Badges for Lifelong Learning (DML, 2011) projects found that while there is no right number and type of badges, they should be contingent on the instructional goals established by its organization (Grant, 2014). Therefore, EduBadger Course badges should be conceptually based according to their learners, content, and contexts with a local K-12 education agencies. Earners complained about the lack of badges applicable to the grade level taught. Rughinis (2013) warns of the importance to associate badges with meaningful/relevant entitlements. As the novelty of the EduBadger Course wears off, attracting new educators onboard may be a problem if the badges lack relevance and meaning to their target population as well as the

sustainability of the program. Furthermore, as chains of badges can reflect diverse learning pathways, the analysis of popular badges earned and those avoided indicate areas of high interest/need and those that need to be redesigned (Casilli & Hickey, 2016). The ultimate outcome of the EduBadger Course is for teachers to recognize and meet student learning needs. Research by Ottenbreit-Leftwich (2007) demonstrated that when teachers witnessed the impact of technology on their students' learning, they were motivated to experiment with additional technologies in their teaching.

Another complaint identified by participants was that some badges required technology tools not available to the students in their district, some required the earner to learn a third-party app, and some badges required purchasing apps or software. The neutral scores of 'neither agree nor disagree' from the self-reported TCK (M = 3.73) and TPK (M = 3.99) may reflect inadequate opportunities to learn technology that was applicable to the grade level/content taught and/or limited access to technology tools required to earn certain badges. However, more inquiry is needed.

Earners reported difficulties with mechanics/operational features of badges. Another significant finding from the Badges for Lifelong Learning project was that user experience generated the most disconnect comments (Grant, 2014). Technical limitations can cause user frustrations and discourage a learner from earning a badge. Survey participants experienced a variety of challenges from interpreting directions, navigating websites, and following operational procedures. A lesson learned from the participant responses is do not make assumptions about learners. Get feedback and engagement early on or the system is likely to fail. (Grant, 2014).

Recommendations for Practice and Further Study

The following are recommendations for practice and further study generated from the

research. Lessons learned from EduBadger earners can assist Region 1's educational technology specialists in the iteration process and future Open Badge entrepreneurs in the design planning process to avoid similar obstacles.

Recommendation #1: Build a solid conceptual foundation of open badges. The creators of *EduBadger Course* did their due diligence to design a PD course aligned to educational agency priorities and initiatives to expand technology integration in K-12 classrooms as reflected in the NETP and the adoption of the CCSS. This alignment was an important attribute to EduBadger Course participants along with the fact that it was valued by the participants. As technology is now considered by most educators and parents to be an integral part of providing high-quality education (U.S. Department of Education, 2003) and technology tools are constantly changing (Ertmer & Ottenbreit-Leftwich, 2010), PD to support educators with well-developed TPACK is of utmost importance (Harris & Hofer, 2011). Building a sustainable infrastructure involves many facets within an organization and stakeholders outside of the system (Grant, 2014).

One facet is the understanding of the concept of open badging. All stakeholders involved in the badge system need to be familiar with the concept of badging and to continue to learn throughout the process (Grant, 2014). In the case of EduBadger, the stakeholders include Region 1, institutions of higher education, educators, students, and parents/families. Badges are catalysts to promote a shared understanding through rich conversation for discussing data, assessment, and technology. Once this goal is accomplished, the EduBadger leadership team may decide to educate potential stakeholders beyond the bounds of its immediate ecosystem.

Although the participants in the study saw value in earning recognition for the competencies mastered, they did not see value or have interest in sharing their badge

achievements through social media platforms. Only 10% plan to display EduBadger Course badges in the Mozilla Backpack, 20 % plan to display EduBadger Course badges on social networks, and 30% plan to list EduBadger Course badges on a curriculum vitae. The data support key findings from a report conducted by Digital Promise (Grunwald Associates LLC & Digital Promise, 2015). The researchers found that 15% of educators were even somewhat familiar with the concept of open badges and educators were not very interested in displaying earned digital credentials through social media platforms. This is another facet worth exploring to ensure the future sustainability of the EduBadger Course.

One of the interview questions asked, “How much do you know about Open Badging?” Quotes from Jane, Maye, and Gwen follow. Jane “didn't’ know anything about it”, Maye knew “little”, and Gwen “very little” and was confused that she probably “didn’t know much about it at all.” Sarah was the only interviewed respondent who had extensive knowledge about Open Badging and had won first prize for earning a digital badge at a CUE conference. The other respondents expressed lack of knowledge about the concept of Open Badging. The data from this study show that it was internally valued by the participants in the study but not externally. The findings of this study support a key takeaway from a report from Hickey, Willis, and Quick (2015). The study found that digital badges are not widely valued yet by educational institutions and in turn, not yet widely valued by learners. The perceived value of digital badges is a problem so, it makes sense to intentionally target ways to promote the EduBadger Course from all constituents of the ecosystem. Exploring marketing tools to promote its visibility within and outside of its ecosystem would be advantageous to the survival of the EduBadger Course.

Recommendation #2: Leverage educators within the ecosystem. Another facet from a different study, the DPD Project, points out that one of the obstacles of recognizing a

constructivist style of learning is that it often requires the development of specific assessment practices such as rubrics to generate evidence of learning (Hickey et al., 2014). The Course applies a constructivist approach style of learning and requires a human to assess the learning products. The frustrations faced by the participants were not a badge problem but an assessment problem as assessments of competencies are time consuming and costly. The educational technology specialists placed themselves in the position of technology support for the educators using their system. It makes sense that as more educators participate in a program and explore more badges, timely feedback to award badges becomes an obstacle due to limited staff.

One consideration for supporting and managing badges is the use of instructional coaches to support novice technology users. Instructional coaches, sometimes referred to as teachers on special assignment or TOSAs, are typically content area specialist (e.g., mathematics or English language arts). In the digital era, this type of structure is diverged from the "new culture of learning" (Thomas & Brown, 2011, p. 18) where instructional decisions reflect consideration of content, pedagogy, and technology (TPACK). In this study, the participants agreed that they had CK, PK, and CPK, therefore, traditional content-specific coaches would not enhance their pedagogical practices in the domains of TP, TCK, and TPACK. Participants interviewed exhibited leadership qualities desired in coaches. All but Gwen stated they currently were or had been in a leadership role as an instructional coach or on a special committee. However, Gwen felt that the EduBadger Course experience set her "apart from the rest of the staff because, in a way, this was a little above and beyond. This wasn't required." Sarah, Jane, Maye, and Gwen were perceived as the "go to" technological savvy educators on their campus, assisting fellow colleagues with technological problem solving. The expertise of Sarah, Jane, Maye, and Gwen could be leveraged to support the EduBadger Course as instructional coaches. Educators, in need

of assistance, could observe them teaching and in turn, the coaches could observe them in their own classrooms and provide feedback. These opportunities could take a variety of forms. For example, video-taped lessons, tutorials, and coaches leading discussions about elements to design a TPACK lesson depending on the desired outcome, technology tools for consideration, and student engagement and learning. The coaches could also provide formative assessments to earn a badge through authentic activities. This framework requires strong commitment from administration beyond the capacity of Region 1 but is a viable option worth consideration.

Recommendation #3: Develop a sense of community. The EduBadger Course is composed of online tutorial-based videos in which participants learn how to use educational technology tools. The participants are expected to use knowledge learned to effectively integrate the technology in their classroom through the lens of TPACK. Without face-to-face interaction with an instructor and/or colleagues, the earners must navigate through tutorials without human interaction therefore, scaffolded supports, discussion, and sharing that are typically provided by a facilitator and/or peers are not present in this form of online learning. Although the EduBadger web-based leaderboard allowed learners to associate and gain status within the group by earning badges deemed valuable, it was not designed as a space for shared collaboration. Results from the survey showed that the participants neither agreed nor disagreed that the leaderboard was used to collaborate with other EduBadger Course earners, encouraged them to virtually network with other educators within their district, or encouraged them to virtually network with other educators outside of my district. Lack of human interaction restricted opportunities for social connectivity as exemplified by a participant, “We are in an instant gratification society” that expects immediate access to information afforded by digital tools. In addition, some participants complained about lack of staff support to troubleshoot technology issues that will hinder “people

who are uncomfortable with technology from using the EduBadger system."

The data suggests that mechanisms are needed to support purposeful collective participation. The work of Hickey et al. (2014) concluded that badges work better where learning is social and networked. The integrated technology course based on the design of Mozilla's Open Badges creates a space for learners to share their expertise and experiences in both formal and informal spaces (Goligoski, 2012). Region 1 could create a similar space providing opportunities for collegial discussions, collective inquiry, and collaborative reflections. One way is to begin to build out the ecosystem for digital badges to include the consumers, in this case, LEAs in synchronous face-to-face environments. This should not be a difficult feat since the EduBadger Course is aligned to the initiatives of the LEAs. Standard practices with the County Offices of Education within Region1 are conducting professional learning communities (PLCs) where educators pursue a clear and shared purpose for student learning. Educators could meet in grade level teams where educators can discuss students, curricula, assessments, and resources shared. This design is not new as supported in the research of Garet et al. (2002) who promote its advantages to afford a space for educators to engage in discussion about shared students, assessment practices, and curriculum within a common LEA.

In the process of gaining digital badges to exemplify the integration of technology, educators could embark on a constructionist journey of building, sharing, and versioning knowledge and artifacts. Administrators such as principals, could set the tone to facilitate the meetings or provide coaches or grade level team leaders to orchestrate them. The in-person, real time platform may encourage educators with little or no technology knowledge or skills to participate in a communication mode most familiar to them while they are gradually exposed to and become comfortable with virtual platforms.

A constructionist journey can also exist in a virtual world. Tools such as web-based learning platforms can provide synchronous communication and discussion boards that provide asynchronous communication where teachers are actively involved in the PD activities, such as looking at student work, receiving feedback on teaching, feedback to peers, and participating in lesson studies (Desimone, 2011; Desimone et al., 2002). Providing dual platforms (face-to-face and virtual spaces) can encourage collective participation of current educators and attract future participants.

Limitations of the Study

There were several limitations of the study. This study explored a small size of EduBadger Course badge earners within two county offices of education within one region. As such, similar results may not be found for other EduBadger Course earners residing in other county offices of education within and outside Region 1. In addition, personal beliefs about technology influenced the four interviewed participants' viewpoints about their Course experience. These educators shared a willingness and commitment to expand their technology skills to improve student learning. Two of them considered themselves technology savvy prior to the EduBadger Course experience. The relatively small, final sample size of 10, may have been the lack of incentives for participating in the study as well as the timing of data collection, which occurred in the Fall of 2016 the day after the United States presidential election. The length of the survey may have also contributed to the low response rate. The phenomenon of Open Badging is new and interest in the EduBadger Course and/or the value of obtaining badges is still in an early stage which also may have contributed to the low participation.

Study Internal Validity

The limitations of this study may result in threats to internal validity. However, the

researcher took steps to minimize these threats through a complex process to ensure reliable interpretations of the data. The collective case study using mixed methods allowed the researcher to collect multiple sources of different types of evidence with a methodology that required triangulation of data. Evidence was built from multiple sources of data: completed surveys, a research journal, and interviews. An inductive thematic analysis employing constant comparison was used for general guidance in analyzing qualitative data and in generating grounded theory (Glaser & Strauss, 1967). To further ensure internal validity, the researcher sought out the use of a peer reviewer who had experience in higher education and research to cross check and compare the codes for inter-coder agreement. For this study, in-depth description and analysis of four cases provided robust understanding of the utility of the EduBadger Course within one geographical region.

Closing Comments

The 21st century brings opportunities to recognize and formally credit learning beyond brick and mortar spaces to encompass learning experiences and competencies gained across flexible contexts in a variety of ways. Open Badging is a way to capture that learning, organize it across contexts, and convey it, creating learning networks across the Web. This study explored the potential use of the digital badge ecosystem, EduBadger, as a viable alternative professional growth opportunity in educational technologies to support practitioners struggling to integrate technology into pedagogical practices in the workplace. The success of educational institutions related to supporting practitioners to continue to develop skills and knowledge to prepare our students for the 21st century and to meet regulatory credentialing and certification hold substantial social and economic consequences. In the digital age, effective teaching includes leveraging relevant educational technologies as meaningful pedagogical tools (Ertmer &

Ottenbreit-Leftwich, 2010). It includes understanding how to use technology to facilitate meaningful learning – enabling students to construct deep and connected knowledge that can be applied to authentic situations. Exploring the utility of digital badging as a materializing credentialing system is worthy.

Creating an Open Badge digital system is complicated. This study informs future research on how informal learning afforded by the digital badge ecosystem supported educators within a formal agency. This study was designed to capture the responses of participants after a limited exposure with the EduBadger Course. The study shares a collective journey of educators, as earners, at the cutting edge of using Open Badging in LEAs to integrate technology into pedagogical practices. As more educational agencies begin to recognize the prevalence of informal learning happening outside of formal establishments (MacArthur Foundation, 2013) innovations such as digital badges become increasingly meaningful. An agency can use badges in many ways to achieve a variety of goals based on its need (Ahn et al., 2014). The issuers, Region 1, strategically designed the EduBadger Course around the local, state, and federal initiatives and priorities. Research posits that PD is likely to be more effective when it is aligned to local initiatives and priorities (Gamrat et al., 2014). The EduBadger Course experience provided ways to recognize informal learning within formal institutions. The LEAs were willing to support the work of Region 1, investing time, energy, and money to explore nontraditional avenues of delivering professional learning to their educators. This is further evident as a local higher education institution, Humboldt State University, offers continuing education units (CEU) for submission and fee to EduBadger Course badge earners. This is another step towards the growing acceptance of informal and asynchronous learning (Google Trends, 2015).

While the EduBadger Course participants overall valued the activities and objectives of

the badge system, there is room for improvement. Participants-generated feedback collected in this collective case study. They identified concerns in the areas of assessment, scaffolding the learning process, relevance and meaning, and mechanics and operational procedures. Designing and implementing a badge system bring insights into instructional practices that may otherwise be unnoticed by LEAs administrators (Riconscente et al., 2013). The feedback is valuable to inform future design iterations to ensure the successful expansion of the EduBadger Course. Careful rethinking of the instructional design progress can remedy the above stated concerns. It is important to realize that iteration is not a unique task, as several of the Badges for Lifelong Learning projects spent significant time to iterate their badge system design and many several times (Hickey et al., 2014). Almost all projects found that their systems required new practices not part of their initial vision or plan (Casilli & Hickey, 2016). None of the Lifelong Learning projects concluded with the fully functioning badge system as originally envisioned in their proposal (Hickey, et al., 2014). In the end, more than 80 % succeeded in creating some sort of badge system (Hickey et al., 2015).

The implementation of Open Badges is gaining momentum as an alternative to traditional PD. Open Badges is a new phenomenon in the realm of PD, further research is needed to understand their impact. Additional studies would benefit from addressing a broader audience to increase the generalizability of the findings including the perspectives from all stakeholders within its ecosystem for instance, the issuers and consumers.

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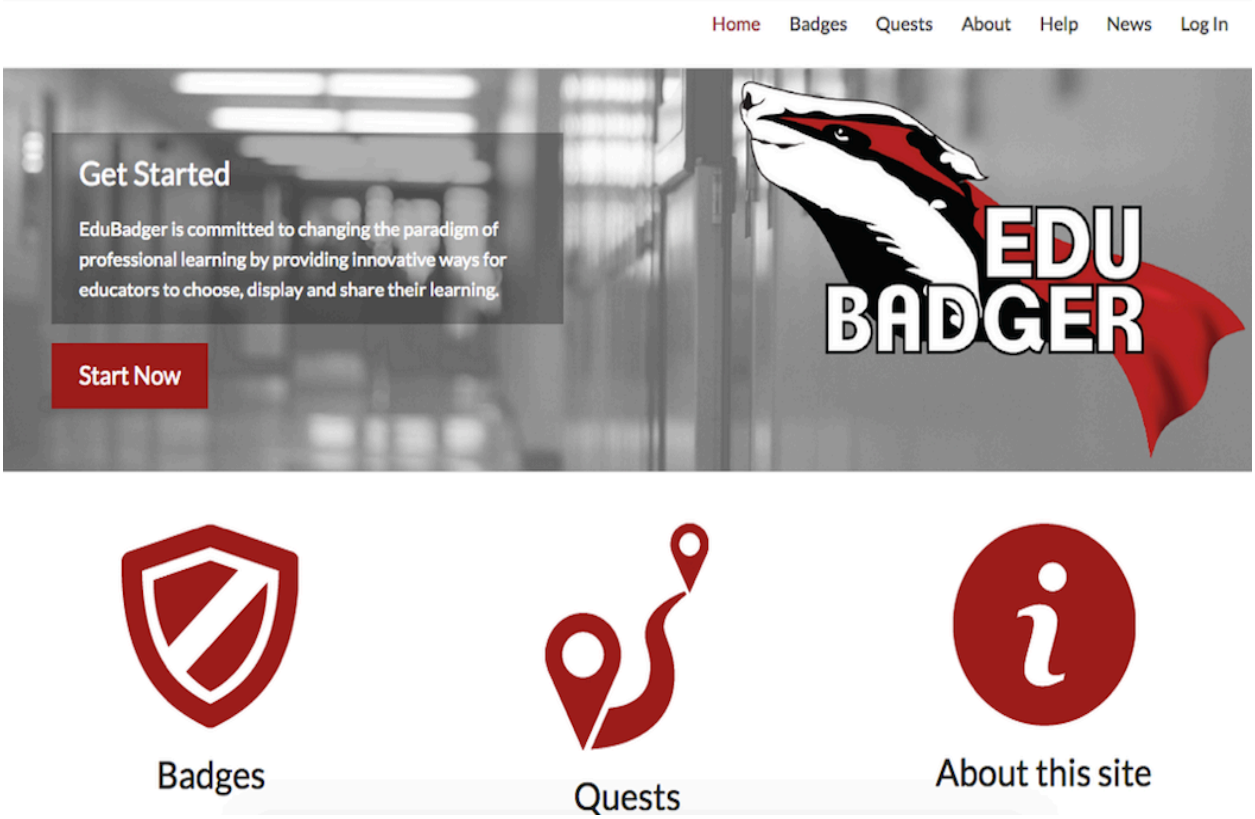
APPENDIX A

Screenshot of EduBadger Course Website



EduBadger (https://edubadger.org/). Copyright 2016. Reprinted with permission.

APPENDIX B

Badge Design Principles from the Design Principles Documentation Project

Design Principles for Recognizing Learning with Digital Badges

- Use badges to map learning trajectory
- Align badges to standards
- Have experts issue badges
- Seek external back of credential
- Recognize diverse learning
- Use badges as a means of external communication
- Determine appropriate lifespan of badges
- Recognize educator learning
- Award formal academic credit for badges
- Promote discovery

Design Principles for Assessing Learning in Digital Badge Systems

- Use leveled badge systems
- Enhance validity with expert judgment
- Align assessment activities to standards: create measurable learning objectives
- Use performance assessments in relevant contexts
- Use e-portfolios
- Use formative functions of assessment
- Use mastery learning
- Use rubrics
- Promote “hard” and “soft” skill sets
- Involve students at a granular level

Design Principles for Motivating Learning with Digital Badges

- Recognize identities
- Engage with the community
- Display badges to the public
- Provide outside value of badges
- Set goals
- Promote collaboration
- Stimulate competition
- Recognize different outcomes
- Utilize different types of assessments
- Provide privileges

Hickey, Itow, Schenke, Tran, Otto, & Chow (2014, p. iii). *Badges Design Principles Documentation Project January Interim Report.* Indiana University. Retrieved from http://iudpd.indiana.edu/JanuaryReport. Reprinted with permission.

APPENDIX C

Email to Inform Participants of the Purpose of the Study and Informed Consent

Dear EduBadger Participants,

Sharen Bertrando, a doctoral student at Pepperdine University, is currently conducting a study entitled, "Rethinking Workplace Learning in the Digital World: An Exploratory Study of Open Badges". The study is designed to help us learn more about the use of digital badging as an alternative approach to professional development for learning educational technology skills. All educators who participated in the EduBadger Course program and earned at least one content badge are being invited to participate in this voluntary study.

If you would like to participate in the study, please click the link below from Sharen to learn more about the study. Thank you for your time and consideration.

[EduBadger as an Approach to Professional Development (PD) in the Area of Educational Technologies Survey]

Sincerely,

[xxxxxxxxxxxxxxx]
[xxxxxxxxxxxxxxx]
Educational Technology Coordinators
California Region 1 County Offices of Education and the Regional System of District and School Support (RSDSS)

APPENDIX D

Informed Consent Form for Teachers and Administrators

PEPPERDINE UNIVERSITY

Graduate School of Education and Psychology

Doctorate in Learning Technologies

RETHINKING WORKPLACE LEARNING IN THE DIGITAL WORLD:

AN EXPLORATORY STUDY OF OPEN BADGES

You are invited to participate in a research study conducted by Sharen Bertrando, a doctoral student at Pepperdine University under the supervision of Dr. Kay Davis. You are asked to participate in the study because you are or were a participant in the *EduBadger* Open Badge Course created and supported by the Educational Technology Coordinators in California Region 1 County Offices of Education and the Regional System of District and School Support. Your participation is voluntary. You should read the information below, and ask questions about anything that you do not understand, before deciding whether to participate. Please take as much time as you need to read the consent form. You may also decide to discuss participation with your family, friends, and colleagues. I realize that you are extremely busy but I hope that you will find 30 minutes to take this important and potentially very useful survey. Thank you for your time and consideration.

PURPOSE OF THE STUDY

The purpose of the study is to help educational institutions, such as local education agencies (LEAs) to learn more about the use of Open Badging as an alternative approach to professional development for learning educational technology skills.

PARTICIPANT INVOLVEMENT

If you volunteer to participate in this study, you will be asked to click on a link at the bottom of this email to take an online survey entitled, *EduBadger as an Approach to Professional Development (PD) in the Area of Educational Technologies Survey*. It should take approximately 30 minutes to complete. Please take the survey in one setting. The survey will be open from November 7, 2016 and close on November 21, 2016. The survey is completely voluntary and anonymous. No personally identifying information, including IP addresses, will be affiliated with your survey responses. Your responses will be kept completely confidential. You do not have to answer any questions you don't want to in the survey and can move to the next question. At the end of the survey you will be asked if you would consider being interviewed through online voice communication of your choice (e.g., landline telephone, *Google Hangout*, or *Skype*) to

share more about your experience with the *EduBadger Course*. If you agree, you will be asked to provide an email contact address. The interview will take no more than 45 minutes. You do not have to answer any questions you don't want to during the interview process.

PARTICIPATION AND WITHDRAWAL

Your participation is voluntary. Your refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may withdraw your consent at any time and discontinue participation without penalty. You are not waiving any legal claims, rights or remedies because of your participation in this research study.

ALTERNATIVES TO FULL PARTICIPATION

Your alternative is to not participate. Your relationship with your employer will not be affected whether you participate or not in this study**.**

CONFIDENTIALITY

I will keep your records for this study confidential as far as permitted by law. However, Pepperdine's University's Human Subjects Protection Program (HSPP) may also access the data collected. The HSPP occasionally reviews and monitors research studies to protect the rights and welfare of research subjects.

Your survey responses are given anonymously. No names, addresses, phone numbers or email addresses are required, however, you may disclose an email address should you decide at the end of the survey that you are willing to be interviewed. Once the survey response time of two weeks has passed, the survey will be closed. Responses are password protected on the electronic survey administered through *Qualtrics* and only the researcher and her advisor has access to the data. Access to the website does not allow a person the ability to track participants.

The data will be stored on a password protected computer in the principal investigator's place of residence. The data collected will be coded, de-identified with a pseudonym, and transcribed. The log of codes will be stored separately from the data. As a result, there will be no identifiable information available to link the data back to the participants in the event of disclosure. Any identifiable information obtained in connection with this study will remain confidential. For participants agreeing to be interviewed, any audio-tapes will be destroyed once they have been transcribed. All electronic work collected will be backed up on a password-protected external hard drive and kept secure by the researcher in a locked cabinet. The data will be stored for a minimum of three years.

INVESTIGATOR'S CONTACT INFORMATION

I understand that the investigator is willing to answer any inquiries I may have concerning the research herein described. I understand that I may contact Sharen Bertrando at (XXX) XXX-XXX or sharen.bertrando@pepperdine.edu. You may also contact the researcher's advisor and Chairperson of the Graduate and Professional Schools IRB, Pepperdine University, Dr. Kay

Davis at kay.davis@pepperdine.edu if you have any other questions or concerns about this research.

RIGHTS OF RESEARCH PARTICIPANT – IRB CONTACT INFORMATION

If you have questions, concerns or complaints about your rights as a research participant or research in general please contact Dr. Judy Ho, Chairperson of the Graduate & Professional Schools Institutional Review Board at Pepperdine University 6100 Center Drive Suite 500 Los Angeles, CA 90045, 310-568-5753 or gpsirb@pepperdine.edu.

Thank you for your time and consideration. By clicking the survey link below, you are acknowledging that you have read and understand what your study participation entails and are consenting to participate in the study. You also understand that you may end your participation at end time, for any reason without penalty.

[EduBadger as an Approach to Professional Development (PD) in the Area of Educational Technologies Survey]

If you would like documentation of your participation in this research you may print a copy of this form.

APPENDIX E

Survey Instrument

EduBadger as an Approach to Professional Development (PD) in the Area of Educational Technologies Survey

SECTION I: DEMOGRAPHIC INFORMATION

The following questions provide some insight into your background in order to better understand your response. Please indicate you answer by choosing one of the responses shown or typing in the text box.

1) County Office of Education in the District where you work
   - XXXX
   - XXXX

2) How many years of experience do you have in education?
   - Less than five years
   - Five to nine years
   - Ten to twenty years
   - More than twenty years

3) Which category best describes your primary subject/specialty?
   - Humanities (e.g., Language Arts, Fine Arts, Theatrical Arts)
   - Social Studies (e.g., World History, US History)
   - Science (e.g., Physical Science, Chemistry, Health Science)
   - Mathematics (e.g., Geometry, Algebra, Statistics, Calculus)
   - Elementary
   - Special Education
   - Other (e.g., Physical Education, Industrial Technology, Other Electives)
   - Administration

4) Have you previously completed an on-line course?
   - Yes
   - No

5) Select all of the EduBadger Course Badges that you have earned.
   - ☐ Book Creator Level 1
   - ☐ Book Creator Level 2
   - ☐ Book Creator Level 3
   - ☐ Edmodo Level 1
   - ☐ Google Docs Level 1
   - ☐ Google Drawing Level 1
   - ☐ Google Drawing Level 2
   - ☐ Google Slides Level 1
   - ☐ Padlet Level 1
   - ☐ Padlet Level 2
   - ☐ Padlet Level 3
   - ☐ Pixir Level 1
   - ☐ Teaching in the Digital Age
   - ☐ Teach 4 Teaching – SMAR Model Level 1
   - ☐ Thinglink Level 1
   - ☐ Thinglink Level 2
   - ☐ Thinglink Level 3
   - ☐ Vocaroo Level 1
   - ☐ WeVideo Level 1
   - ☐ YouTube Video Editor Level 1
   - ☐ Other: _____

6) Select all the EduBadger Course Quests that you have earned (e.g., Expert badges you earned that required successfully completing three required steps).
   - ☐ Book Creator Expert
   - ☐ EdTech Essentials
   - ☐ Padlet Expert
   - ☐ Google Apps Beginner
   - ☐ Tech 4 Teaching
   - ☐ Thinglink Expert

7) I plan to display my EduBadger Course badges in my Mozilla Backpack.
   - ☐ Yes
   - ☐ Maybe
   - ☐ No

8) I plan to earn more EduBadger Course badges.
   - Yes
   - Maybe
   - No

9) I plan to display my EduBadger Course badges on a social network site (e.g., Edmodo, Facebook, LinkedIn)
   - Yes
   - Maybe
   - No

10) I plan to list my EduBadger Course badges on my curriculum vitae.
   - Yes
   - Maybe
   - No

SECTION II: EDUBADGER COURSE PROFESSIONAL DEVELOPMENT (PD) DESIGN CHARACTERISTICS

Based on your understanding and experience as an earner of an EduBadger Course badge for professional development to learn educational technologies, for each statement please indicate your level of agreement on a scale from "Strongly disagree", "Disagree", "Neither agree or disagree", "Agree", and Strongly agree".

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
Recognition of Learning					
1. Being able to set and choose my own learning goals was an important aspect of participating.					
2. Recognition of achievement by school/ district administration was an important aspect of participating.					

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
3. Recognition of achievement by a credited university was an important aspect of participating.					
4. Being able to work at my own pace was an important aspect of participating.					
5. Being able to begin to learn and work at my level of expertise was an important aspect of participating.					
6. Being able to participate in professional development training anytime/anywhere was an important aspect.					
7. Being able to earn educational credit units was an important aspect.					
8. Course activities aligned with school/district improvement priorities and goals are important to my learning and instruction.					
9. Overall, the time I spent completing the EduBadger Course was time well spent.					
10. Professional development is important to me.					
11. Participating in the EduBadger Course helped me to achieve my professional development goals.					

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
12. The EduBadger Course training materials and activities helped me to gain targeted technological skills.					
Motivation for Learning					
13. The EduBadger Course leaderboard encouraged me to compete with other EduBadger earners.					
14. Personal achievement was an important aspect of the program.					
15. Earning points encouraged me to compete with other EduBadger earners.					
16. Monetary compensation was an important aspect of the EduBadger Course.					
17. Earning points encouraged me to meet my personal goals.					
18. The *EduBadger Course* leaderboard encouraged me to collaborate with other EduBadger earners.					
19. The EduBadger Course encouraged me to virtually network with other educators *within* my district.					
20. The EduBadger Course encouraged me to virtually network with educators *outside* my district.					

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
Assessment of Learning					
21. The EduBadger Course activities allowed time for cumulative study of learning how to use technology tools.					
22. The EduBadger Course increased my access to innovative learning opportunities.					
23. The EduBadger Course activities allowed time for cumulative study of learning how to implement technology into my teaching/training.					
24. The process used to evaluate my work was rigorous.					
25. The criteria required to earn an EduBadger Course badge was rigorous.					
26. The EduBadger Course rubrics accurately assessed my learning.					

SECTION III: KNOWLEDGE OF INSTRUCTION AND TECHNOLOGY

For the purpose of this questionnaire, technology is referring to educational technologies. That is, technologies used for the purpose of improving learning, instruction, and/or performance (Spector, 2016, p. 221).

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
TK (Technology Knowledge)					
27. I know how to solve my own technical problems.					
28. I can learn technology easily.					
29. I keep up with important new technologies.					
30. I frequently play around with technology.					
31. I know about a lot of different technologies.					
32. I have the technical skills I need to use technology.					
CK (Content Knowledge)					
33. I have sufficient knowledge about the content that I teach/instruct.					
34. I have various ways and strategies of developing understanding of the content that I teach/instruct.					
PK (Pedagogical Knowledge)					
35. I know how to assess student/staff performance.					
36. I can adapt my instruction based-upon what students/staff currently understand or do not understand.					
37. I can adapt my instruction style to different learners.					
38. I can assess student/staff instruction in multiple ways.					
39. I can use a wide range of instructional approaches in a classroom/meeting setting.					
40. I am familiar with common student/staff understandings and misconceptions.					

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
41. I know how to organize and maintain classroom/meeting management.					
PCK (Pedagogical Content Knowledge)					
42. I can select effective instructional approaches to guide student/staff thinking and learning in the content that I instruct.					
TCK (Technological Content Knowledge)					
43. Participating in the EduBadger Course helped me to know about technologies that I can use for understanding and doing the content that I teach/instruct.					
TPK (Technological Pedagogical Knowledge)					
44. Participating in the EduBadger Course helped me to choose technologies that enhance the teaching/instructional approaches for a lesson/training.					
45. Participating in the EduBadger Course helped me to choose technologies that enhance student/staff teaching/instruction for a lesson/training.					
46. Participating in the EduBadger Course caused me to think more deeply about how technology could influence the instructional approaches in my classroom.					
47. Participating in the EduBadger Course helped me to think critically about how to use technology in my classroom.					
TPK (Technological Pedagogical Knowledge)					
48. Participating in the EduBadger Course helped me to adapt the use of the technologies that I am learning about to different instructional activities.					

Response Key – select the response that best fits your answer to each statement.	1 Strongly Disagree (SD)	2 Disagree (D)	3 Neither Agree or Disagree (N)	4 Agree (A)	5 Strongly Agree (SA)
49. Participating in the EduBadger Course helped me to select technologies to use in my classroom/meeting that enhance what I teach/instruct, how I teach/instruct and what students/staff learn.					
50. Participating in the EduBadger Course helped me to use strategies that combine content, technologies, and instructional approaches.					
51. After participating in the EduBadger Course I can provide leadership in helping others to coordinate the use of content, technologies, and instructional approaches at my school or district.					
52. Participation in the EduBadger Course helped me to be able to choose technologies that enhance the content for a lesson/training.					
TPACK (Technology, Pedagogy, and Content Knowledge)					
53. The EduBadger Course helped me to instruct lessons/trainings that appropriately combine the content that I teach/instruct, technologies, and instructional approaches.					

SECTION IV: OPEN-ENDED QUESTIONS

In order to gain a deeper perspective of your experience as an EduBadger Course badge earner, please answer the following questions to the best of your knowledge. Again, your thoughtfulness and candid responses will be greatly appreciated.

1. What did you like best about this Open Badge Professional Development Course?

2. What did you consider to be the least effective aspect of this Open Badge Professional Development Course?

3. What were the two or three biggest challenges for you during this Open Badge Professional Development Course?

4. What were two or three overall benefits of this Open Badge Professional Development Course?

5. In what way(s) did the Open Badge Professional Development Course experience impact your own technology skills and ability?

APPENDIX F

Informed Consent Form for Interviews of Teachers and Administrators

EDUBADGER CONSENT TO BE INTERVIEWED

December 5th 2016, 6:30 pm MST

Q1 - PARTICIPANT INVOLVEMENT

Thank you for volunteering a to be interviewed to share more about your experience with the EduBadger Course . The interview will take no more than 45 minutes. Your responses will be kept completely confidential. You do not have to answer any questions you don't want to answer during the interview process. Please provide your contact information below. After completion, click the arrows to end the survey.

Name	Email Address	Phone Contact

APPENDIX G

Interview Protocol for Teachers and Administrators

EduBadger as an Approach to Professional Development (PD) in the Area of Educational Technologies Survey

Time began:

Date:

Interviewee:

Thank you for your willingness to be interviewed. Your answers will be confidential and you may discontinue the interview at any time. The interview will be audio recorded to allow the researcher, myself, to study your responses. All identities will remain confidential and names will not be disclosed in the written dissertation.

Do you have any questions before we begin?

1. Are you a teacher or an administrator?

2. Teacher: What grade(s) do you teach? Administrator: What grade level campus do you support?

3. Approximately how may badges did you earn?

4. What initially interested you about *EduBadger's* professional development course? (Probes: Were you specifically interested in professional development? A different type of professional development? Learning about educational technology tools? The badges? Open Badging?)

5. What were two or three top affordances or benefits of the course to you personally? (Probes: Choice of badges, leveling of badges, self-paced, feedback, points, levels)

6. What were two or three top challenges of the course to you personally? (Probes: Choice of badges, leveling of badges, self-paced, feedback, points, levels)

7. What are your impressions about the effectiveness of the training activities that were provided for you? (Probe: Were the activities valuable to you? Can you describe a part of the course activities that contributed to your successful experience? Which badges were purposeful to you?)

8. What are your impressions about the effectiveness of the design principles or components that were provided for you? (Probe: Were certain features valuable to you? Can you describe a part of the course design features that contributed to your successful experience?)

9. How was the professional development experience effective in supporting your TEACHING? Can you give examples? (Probes: Did the EduBadger Course experience impact and/or change your teaching (e.g., modes of delivery, instructional practices, content, assessment, etc.)?

10. How was the professional development experience effective in supporting your LEARNING? Can you give examples? (Probe: In what ways did the experience impact your own technology skills and ability?)

11. How do you rate yourself with technology on a scale from one to three? Where do you see yourself with technology with one being a beginner and three being, I could teach myself and explore new things? How would you rate yourself before prior to participating in the EduBadger Course experience?

12. In what way(s) did the experience impact your colleagues? Specially, who was impacted, how and why, to what degree?

13. How was your professional development experience earning an EduBadger certificate different than completing a traditional face-to-face professional development experience?

14. What could be done to improve the course?

15. Should the program be continued? Why or why not?

16. How much do you know about Open Badging?

17. Is there anything else that you would like to share or discuss about the EduBadger Course? Or professional development in general?

APPENDIX H

TPACK Survey Instrument Use Permission

Sharen Bertrando 'student' <sharen.bertrando@pepperdine.edu> Tue, Nov 8, 2016 at 1:01 PM

To: dschmidt@iastate.edu

Dear Dr. Schmidt,

I am a doctoral student at Pepperdine University conducting a study, *Rethinking Workplace Learning in the Digital World: An Exploratory Study of Open Badges*. I am requesting the use of the TPACK survey, *Survey of Preservice Teachers' Knowledge of Teaching and Technology* (Version 1.1, September, 2009). The purpose of this mixed-methods study is to explore digital badging in educational institutions as support for educators struggling to integrate technology into pedagogical practices. I will conduct a sequential explanatory mixed-method study that captures perceptions about digital badges and follow-up interviews with selected badge users to explore their viewpoints further. All educators (teachers and administrators) who participated in the *EduBadger Course* and earned at least one content badge are being invited to participate in this study.

California Region 1 County Offices of Education and the Regional System of District and School Support provides leadership, resources, and technical assistance to the schools in districts within the County Offices of Education within Del Norte, Humboldt, Lake, Mendocino, and Sonoma in order to increase their collective capacity to support students in meeting or exceeding the State's academic content standards. As part of Region 1's commitment to change the paradigm of professional learning by providing innovative ways for educators to select, display, and share their learning, its educational technology coordinators designed a badging system called *EduBadger* (https://edubadger.org). *EduBadger*, a subset of digital badges that follows Mozilla's Open Badge Infrastructure (OBI) standard, offers an alternative approach to traditional professional development (PD) in the area of educational technologies to support educators struggling to integrate technology into pedagogical practices.

I have attached the survey components that have been adapted from your survey for your review as well as the other blocks of the survey and the IRB approval letter from Pepperdine University. There are approximately 150 participants both K-12 administrators and teachers within the public school system. The scope of the research questions delves into the perspectives of digital badges as an alternative approach to traditional profession growth opportunities. The research questions for the study are:

1. What are the educators' knowledge and skills to teach with technology?
2. What are the earners' perceived affordances of a digital badge approach for technological professional growth within the workplace?
3. What challenges do earners describe as a result of participating in a digital badge approach for technological professional growth within the workplace?

The participants will receive an invitation through their work email accounts to participate in an online survey composed using *Qualtrics*. At the end of the survey, participants are asked if they would consider being interviewed for further discussion. If additional information is needed, please contact me. Thank you for your time and consideration.

Best regards,

Sharen Bertrando

sharen.bertrando@pepperdine.edu

[redacted]

2 Attachments

APPENDIX X Sur...

ApprovalLetter-I...

APPENDIX I

Pepperdine University Institutional Review Board Approval Letter

Pepperdine University
24255 Pacific Coast Highway
Malibu, CA 90263
TEL: 310-506-4000

NOTICE OF APPROVAL FOR HUMAN RESEARCH

Date: July 26, 2016

Protocol Investor Name: Sharen Bertrando

Protocol #:1605-269

Project Title: Rethinking Workplace Learning in the Digital World: An Exploratory Study of Open Badges

School: Graduate School of Education and Psychology

Dear Sharen Bertrando:

Thank you for submitting your application for exempt review to Pepperdine University's Institutional Review Board (IRB). We appreciate the work you have done on your proposal. The IRB has reviewed your submitted IRB application and all ancillary materials. Upon review, the IRB has determined that the above entitled project meets the requirements for exemption under the federal regulations 45 CFR 46.101 that govern the protections of human subjects.

Your research must be conducted according to the proposal that was submitted to the IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an amendment to the IRB. Since your study falls under exemption, there is no requirement for continuing IRB review of your project. Please be aware that changes to your protocol may prevent the research from qualifying for exemption from 45 CFR 46.101 and require submission of a new IRB application or other materials to the IRB.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite the best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the IRB as soon as possible. We will ask for a complete written explanation of the event and your written response. Other actions also may be required depending on the nature of the event. Details regarding the timeframe in which adverse events must be reported to the IRB and documenting the adverse event can be found in the *Pepperdine University Protection of Human Participants in Research: Policies and Procedures Manual* at community.pepperdine.edu/irb.

Please refer to the protocol number denoted above in all communication or correspondence related to your application and this approval. Should you have additional questions or require clarification of the contents of this letter, please contact the IRB Office. On behalf of the IRB, I wish you success in this scholarly pursuit.

Sincerely,

Judy Ho, Ph.D., IRB Chairperson

cc: Dr. Lee Kats, Vice Provost for Research and Strategic Initiatives
Mr. Brett Leach, Regulatory Affairs Specialist

APPENDIX J

Codebook

CODE	DESCRIPTION
Affordances of Course Content	Refers to teacher's perception of course content as valuable. For example, type of badge offering, relevance to teaching his/her students, activities to earn badge level, resources and tutorials provided, course assessments.
Affordances of Course Design	Refers to the teacher's perception of course design principles as valuable. For example, the leaderboard, leveled/tiered badge system, point system, ability to earn formal academic credit, online platform, convenience, assessment features, technical components to post work for assessment.
Challenges of Course Content	Refers to teacher's perception of course content as questionable. For example, type of badge offering, relevance to teaching his/her students, activities to earn badge level, resources and tutorials provided, course assessments.
Challenges of Course Design	Refers to the teacher's perception of course design principles as questionable. For example, the leaderboard, leveled/tiered badge system, point system, ability to earn formal academic credit, online platform, convenience, assessment features, technical steps to post work for assessment.
Initial Exposure to Course	Refers to how teacher was formally or informally introduced to course. For example, district initiative, networking, type of professional development, stipend.
Motivation for Learning	Refers to teacher's intrinsic and extrinsic motivational factors for participating/earning a badge. For example, display badges, set personal goals, promote collaboration, stimulate competition, provide privileges, monetary compensation, recognize identity.
Open Badging Knowledge and Prior Experience	Refers to teacher's prior experiences with Open Badging and understanding of Open Badging. For example, define it, describe its features, reference to other Open Badges.
Ownership of Learning and Engagement	Refers to teacher's ownership of learning and engagement. For example, self- initiation, problem solving, critical thinking skills, perseverance to complete tasks.
Prior Professional Development Experiences	Refers to teacher's previously experienced professional development (PD). For example, comparisons between the *EduBadger Course* and another PD experienced.
Recommendations to Sustain or Improve Course	Refers to teacher's suggestions to maintain and improve the course content or course design. For example, introduce more badges targeted specifically to teachers' grade levels taught, adjust criteria for badge levels/tires, expand badge variety, timely feedback, ongoing technical support.
Role of Teacher	Refers to duties and responsibilities as a teacher, as well as, additional roles assigned and/or volunteered. For example, member of special committee, special assignment, supporting or encouraging other teachers to learn technology skills.

CODE	DESCRIPTION
Teacher Perceived Level of Technology Skills	Refers to teacher's technology skills and/or experience including technology available to students and/or staff. For example, references to mastery technology skills, confidence with technology, attitude towards learning about and with technology.
Teacher Support System	Refers to teacher seeking and/or obtaining support and/or networking to complete badges. For example, approaching colleagues, contacting district/County Office of Education technical assistance staff, reaching outside district for technical support.
Ways Experience Impacted/Changed Learning	Refers to ways in which teacher's participation in the course impacted and/or changed his/her learning. For example, learning new skills/tools, exposure to new things, confidence building, promotion of discovery/awareness.
Ways Experience Impacted/Changed Teaching	Refers to ways in which teacher's participation in the course impacted and/or changed his/her teaching. For example, describing how a technology tool was implemented in his/her classroom to support student learning.
Ways PD Experience Supported Learning & Learning Style	Refers to ways in which the course supported teacher's learning and/or learning style. For example, self-paced, choice afforded, flexible time to complete, convenience.

APPENDIX K

Documented Permission from Authors for Figures Used

ets@indiana.edu 10:08 AM (1 hour ago)

to dthickey, me

Please note

This email was sent by an online form and the identity of the sender cannot be verified because this is a public anonymous form. The sender indicated the following contact information:

Email Address: sharen.bertrando@pepperdine.edu
First Name: Sharen
Last Name: Bertrando

The comment/inquiry follows:

Hello Dr. Hickey

I am a doctoral student at Pepperdine University, Malibu, California USA. I am completing my dissertation on Open Badging entitled, Rethinking Workplace Learning in the Digital World: A Case Study of Open Badges. I am requesting your permission to use the following two resources as figures: Badge Design Principles from the DPD Project (executive summary) and Six Badge Research Designs (p. 53) from the following report: Hickey, D. T., Itow, R., Schenke, K., Tran, C., Otto, N., & Chow, C. (2014). Badges design principles documentation project. January interim report. The Figures would be cited appropriately underneath the figures.

My citations will need to be listed within APA formatting if there is a specific language you would like to utilize. I would truly appreciate your permission in my being able to use these figures as it will serve to educate others and promote further inquiry of Open Badges in k-12 educational institutions. I look forward to your response. Thank you for your consideration.

Best regards,
Sharen
Doctoral Student EDLT

Hickey, Daniel Thomas <dthickey@indiana.edu> 11:12 AM (4 hours ago)

to Rebecca, me

Sharen--

Yes you have my permission to use those images. However I would prefer that you reference the final report. Attached.

[redacted]

Dan Hickey

Sharen Bertrando 'student' <sharen.bertrando@pepperdine.edu> 12:07 PM (4 hours ago)

to mkoehler, Punya.Mishra

Hello Dr. Koehler and Dr. Mishra,

I am a doctoral student at Pepperdine University, Malibu, California USA. I am completing my dissertation on Open Badging entitled, Rethinking Workplace Learning in the Digital World: A Case Study of Open Badges. I am requesting your permission to use the knowledge domains of the TPACK framework (http://tpack.org). The Figure would be cited appropriately underneath the figure.

My citation will need to be listed within APA formatting if there is a specific language you would like to utilize. I would truly appreciate your permission in my being able to use this figure as it will serve to educate others and promote further inquiry of Open Badges in k-12 educational institutions. I look forward to your response. Thank you for your consideration.

Best regards,

Sharen

Punya Mishra 12:10 PM (3 hours ago)

to me, mkoehler

Sharen –

We have made the image available freely for scholars to use and the TPACK.org website provides specifics of how the image is to be cited.

Thanks

~ punya

—

Punya Mishra
Associate Dean of Scholarship & Innovation
Mary Lou Fulton Teachers College
Arizona State University
education.asu.edu

punya.mishra@asu.edu
517 303 9567
punyamishra.com

Sharen Bertrando 'student' <sharen.bertrando@pepperdine.edu> 9:41 AM (1 hour ago)

to jdiamond

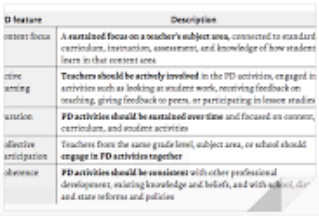
Hello Dr. Diamond,

I am a doctoral student at Pepperdine University, Malibu, California USA. I am completing my dissertation on Open Badging entitled, Rethinking Workplace Learning in the Digital World: A Case Study of Open Badges. I am requesting your permission to use the Analytic Framework on evidence-based "core features" of effective professional development (p. iv). from the following report: Diamond, J., & Gonzalez, P. C. (2014). Digital badges for teacher mastery: An exploratory study of a competency-based professional development badge system. CCT Reports. Center for Children and Technology, Education Development Center, Inc. The Figure would be cited appropriately underneath the figure.

My citation will need to be listed within APA formatting if there is a specific language you would like to utilize. I would truly appreciate your permission in my being able to use this figure as it will serve to educate others and promote further inquiry of Open Badges in k-12 educational institutions. I look forward to your response. Thank you for your consideration.

Best regards,

Sharen



D feature	Description
ontent focus	A **sustained focus on a teacher's subject area,** connected to standard curriculum, instruction, assessment, and knowledge of how student learn in that content area
ctive rning	**Teachers should be actively involved** in the PD activities, engaged in activities such as looking at student work, receiving feedback on teaching, giving feedback to peers, or participating in lesson studies
uration	**PD activities should be sustained over time** and focused on content, curriculum, and student activities
ollective articipation	Teachers from the same grade level, subject area, or school should **engage in PD activities together**
oherence	**PD activities should be consistent** with other professional development, existing knowledge and beliefs, and with school, dist and state reforms and policies

Diamond, James via educationdevelopmentcenter.onmicrosoft.com 9:48 AM (1 hour ago)

to me

Dear Sharen,

Of course! And if you think of it, I'd love to see your work when you're done—really!

Good luck with your research.

Best,

Jim

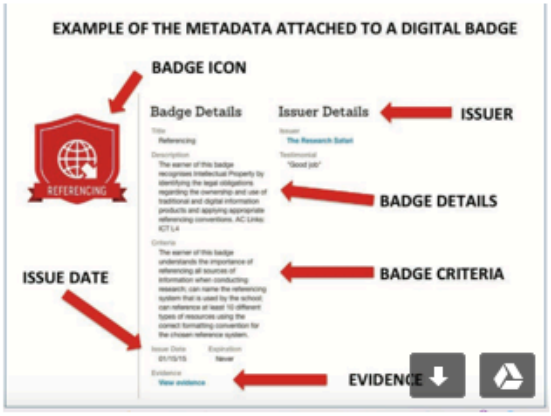
James Diamond, Ph.D.
Senior Research Associate
Education Development Center|Center for Children & Technology
96 Morton St., 7th Floor, New York, NY 10014
212.807.4256 • jdiamond@edc.org • cct.edc.org

Sharen Bertrando 'student' <sharen.bertrando@pepperdine.edu> May 4

to leonie

Hello Dr. McIlvenny,

I am a doctoral student at Pepperdine University, Malibu, California USA. I am completing my dissertation on Open Badging entitled, Rethining Workplace Learning in the Digital World: A Case Study of Open Badges. I am requesting your permission to use Figure 1 from the following article: McIlvenny, L. (2015). Open Badges - glorified award stickers or valuable learning credential? *Access,* 30-40.



Leonie McIlvenny <leoniem@westnet.com.au> May 5

to me

Dear Sharon

I am more than happy for you to use the image. I have others from presentations that may be of use also.

I would be very interested in finding out about your dissertation. I am currently in European on sabbatical but looking at some interesting new projects around closing the gap between formal education and workplace requirements. The people I am liaising with are interested in the open badge concept to capture the nontraditional less formal (soft) skills.

Please let me know if you would like any other diagrams. I am also happy to chat via Skype if you want to know more of what I haven doing with DBs.

Kind Regards

Leonie

Sharen Bertrando 'student' <sharen.bertrando@pepperdin 1:08 PM (22 hours ago)
to em

Hello Emily,

I am a doctoral student at Pepperdine Univeristy, Malibu, California. I am completing my dissertation on Open Badging entitled, Rethinking Workplace Learning in the Digital World: A Case Study of Open Badges. I am requesting your permission to use the figure attached, "An infrastructure map of Open Badges from Mozilla Open Badges by E. Knight, C. Casilli, S. Lee, E. Goligoski, C. McAvoy, B. Brennan, M. Larsson, J. Klein, C. Varelidi, A. Varma, M. Cole, & J. Forester. The figure will be cited appropriately underneath the figure.

I have contacted Constant Contact support, however, the efforts are outsourced to another part of the agency with no ability to assist.

My citation will need to be listed with APA formatting if there is a specific language you would like me to utilize. Thank you for your consideration and assistance to receive permission.

Best regards,

Sharen

Emily Goligoski 2:57 AM (8 hours ago)
to me

Hi Sharen! I think that's fine. Jess Klein is the visual designer to cite if I remember correctly.

Best,
Emily
Work | @emgollie

Sharen Bertrando 'student' <sharen.bertrando@pepperdine.edu 8:55 AM (2 hours ago)
to Emily

Thank you, Emily. I know that you used a similar design in your article: Goligoski, E. (2012). Motivating the learner: Mozilla's open badges program. *Access to Knowledge: A Course Journal, 4*(1). I

May I have permission to use the figure 2. Infrastructure map in your article: Goligoski, E. (2012). Motivating the learner: Mozilla's open badges program. *Access to Knowledge: A Course Journal, 4*(1), if I do not receive written permission from Mozilla Open Badges?

Thank you, Sharen

Emily Goligoski 9:00 AM (2 hours ago)
to me

Yes!

Best,
Emily
Work | @emgollie

Sharen Bertrando <slebertrando@gmail.com> Jun 9 (5 days ago)
to Rae, Blaze

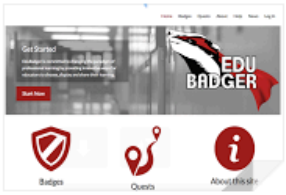
Hello Rae and Blaze,

First and foremost, thank you for your support efforts to expand, explore, and improve professional growth opportunities for educators in the area of educational technologies. Let me know when you have time this summer or early fall to share the data, summary, and recommendations from the research study.

I am requesting your permission to use a screenshot of the EduBadger website (attached) as an Appendix. The Figure would be cited appropriately underneath the figure.

My citation will need to be listed within APA formatting if there is a specific language you would like to utilize. I truly appreciate your permission in my being able to use this figure.

Thank you, Sharen



Hi Sharen - sorry I haven't gotten back to you yet! I have no issues with copyright permissions. What you suggested is fine with me. Rae?

I would love to see the data and recommendations from this study. [redacted]

Thanks!

Blaze King / Director of Information Technology
[redacted]

Lake County Office of Education
1152 South Main Street / Lakeport, CA 95453
[redacted]

Fearing, Rae 12:57 PM (19 hours ago)
to Blaze, me

I have no objections. Feel free to use and cite the screenshot.
Thanks Sharen!
Rae

Rae Fearing, M.S.
[redacted]

Director of Educational Technology
[redacted]
Del Norte County Office of Education