

**ONLINE LEARNING THROUGH EMERGING
INNOVATIONS AND PLATFORMS:
DIGITAL BADGES AND MOOCS**

by

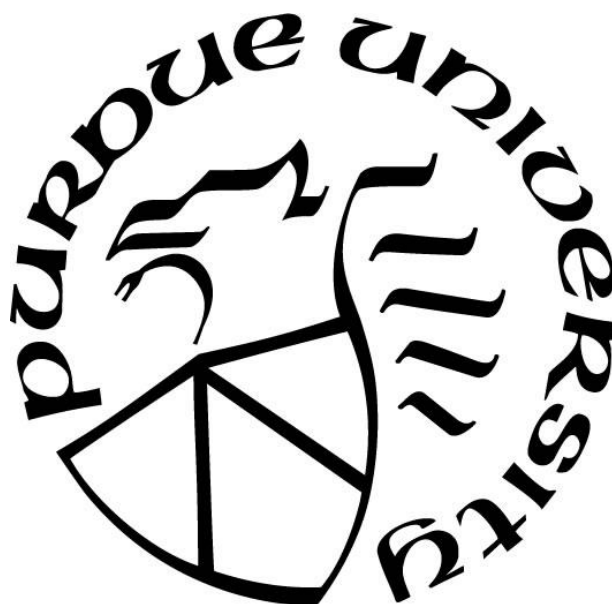
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ABSTRACT

Innovations in technology are changing not only everyday life for many individuals around the world but are also influencing the expansion of online learning opportunities at an accelerated rate (Collins & Halverson, 2018; Mah, 2016). Online learning platforms allow for scalability, flexibility, greater global access, and innovative and new ways to deliver education (Goodman, Melkers, & Pallais, 2019; Kizilcec et al., 2019). Enrollments in online learning programs and opportunities have seen significant growth in recent years (Seaman, Allen, & Seaman, 2018; U.S. Department of Education, 2018) with continued and steady growth expected into the future. The ubiquity and newness of new online learning formats present a challenge in linking research and practice. Through three separate academic papers, the following dissertation discusses and considers key questions and topics with regards to the use of digital badges and Massive Open Online Courses (MOOCs), two types of emerging online innovations and platforms, and aspects of their efficacy. The three papers respectively 1) identify and discuss the theoretical and empirical foundations digital badges use in specific learners groups by reviewing current literature; 2) highlight the application of a use case in which digital badges have been implemented as a means to offer training; and 3) explore the perceptions of MOOC instructors toward quality learning in their courses in a case study. Conclusions are drawn and solutions as well as potential future directions for research and practice of discussed.

CHAPTER 1. INTRODUCTION

Continued Developments in and Expansion of Online Learning

Innovations in technology are not only changing everyday life for many individuals around the world but are also influencing the expansion of online learning opportunities at an accelerated rate (Collins & Halverson, 2018; Mah, 2016). Online learning allows for flexibility and increased access for those who otherwise may not be able to pursue higher education (Goodman, Melkers, & Pallais, 2019; Kizilcec et al., 2019). Furthermore, advancements in educational technologies afford learners access to existing instructional material as well as the ability to “find, curate, and create content and connect with people all over the world to share ideas, collaborate, and learn new things” (U.S. Department of Education, 2017, p. 3; see also Trust, 2017).

As educational technology continues to evolve and develop, we can also expect to see continued adoption and evolution of online learning and growth in institutions of higher education (Alexander et. al, 2019). Where it was once stigmatized as a less effective modality for teaching and learning (Haynes, 2017; Kizilcec, Davis, & Wang, 2019), online learning has become increasingly normalized, valued, and sought-after (Lederman, 2018). For example, a recent report of online education trends (BestColleges, 2019) found that “student perceptions of online learning quality and value are high... [with] 77% [stating] that distance education is better than or equal to on-campus options, and 88% said their degrees have or will have a positive [return on investment]” (p.3). Learners pursuing graduate degrees online steadily grew as 26% of graduate students are enrolled in an online program (U.S. Department of Education, 2018). While the majority of online learners continue to be full-time working adults, the demographics continue to evolve, becoming diverse among age, race, social class, and location characteristics, with learners being both fully and partially online learners (BestColleges, 2019; Lederman, 2018; Morin, Fard, & Saadé, 2019).

This shift toward online learning can be seen in higher education enrollment trends as the proliferation of online learning opportunities offered by universities and other organizations continues to rise due to the demand for a diversified set of online learning contexts (U.S. Department of Education, 2017; Seaman, Allen, & Seaman, 2018). As institutions of higher education seek to address an increasing set of new challenges such as declining enrollments and increasing globalization, online education is proving to be a key strategy to expand access to a broader student population (Wiley Education Services, n.d.) For example, Seaman et al.'s (2018) report shows a growth of 5.6% from Fall 2015 to Fall 2016 to reach 6,359,121 of students who are taking at least one distance course, representing 31.6% of all students. Similarly, the U.S. Department of Education's National Center for Education Statistics (2018) reported a 15.4% increase in students enrolled exclusively in distance education (or online learning) courses, and a 17.6% increase among students enrolled in a mix of distance and face-to-face courses in the Fall of 2018. It is important to note, however, that these statistics include traditional higher education structures of delivering instruction, though in an online or distance education format. Current and upcoming shifts in the occupational landscape call for new, alternative educational models that will need to deviate from traditional in-person classroom models of the past in order to provide great flexibility and autonomy to the learner (UPCEA, 2017; Matkin, 2018).

The evident growth in online learning opportunities and the array of formats and the ongoing development of educational technologies is manifested in a wide variety of models or platforms. Among the multiple innovations and formats that are emerging are digital badge systems and Massive Open Online Courses, which are more commonly known as MOOCs (Brown & Kurzweil, 2017). In recent years, there has been demonstrated growth in both the use of and participation in online learning opportunities through these formats (Hurst, 2015; Schroeder,

2018). These alternative modes of education are influencing a shift in how individuals are pursuing education, learning new content, and engaging with other learners throughout the world (Brown & Kurzweil, 2017; UPCEA, 2017). Digital badges and MOOCs provide alternative credential options for those who may not be interested in or have no need for traditional degrees, though both of these formats can and are being utilized in traditional educational contexts (Hurst, 2015). Both digital badges and MOOCs can serve as models for alternative credentialing can help meet the major shift in the market of adult learners for continuing education toward online learning opportunities that afford shorter, more focused, flexible, intense courses (Fong, Janzow, Peck, 2016; Matkin, 2018; UPCEA, 2017).

Problem and Purpose

Both the newness of online learning innovations and platforms such as digital badges and MOOCs as well as the increasing ubiquity of online learning opportunities warrant investigation and exploration. Doing so can help advance the understanding of how these online learning spaces can be best utilized to evaluate, verify, and contribute to student learning (Breslow, Pritchard, DeBoer, Stump, Ho, & Seaton, 2013; Padilla Rodriguez, Armellini, & Rodriguez Nieto, 2019; Prineas & Cini, 2011). Moreover, the extent to which institutions can scale up high quality online offerings with high student enrollments (Parker, 2004) by leveraging new innovations such as digital badges and MOOCs and maintain relevance in a rapidly changing industry while striving to serve a broader, more diverse range of learners (BestColleges, 2019; Sirgusa & Dixon, 2005) is a consideration of significant importance. Much of the literature on digital badges and MOOCs reference that much still remains unknown regarding their effective uses and strategies (e.g. Newby & Cheng, 2019; Iniesto, McAndrew, Minocha, & Coughlan, 2019). To this end, continued effort to bridge the gap between the theoretical underpinnings of pedagogy and learning in online

educational technologies as well as the practice and application thereof is greatly needed in order to contribute to the still young body of research and literature (Ma & Lee, 2019; Bennett et al., & Harper, 2007; Siragusa & Dixon, 2005).

The purpose of this dissertation is to introduce and discuss several relevant questions, topics, and inquiries related to digital badges, MOOCs, and the role they play in online learning conversations. Additionally, it is intended that this dissertation contributes to the advancement of the field that focuses on online learning in these two particular online models and formats by providing answers to important questions through scholarly research and examples of applied potential evidence-based practices. This has been accomplished by reviewing and identifying gaps in the respective literature on digital badges and MOOCs, conducting an empirical inquiry, and offering evidence-based solutions to challenges and issues. The result of this dissertation was three academic papers that have been submitted for publication in peer-reviewed journals.

Overview of Digital Badges and MOOCs

Digital Badges

A digital badge is a web-based visual graphic that represents a skill or competency earned by a learner for successfully completing a set of tasks or criteria outlined by a credible issuer (Ellis, Nunn, & Avella, 2016). Digital badges contain information regarding the requirements of the learner in order to earn the badge (Glover, 2013; Grant, 2014; Mah, Bellin-Mularski, & Ifenthaler, 2016; Mah, 2016) and can be shared and displayed on social platforms and online portfolios with peers, current or potential employers, and on social networks (Hope & Jones, 2016). Digital badges and their systems have multiple inherent affordances, many of which can motivate learner engagement and completion, and offer an alternative way to recognize, credential, and assess

learning (Abramovich, Schunn, & Higashi, 2013; Ellis et al., 2016; Fanfarelli & McDaniel, 2017; Jovanovic & Devedzic, 2015). Moreover, digital badges provide a shareable portfolio of visual representations of both credentials and skills to communicate individual competency and skill attainment (Cheng, Watson, & Newby, 2018) and have an “ongoing connection to sources that validate their issue” (Finkelstein et al., 2013, p. 2). This capability is unique and allows for transparency and social capabilities through shareable portfolios (Boticki, Baksa, Seow, & Looi, 2015).

Massive Open Online Courses (MOOCs)

MOOCs first came onto the scene in 2008 but became more prominent in 2012 (Altinpulluk & Kesim, 2016). In recent years, MOOCs have begun to play a larger role in the online education industry (Palvia et al., 2018). MOOCs stem from a vision to provide free public access to education in large, open courses offered in an online format that are designed to scale for a high number of learners (Barnes, 2013; Ferguson, Sharples, & Beale, 2015; Margaryan, Bianco & Littlejohn, 2015). Because of their open and free nature, many praise MOOCs for addressing important global issues such as educational access and affordability (Evans & Myrick, 2015; Ferguson & Clow, 2015).

As an emerging online learning context and due to their often large and globally diverse enrollment numbers, MOOCs can offer unique learning experiences for the learner (Haavind & Sistek-Chandler, 2015; Zheng, Wisniewski, Rosson, & Carroll, 2016) and tend to attract learners with diverse interests and goals (Walji, Deacon, Small, & Czerniewicz, 2016). In 2018, over 100 million learners enrolled in over 11,000 MOOCs (Shah, 2018). Moreover, many institutions and MOOC providers are finding new ways to utilize and package MOOCs as pathways towards degree programs and even offer full master’s degrees on their platforms (Baker, Passmore, &

Mulligan, 2018; Kurzweil, 2018; Reich & Ruipérez-Valiente, 2019). For example, the Georgia Institute of Technology developed a model for their online Master's in Computer Science to scale up to high enrollments while still offering a reputable program at an affordable cost to students (Goodman et al., 2016; Schroeder, 2018) through a partnership with U.S.-based MOOC platform provider edX.

Current Issues with Digital Badges and MOOCs

Digital Badges. Though digital badges are increasing in use, they have yet to fully become mainstream and prove themselves as a universal way to verify competency. Thus, the literature on digital badges is also young (Cheng, Watson & Newby, 2018; Law, 2015). Moreover, some conclude that “research implications [for digital badges] are quite broad and varied” (Gibson, Ostashewski, Flintoff, Grant, & Knight, 2015, p. 409). While the utilization of digital badges is on the rise (Blumenstyk, 2018; Gamrat, Zimmerman, Dudek, & Peck, 2014), the number of institutions and organizations that formally employ them remains relatively small.

Due to the still-limited application of digital badges, gaining a better understanding of the affordances of digital badges, such as exhibiting aspects of just-in-time training, as well as ways in which they can be utilized in a variety of settings, can contribute to current conversations and influence where the educational technology may continue in the future. While there does exist in the digital badge literature case studies and examples of implemented digital badges (e.g., Abramovich, Schunn, & Higashi, 2013; Boticki et al., 2015; Hope & Jones, 2016), the literature would benefit from more of these as digital badges become used in a wider range of educational contexts (both online and face-to-face) to inform evidence-based practices (Law, 2015).

MOOCs. Ongoing discussions regarding the instructional and learning value of MOOCs vary among scholarly and practitioner arenas (Brahimi & Sarirete, 2015; Czerniewicz, Deacon,

Glover, & Walji, 2017; Haggard, Wang, & He, 2014). For example, some correlate the overall low completion rates to poor instructional quality (Onah, Sinclair, & Boyatt, 2014), while others argue that course completion is an inaccurate indicator of MOOC success given the wide variety of reasons that brings a learner to a MOOC (DeBoer, Ho, Stump, & Breslow, 2014; Liu, Kang, & McKelroy, 2015; Zelinski, Hicks, Wang, Douglas, Bermel, Diefes-Dux, & Madhavan, 2017). Furthermore, some contend that instructional and learning quality is poor in most MOOCs (Margaryan, Bianco, & Littlejohn, 2015) and yet others claim it is feasible for MOOCs meet the standards of quality set for other online courses (Lowenthal & Hodges, 2015). The differing opinions of the uses for and direction of MOOCs warrant further discussion.

Along with the various differing opinions on MOOCs, there is an apparent gap in the literature regarding an important viewpoint, that being the perspective of the faculty or instructors of MOOCs (Evans & Myrick, 2015; Lowenthal, Snelson, & Perkins, 2018; Yengin, Karahoca, & Karahoca, 2011). The scarcity of instructor perspectives creates a need for this area of the literature to be developed (Deng, Benckendorff, & Gannaway, 2017; Lowenthal et al., 2018).

In addition to the projected continual expansion of online education in general in the future, the current issues and trends involving digital badges and MOOCs previously described poses a compelling need for scholars and practitioners to better understand how digital badges and MOOCs can affect learning and historical educational contexts. The inquiry in this dissertation attempts to accomplish the building of bridges between theory and practice.

Philosophy and Worldview

When commencing any form of inquiry, it is important that the researcher recognize the philosophy and worldview that shape his or her assumptions that can influence the interpretation and methodology of the research and data (Creswell & Clark, 2017). To this end, this dissertation

will briefly identify and discuss the theoretical frameworks and philosophies that inform the inquiry found within its subsequent chapters. A theoretical framework, as defined by Anfara (as cited in Given, 2008, p. 871), is “any empirical or quasi-empirical theory or social and/or psychological processes, at a variety of levels (e.g., grand, midrange, explanatory), that can be applied to the understanding of phenomena.” The theoretical frameworks implemented in this dissertation will be described individually in detail in chapters two through four. Given that the individual academic papers had varied foci and purposes, this dissertation was influenced by a pragmatic as well as a social constructivist worldview.

Pragmatic Worldview

As a worldview, pragmatism "arises out of actions, situations, and consequences rather than antecedent conditions" (Creswell, 2014, p. 10). Pragmatism strives to identify and explain tangible improvement to everyday contexts and is based heavily on our belief and actions (Dewey, 1938; Korte & Mercurio, 2017). Moreover, pragmatism focuses on the application of how phenomena and/or processes work as solutions to problems (Patton, 1990). Creswell (2014) further explained that a pragmatic worldview affords individual researchers the latitude to choose methods, techniques, and procedures that best meet their needs and purposes.

The orientation towards real-world practice and application as well as understanding online learning through new formats is fittingly represented by a pragmatic worldview. From the very beginning of my doctoral studies, a key focus of my research has been on exploring and understanding the value, application, and impact of learning theories and emerging educational technologies in real-world contexts. Having a pragmatic philosophy and worldview has allowed me to meet objectives of my academic papers that comprise this dissertation, especially in reviewing the literature of digital badge use among specific learner groups and highlighting a

practice-oriented use case of digital badges as a means of training. However, the greater contribution of this worldview for this dissertation is found by how it can help inform evidence-based practices for others in the field of online education.

Social Constructivist Worldview

The other worldview that has been influential, particularly in my study on MOOC instructor perceptions regarding quality learning in their courses, is social constructivism. Creswell (2014) described social constructivists as believing that an individual's search for meaning is influenced by and dependent on the world or context in which he or she lives. Researchers with this worldview “look for the complexity of views rather than the narrowing meanings into a few categories or ideas” (p. 8). Even more so with social constructivism (as opposed to just a constructivist worldview) is the premise that meanings are formed through interactions with others as well as influenced by historical and cultural factors. In the case study on MOOC instructor perceptions, the participants’ responses were interpreted through the lens of social constructivism, placing significant emphasis on how the MOOC instructors perceived quality learning in their courses via social interactions.

Dissertation Organization

This dissertation follows a format consistent with journal article papers and consists of three articles that have been or will be submitted for publication in peer-reviewed journals. These three articles comprise chapters two through four and address the previously mentioned issues and trends. Chapters 2 through 4 are summarized as follows:

Chapter 2

- **Title.** Digital Badge Use in Specific Learner Groups

- **Problem of/need for review.** Digital badges are being utilized more and more in educational contexts and among various groups of learners. The literature and use cases for them are still in their infancy.
- **Purpose.** Review of the theoretical underpinnings as well as empirical research within the digital badge literature to contribute to both the scholarly research of digital badges as pedagogy as well as potential effective or evidence-based practices for implementation among learner populations.
- **Research questions.** What are the underlying learning and motivation theories that inform or influence the employment of digital badges? How have digital badges been utilized as both a means of credentialing as well as instruction among various educational contexts and specific learner groups?
- **Research design.** Review of relevant literature.
- **Methods.** Digital badges have and are being used in a wide range of learner contexts; however, this literature review focused primarily on specific learner groups within educational settings, specifically higher education, K-12, and adult learners and used relevant search terms.
- **Analysis and Results.** Four main learning and motivation theories emerged as prominent underpinnings (though not exclusive) of digital badges: behaviorism, goal-setting theory, constructivism, and gamification. Additionally, examples of empirical studies of digital badges used among the specified learner groups (higher education, K-12, and adult learners) found in the literature were highlighted.
- **Conclusion.** Much of the current research on digital badges used in the field in specific learner groups tends to focus more often within higher education, though other learner

groups, such as adults, are beginning to emerge as well. Not all reactions or opinions of digital badges are positive, as the perceptions of digital badges among instructors and learners can be polarizing regarding their ability to motivate learners. Additional research on the use of digital badges is needed, and several directions for research and the implications thereof are discussed.

- **NOTE.** This article has been published in the International Journal of Innovative Teaching and Learning in Higher Education.

Chapter 3

- **Title.** Utilizing Digital Badges as a Means to Train Student Tutors
- **Problem of/Need for Review.** There are relatively few empirical studies or examples that examine or highlight digital badges as a means of delivering training and instruction.
- **Purpose.** This paper depicts one specific example in which a three-phased implementation approach of digital badges was determined to be an effective platform to deliver and verify training at a large, comprehensive land-grant university. Digital badges were implemented specifically for college students who serve as tutors to student-athletes. The overviewing of a specific use case of digital badges offers insight into implications for practice, as well as potential needs for future research on digital badge use as a mechanism for training and instruction.
- **Conceptual framework.** Just-in-time training is a concept of training that aligns with digital badge affordances, enabling specific training to a learner when and where they need it.
- **Design of Digital Badges.** In this instance, the affordances of digital badges to offer just-in-time training and credential or verify learning has occurred was viewed as a very positive

aspect. Furthermore, the badges were designed to offer convenience, flexibility, and tailored specific to relevant topics that each student tutor would need to know.

- **Discussion.** This case identifies digital badges as a viable, engaging training tool and designed with consideration of the learners; this conveys the wide application and versatility of digital badges as a means to deliver instructional content and verify or assess competency. In this case, digital badges are seen to offer solutions to 1) actively engage learners (student tutors) in the training material as a means for offering instruction, and 2) provide full-time staff with greater ability to verify that learning and knowledge acquisition had taken place for each individual tutor.
- **Conclusion.** Additional use cases and examples that provide insights from evaluating digital badges will be valuable to both practice and literature. As more and more educational institutions and others look to digital badges as a means of offering training, research should be conducted to verify their effectiveness and how they are being received on a large scale. This specific use case would benefit from further in-depth investigation through perhaps a mixed-methods approach to better understand digital badge effectiveness.

Chapter 4

- **Title.** Instructor Perceptions of Quality Learning in MOOCs They Teach
- **Problem of Study.** Few studies and articles in MOOC literature give voice to the perspectives of the instructors of the MOOCs. There is an even greater lack of instructor perceptions of the quality of the learning that can and/or does occur in the MOOCs they teach. The scarcity of instructor perspectives creates a compelling need for this area of the literature to be developed.

- **Purpose.** Explore the perceptions that instructors of MOOCs have regarding the level of quality learning that can and/or does occur in the MOOCs they teach, focusing on social interaction. This insight can greatly contribute to relevant literature, scholarship, and practice.
- **Research questions.** What are MOOC instructors' perceptions of quality learning? What factors do MOOC instructors believe influence or enable quality learning? What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning? How do instructors perceive social learning as influencing quality learning in a MOOC?
- **Theoretical framework.** Social constructivism and social learning theory focusing on the learning process through social interaction with MOOC spaces (i.e. discussion boards and social media).
- **Research design.** This study took a qualitative research approach to gather data and insights on MOOC instructor perceptions.
- **Methods.** Utilized semi-structured interviews with instructors as the primary source of data in addition to course document reviews as a secondary source to provide examples of instructor perceptions in practice as well as triangulation. Together these sources were developed into a multiple case study design, one based on exemplars as the basis of replication logic. This type of multiple case study design involved selecting cases, conducting the case studies, writing individual case reports, and drawing cross-case conclusions.
- **Analysis.** Transcripts from the interviews were analyzed through a combination of predefined (a priori) codes and emergent codes to categorize, summarize, and condense

data into themes based on conceptual overlap and then into broader themes that aligned with principles of social constructivism. Trends and patterns from the data were then developed dependent on the extent to which the themes answered the research questions. The course document review looked specifically at the discussion threads of the MOOCs taught by participants to look for examples of potential social learning taking place and were revealed through instances of interactions between instructors and students. Trustworthiness was established throughout the study to ensure credibility through data triangulation and member checking was conducted following the data analysis stage to allow participants to review and confirm our data and interpretations. Transferability was addressed through purposive sampling. An external audit of the research by faculty experts (N = 3) served to help with dependability. Confirmability was established by ensuring research protocols were based in the literature.

- **Results.** After analysis of the data three themes emerged: 1) instructors perceive that social interactions in MOOCs can foster quality and meaningful learning experiences for both learners and instructors, 2) instructors perceive that learner goals and interests can influence their participation and learning in MOOCs, 3) instructors perceive social learning in MOOCs through discussion boards.
- **Discussion.** The main themes that emerged in this study contribute to the discussions on how MOOCs can be used to foster quality learning for people from diverse backgrounds, experiences, and learning goals through social interaction. These themes can also contribute to a broader framework for evaluating the effectiveness of a MOOC.
- **Conclusion.** With little scholarly work that focuses on instructor perceptions toward learning that occurs in their MOOCs in the current literature, the findings from this study

fill this current gap. Exploring and highlighting additional viewpoints of MOOC instructors can be beneficial to the ongoing research, practice, and discussion regarding MOOCs as viable learning opportunities. The increased understanding gained from this study and other similar studies can help inform the instructional design, ongoing research, practice, and discussion of MOOCs and how learners can learn in these unique online environments.

NOTE. This article has been published in the Online Learning Journal, Special Conference Issue: AERA Online Teaching and Learning.

Chapter 5

The fifth and final chapter presents a discussion of the conclusions and implications drawn from the dissertation – a culmination of the three individual academic papers.

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CHAPTER 2: DIGITAL BADGE USE IN SPECIFIC LEARNER GROUPS

Abstract

As educational technology continues to advance, new technologies continue to enter the scene that seek to enhance the delivery and reception of learning in both academic and industry settings. Digital badges are a recent educational innovation that has unique characteristics and capabilities that can allow for individualized pathways for learning and are being implemented in a variety of settings and for multiple purposes. This article reviews the literature on digital badges and four of their core theoretical underpinnings – behaviorism, goal-setting, constructivism, and gamification theory – as well as empirical studies that highlight the contexts and specific learner groups in which digital badges are being utilized. This review contributes to both scholarly research and practical applications of digital badges and offers potential directions for future research involving digital badges.

Keywords: Digital badges, behaviorism, goal-setting theory, constructivism, gamification theory, game theory, educational technology, groups of learners

Introduction

Educational technology's impact on how instruction is delivered is ever-changing as new technologies enter the academic and industrial scene on a seemingly regular and consistent basis (Mah, 2016), prompting ongoing evolutions to how education is delivered but also how it is assessed and awarded. Some research identifies current and upcoming shifts in the occupational landscape that call for new educational models (UPCEA, 2017). Digital badges are one educational technology tool with unique characteristics and capabilities that make them “well suited to foster the pursuit of individualized pathways for learning” (Finkelstein, Knight, &

Manning, 2013, p.3; see also Põldoja, Jürgens, & Laanpere, 2016) and can meet the evolving needs of learners.

A digital badge is a web-based visual graphic that represents a skill or competency earned by a learner who successfully completes a set of tasks or criteria outlined by a credible issuer. Figure 1 provides an example of a digital badge used by Purdue University for a summer program for incoming undergraduate students issued using the University's internal digital badge platform known as Open Passport in 2016. Due to their digital format, a digital badge also contains information regarding the requirements of the learner in order to earn the badge (Glover, 2013a; Grant, 2014; Erickson, 2015; Mah, Bellin-Mularski, & Ifenthaler, 2016; Mah, 2016). Learners are able to display and share these badges via online portfolios with peers, current or potential employers, and on social networks (Hope & Jones, 2016). Digital badges and their systems have multiple inherent affordances, many of which can provide motivation to learners, and offer an alternative way to recognize, credential, and assess learning (Ellis, Nunn, & Avella, 2016; Fanfarelli & McDaniel, 2017; Jovanovic & Devedzic, 2015). Moreover, digital badges provide a shareable portfolio of visual representations for both credentials and skills to communicate individual competency (Cheng, Watson, & Newby, 2018; Finkelstein et al., 2013).

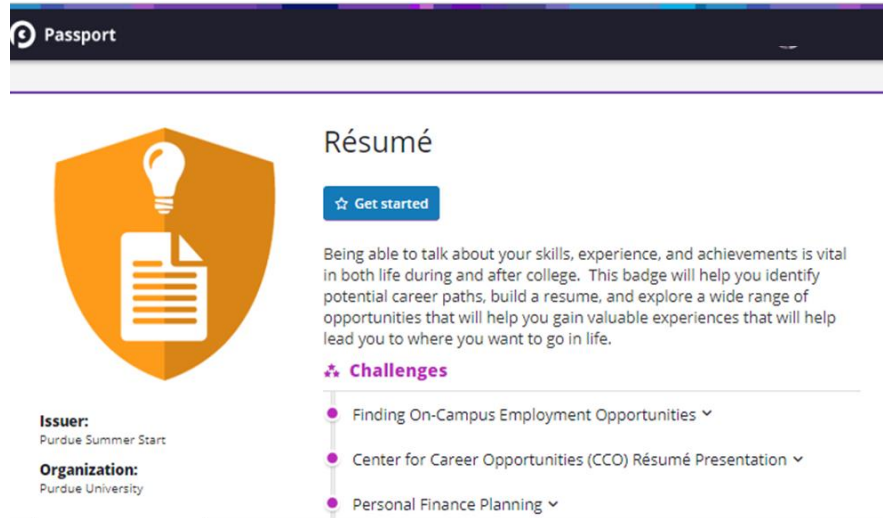


Figure 1. Example of digital badges used by Purdue University's Division of Summer Session's Summer Start program in 2016

Digital badges may never fully replace the traditional academic transcript, which only show the name of courses (often abbreviated) and the grades earned therein by the learner. However, digital badges can show a more detailed and arguably more complete picture of what the individual knows and can do (Matkin, 2018) that can be easily communicated through shareable platforms at the discretion of the learner (Bowen, 2014; Hope & Jones, 2016; Ostashewski & Reid, 2015) and can also recognize prior learning (Educause, 2014). With a wide range of application, many institutions and organizations are using digital badges in multiple industries as they gain traction in both formal and informal educational settings. Open Badges by Mozilla appears to be the digital badging platform most widely used by a variety of organizations (Open Badges, n.d.), but the complete list of digital badge-issuing platforms and the organizations that utilize and display them is not entirely clear (Badge Alliance, n.d.; IMS Global Learning Consortium, n.d.). Some institutions, like Purdue University and University of California-Davis, have developed their own digital badge issuing platforms for internal use (Fain, 2014).

Gibson, Ostashevski, Flintoff, Grant, and Knight (2015) conclude that “research implications are quite broad and varied” (p. 409). While the utilization of digital badges is on the rise (Blumenstyk, 2018; Gamrat, Zimmerman, Dudek, & Peck, 2014), the number of institutions and organizations that formally employ them remains relatively small. While the empirical investigation of the use of digital badges in educational contexts among special learner groups in the literature continues to increase with time, the use of digital badges within educational contexts and specific groups is still in its infancy (Law, 2015). This literature review will consider the following questions: 1) what are the underlying learning and motivation theories that inform or influence the employment of digital badges, and 2) how have digital badges been utilized as both a means of credentialing as well as instruction among various educational contexts and specific learner groups? To this end, the nature, definitions, theoretical underpinnings, and findings of empirical studies related to these questions within the literature will be reviewed, discussed, and synthesized. Recommendations regarding future research will also be offered.

Conducting this review of the theoretical underpinnings as well as empirical research within the literature contributes to both the scholarly research of digital badges as pedagogy as well as best practices for implementation among learner populations. While digital badges have been and are being used in a wide range of learner contexts, such as industry, business, education, sports, and even entertainment (Ellis et.al, 2016), this literature review will focus primarily on specific learner groups within educational settings, specifically higher education, K-12, and adult education.

Background

Recent advances in information technology have created a new paradigm (Reigeluth, Watson, & Watson, 2012) for how people obtain skills and knowledge and afford individuals

access to education without passing through a traditional, residential college or university experience (Matkin, 2018; Voorhees, 2001). The increase in the population of learners who are attracted to the conveniences these new technologies offer and the creation of an alternative “ecosystem” of credentialing (Olneck, 2012; Clayton, 2014; Halavais, 2013) have been the impetus for institutions of higher education in considering ways to adjust current systems to allow for use of new educational technologies (Reigeluth et al., 2012). Voorhees (2001) speaks of a developing connection between traditional educational paradigms and “the learning revolution can be found in competency-based approaches” (p. 5). One new competency-based curriculum and an example of open educational technology gaining momentum and popularity is the digital badge.

A digital badge is a visual, online representation of the earning or accomplishment of a skill or competency by a learner, containing optionally visible metadata to give context to what was required to earn it (Finkelstein, Knight, & Manning, 2013; Gamrat, et al., 2014; Gibson et. al, 2015; Glover, 2013a; Grant, 2014; Morrison & DiSalvo, 2014; Erickson, 2015; Mah, Bellin-Mularski, & Ifenthaler, 2016; Mah, 2016). Just as many cultures have had long-standing customs of awarding physical tokens such as medals and ribbons to represent accomplishment of some skill or feat, digital badges offer online evidence of knowledge, competencies and skills (Ostashewski & Reid, 2015).

Digital badges create a gamified system that motivates and allows learners the ability to advance through challenge levels in formal and informal learning environments (Alliance for Excellent Education & Mozilla Foundation, 2013; Carey, 2012; Reigeluth et al., 2012; Sullivan, 2013). The use of digital badges is gradually becoming more prolific and more mainstream in higher education as well as professional and workforce development audiences (Ahn, Pellicone, & Butler, 2014; Goligoski, 2012; Phelan, 2012; Jovanovic & Devedzic, 2014; Matkin 2018).

Ostashewski and Reid (2015) note that, “[digital] badges allow users to selectively display badges on websites, social media pages, online profiles and resumes as claims of achievement...,” which contributes to them “quickly becoming a new method of validating and representing learning” (p. 187).

It is significant that there has been less than a decade of research on digital badges, making it still a nascent field of study (Cheng et al., 2018). Within the current body of research in the literature, digital badges occupy three main roles: motivating learner behavior, serving as a pedagogical tool, and serving as a form of credentialing (Ahn et al., 2014; Cheng et al., 2018). This literature review will consider four major theoretical underpinnings or frameworks of digital badges: behaviorism, goal-setting theory, constructivism, and gamification theory. Synthesis of scholarly work will demonstrate connections and foundations within these theories. Following the theoretical research review, this paper will review empirical research as it relates to specific learner groups in educational contexts, specifically higher education, K-12, and adult education.

Review of the Literature

Underlying Learning and Motivation Theories of Digital Badges (Theoretical Research)

The use and implementation of digital badges within educational contexts merits consideration of the theoretical frameworks upon which they are based. A review of empirical research regarding these contexts will be reviewed and discussed later. This literature review will first consider the underlying learning and motivation theories and frameworks of digital badges. While other theories may also be utilized by digital badges, the primary learning and motivation theories that will be of focus are behaviorism, goal-setting theory, constructivism, and game theory or gamification.

Behaviorism. Within the context of learning, behaviorism focuses on strategies that reinforce and build responses to stimuli (Ertmer & Newby, 2013). According to Blackburn, Porto and Thompson (2016), behaviorism is at the cornerstone of competency-based curriculum. Digital badges are an educational tool that represents the achievement of certain and specific competencies and skills. Digital badges in educational settings employ behavioristic strategies (Kappes & Berto, 2015), among other learning and motivation theories, to provide motivation, positive reinforcement and extrinsic rewards for accomplishment (see also Abramovich, Schunn & Higashi, 2013).

There are several characteristics of digital badges that exemplify behaviorism. A specific behavior is more likely to reoccur if it has been rewarded and reinforced (Driscoll, 2005). Digital badges serve as a credential or evidence-based documentation that is earned when specific criteria, levels, and requirements are achieved (Ostashewski & Reid, 2015). This aligns with behaviorism in that digital badges are structured around a target stimulus for the learner, providing “opportunities for the learner to practice making the proper response” (Ertmer & Newby, 2013, p. 50) to meet the criteria in order to earn the badge. Moreover, learner motivation and positive reinforcement by way of external rewards can be essential to learning (Ray, 1992). One learning-related motivation framework that is helpful to understand the foundations of badges is Elliot’s (1999) achievement goal theory (Abramovich et al., 2013), which explains the different types of motivation as a result of desire to master a new skill, to demonstrate one’s ability, and to avoid exposing one’s lack of ability or underperforming.

Although there have been debate and controversy over the use of external rewards in educational contexts, such strategies are commonly used to support achievement and appropriate behavior (Denny, 2013; Filsecker & Hickey, 2014). In the case of digital badges, a learner

progresses towards earning a reward for the completion of tasks or skill competency. The establishment and awarding of these rewards promote learning in significant ways (Ostashewski & Reid, 2015). Dweck (1986) noted that adaptive learners are motivated to and “appear to enjoy exerting effort in the pursuit of task mastery” (p. 1040), incrementally motivating learners to complete tasks or challenges until ultimately earning the full badge. Motivation to learn through a digital badge is often the result of flexibility, autonomy, and access that a learner may have to attain relevant and applicable skills to their individual learning goals (Acclaim, n.d.; Glover, 2013a; 2013b; Goligoski, 2014). Additionally, there are other external indicators such as incentives for the pursuit of the completion of a task through a gamified platform (Zimmerman & Cunningham, 2011; Ahn et. al, 2014) afforded in digital badges can influence learner motivation.

Some scholars within the literature have found drawbacks to the use of external motivators via digital badges. Skeptics of digital badges see rewarding students for learning as cheapening the learning process by removing intrinsic rewards that sustain learning as the end goal (Reid, Paster,& Abramovich, 2015; Rughinis & Matei, 2013). By giving experimental participants external rewards at different times in a study, Deci (1971) found that if intrinsic motivation is the goal, then the nature of the external rewards matter. Additionally, employing digital badges may not have the same outcome for all learners, as found by Abramovich, Schunn, and Higashi (2013) who identified differential relationships to the motivation of learners with varying skill sets and abilities.

Goal-Setting Theory. Though developed in the research realm of industrial and organizational psychology (Locke & Latham, 1990, 2002), many researchers on digital badges have argued goal-setting theory to motivate learners in educational contexts as being a foundational component to digital badges (Antin & Churchill, 2011; Chou & He, 2017; Gamrat et

al., 2014; McDaniel & Fanfarelli, 2016; Randall, Harrison, & West, 2013). Furthermore, the strong relationship between goal setting and digital badges also positions digital badges as being able to expand their impact as a pedagogical tool due to inherent goal setting and achievement aspects (Cheng et al., 2018).

According to Locke and Latham (2006), goal-setting theory “implies discontent with one’s present condition and the desire to attain an object or outcome” (p. 265), and motivates a person to achieve the desired object or outcome. Extrinsically- or intrinsically-motivated goals can be both present in the design and administration of digital badges for educational or training purposes (Reid et al., 2015). While digital badges are often thought to provide extrinsic motivation (Cucchiara et al., 2014; Rughinis & Matei, 2013), digital badges can also be used for achievement of intrinsic and learning goals as long as they are not too heavily-focused on or encouraging of the mere collection of badges (Rughinis, 2013). In addition, the completion of each activity and digital badge can serve as a pathway of stepping stones, completing sub-goals along the journey to larger educational goals (Cheng et al. 2018).

Motivation to engage in or complete digital badges can also increase commitment to goal attainment in a variety of ways. Two ways in particular include the fostering of self-efficacy and the shareable and publicity affordances of digital badges. For example, digital badges have the potential to enhance goal commitment as they facilitate recognition of each learning milestone achieved, encouraging learners to continue to set new and challenging goals (Randall et al., 2013).

Constructivism. While behavioral theories are based on the philosophy that knowledge and the world are tangible and external to the learner, “constructivism is a theory that equates learning with creating meaning from experience” (Ertmer & Newby, 2013, p. 55). Constructivism’s main premise is that knowledge is continuously constructed by learners as they

make sense of what they experience (Driscoll, 2005; Schunk, 2000), resulting in learning being a life-long process that evolves as the learner experiences and acts in various situations (Brown, Collins, & Duguid, 1989; Ostashewski & Reid, 2015). Digital badges also embody some attributes of constructivist theory.

Instructional and educational strategies that allow the learner to be more self-directed and autodidactic (Phelan, 2012) constitute a form of constructivism. Digital badges can be designed in ways that offer multiple learner pathways with real-world application (Ostashewski & Reid, 2015), which can enable learners to select skills and competencies that are relevant to their individual goals, learning styles, and circumstances (Driscoll, 2005, Kappes & Betro, 2015; Põldoja, et. al, 2016). Moreover, digital badges are also influencing and changing the structures and parameters by which people have grown accustomed to thinking about education, that traditional, formal educational settings are the gatekeepers authorized to grant access to learning (Duncan, 2011; Phelan, 2012). The opening of educational access via digital badges is reflective of constructive processes. Learners given the autonomy over their own learning process are more likely to “engage in meaningful learning activities and ultimately achieve favorable development and learning outcomes” (Furtak & Kunter, 2012, p. 285).

Individuals who learn through e-learning media, such as digital badges, can often have more control over or customization abilities regarding when and what they learn (Gamrat, et al., 2014). Self-regulated learners must also be self-motivated to make the connections between what they already know and can do with the expected or new experience, knowledge and behavior (Clayton & Saravani, 2014). In other words, they must continue to build on their constructive scaffolding, which also can be inherent in digital badge systems as learners progress through task completion and advancing to more complex challenges.

Social constructivism, or social learning, places emphasis on the importance of culture and context (McMahon, 1997) and views meaningful learning as a social process that occurs when learners engage in social activities (Kim, 2001; Lave & Wenger, 1991; Vygotsky, 1978). Vygotsky's theories of development include social constructivism as being focused on how the environment and interactions with others, along with support and scaffolding in the instruction, can influence the individual learning process (Lave & Wenger, 1991; Toven-Lindsey, Rhoads, & Lozano, 2015). Digital badge platform affordances often include the technology that can provide opportunities and spaces wherein meaningful learning through social activities occur (Herrington & Oliver, 1999) by way of discussions, sharing, and viewing the achievements and digital badges of other learners.

Gamification Theory. In addition to a basis in behavioral and constructive learning theories, digital badges operate similarly as video-game models (Abramovich et al., 2013; Shields, R., & Chugh, R. (2017), often referred to as game theory or gamification. Though a formal definition remains to be contested, Deterding, Khaled, Nacke, and Dixon (2011) define gamification as the use of game design elements of which possibilities are unlimited, in a non-game environment or context, which may often be manifested when the game elements are used for a different purpose than their typical expected use, such as video games. Gamification as a motivation learning theory is closely linked with behaviorism and its use is beginning to emerge in education as a means to motivate and rewards learners (Delello, Hawley, McWhorter, Gipson, & Deal, 2018; Hamari, Koivisto, & Sarsa, 2014).

Easley and Ghosh (2016) noted a proliferation of game-theoretic approaches being used in the design of digital badge systems in many contexts for instructional and learning purposes. Furthermore, Ostashewski and Reid (2015) identified three intended outcomes of digital badges

as a gamified framework for accomplishment and achievement. First, digital badges act as a source of positive feedback and reward for when learners accomplish particular tasks. Second, digital badges possess a social component in that learners can compete against one another in pursuit of badge achievement and evidence of learning are shareable with others via social networks. Third, digital badges are designed to foster a sense of accomplishment, motivating learners to progress toward advanced learning materials. Similar to video games and other games used primarily for entertainment, digital badges reward the learners as they meet certain criteria or requirement, demonstrate mastery of skills to complete tasks, and progress in complexity (Kappes & Betro, 2015; Phelan, 2012).

The four theories discussed are not exhaustive as it could be argued that other theories are also foundational to digital badge use. These learning and motivation theories discussed here share many connections or areas of overlap, as seen in the context of digital badges. Some examples of these intersections include:

- Reflection of how digital badges and gamification are tools for motivating learners (Glover, 2013a)
- External rewards are especially important when elements of self-direction and autonomy are required of the learner (Glover, 2013b)
- Investigation of the effects that external rewards have on motivation, engagement and learning while playing an educational game (Filsecker & Hickey, 2014)
- A Self-Regulated Learner is an “[individual] who actively and consciously controls [his or her] own learning from cognitive, affective [(constructivist)], motivational and behavioral [(behaviorist)] points of view” (Cucchiara, et. al., 2014, p. 134)

- In some instances, giving the learner greater autonomy can serve as the reward that motivates them to increase engagement and participation (Furtak & Kunter 2012).

Table 1 briefly summarizes and identifies how elements or characteristics unique to digital badges connect to the theories that have been discussed. These theories also inform the empirical studies of digital badges among specific learner groups that will now be reviewed in this paper. The theoretical frameworks for such studies have guided the research questions and analysis of findings to coalesce into increased understanding of digital badge effectiveness and viability as a means of instruction and credentialing.

Table 1. Summary of Digital Badge Elements Present in Key Learning and Motivation Theories

Digital Badge Elements	Behaviorism	Goal-Setting Theory	Constructivism	Gamification/Game Theory
Motivating and rewarding learners for achievement	When specific criteria, levels, and requirements are achieved, the learner is rewarded	Badge design can include both extrinsically- or intrinsically-motivated goals	Learners are more likely to engage in and achieve learning outcomes when given autonomy over their own learning process	Designed to foster a sense of accomplishment, motivating learners to progress and continue to advanced learning materials
Shareable on professional and social networks	Learners complete tasks or challenges until ultimate earning of the full badge that can be visible to others	Fosters goal commitment by publicly recognizing achieved learning milestones and encouraging learners to set new goals	Meaningful learning is a social process that occurs when learners engage in social learning activities	Learners can compete against peers in pursuit of badge achievement and evidence of learning can be easily shared with others
Visual representation of achievement, knowledge, skill, or competency	Badges can contain optionally visible metadata to give context to what was required to earn it	Earning visual graphics of badges promote the continued pursuit of extrinsic and intrinsic goal achievement	Learners can select skills and competencies that are relevant to their individual goals, learning styles, and circumstances	Badges reward the learners with visual graphic as they meet criteria, demonstrate mastery of skills, and progress to tasks with increased complexity

Digital Badges in Specific Learner Groups (Empirical Research)

The versatile and widely applicable capabilities inherent in digital badges give it substantial potential for application and use in a multitude of formal and informal educational settings (Davies, Randall & West, 2015; Glover & Latif, 2013; Glover, 2013b; Gibson et al., 2015; Ostashevski & Reid, 2015) such as higher education, K-12 and adult education. Digital badges “provide a learning ‘map’ to [learners to]... tailor their learning experiences, seek learning opportunities, and

receive badges that align with what employers are seeking” (Alliance for Excellent Education & Mozilla Foundation, 2013, p. 7; see also Ruff, 2016).

Higher Education. Recently, digital badges have begun to be utilized and examined among specific learner groups within higher education settings (Delello, et al., 2018; Diaz, 2013, Law, 2015). Some studies, for example, have seen increases in learner participation and contributions as well as enjoyment in the learning process through using digital badges (e.g. Denny, 2013). When Glover and Latif’s (2013) pilot study explored Open Badges at City University of London, they found students were enthused by the possibilities and applications of Open Badges and initially skeptical students developed favorable attitudes once they obtained a full conceptual understanding. Such is likely to be, and has been, the case as the benefits and uses of digital badges and other educational technologies for educational purposes become more sophisticated and embraced by educators (Groves & Zemel, 2000). Further evidence can be found at Purdue University, where the institution has not only developed its own internal, standalone badging system, but has also significantly integrated competency-based curriculum in one of its colleges to the extent of having digital badges included on students’ transcripts (Purdue Polytechnic Institute, n.d.).

Digital badges are also being used at colleges and universities for less formal, non-academic purposes. For example, Ippoliti (2014) highlighted an initiative that incorporated the creation of a digital badge to provide just-in-time customer service training to library employees at the University of Maryland. Other universities are using digital badges to help enhance students’ resumes for when they enter the job market (Rubin, 2018).

Other research and scholarly work suggest that the implementation of digital badges in higher educational settings can have other, perhaps less obvious impacts on learners. For example,

Mah (2016) purports that a systematic synthesis of digital badges and learning analytics or learning management systems “both show promise for enhancing student retention in higher education” (p. 285). Mah’s model can, in short, help higher education officials use learning analytics to identify generic academic skills in which learners are deficient or in need of remediation. It is possible that deficiencies could be improved through administering digital badges specific to the competencies most needed by the student. This model, however, has yet to be tested in an empirical study among a learner group.

K-12. In addition to learner groups in higher educational contexts, digital badges have also been implemented in younger groups in the K-12 settings (Shields & Chugh, 2017). The findings from a study of digital badges used in a high school program by Davis and Singh (2015) studied the use of digital badges among a group of high school students in an afterschool program. Their case study used focus groups and interview methodology to understand the experiences and perspectives of learners, teachers and staff involved in this program. The study provided new insights into “factors affecting the success or failure of implementing a digital badge system in an informal context” (p. 73). Interestingly, participants described perceived credibility of the content and platform as a concern or challenge. For example, while many participants recognized the value of being able to share and communicate learning and competency attainments, these learners also worried whether or not that learning would be viewed as credible to important external audiences, such as college admissions committees and employers. It is difficult to predict how acceptance of digital badges by external audiences in terms of credibility may result in the future. Using 305 students in a primary school in Singapore as a specific learner group, Boticki, Baksa, Seow, and Looi (2015) “presented a mobile learning platform that utilizes contextual question prompts, virtual badges and allows for collaborative learning” (p. 136). Their findings

included a prediction of student's end-year assessment score on a science examination that was linked to the students' completion of digital or virtual badges.

Research on the use of digital badges in educational contexts has produced mixed results among various learner populations. In a study of over 50 middle school students in a low-income city in North America, Abramovich, Schunn, and Higashi (2013) found badge acquisition patterns varied based on learner types and different badge types seemed to appeal to or motivate learners differently. Furthermore, Abramovich et al., (2013) found "evidence that earning various badges can be associated in increases in expectations for success but also increases in counter-productive educational goals" (p. 229).

Adult Education. Digital badges have great potential and use among adult learner groups as well. Adult learners are typically understood to be 25 years or older and not pursuing a traditional, residential college degree (National Center for Educational Statistics, n.d). Finkelstein, Knight, and Manning (2013) highlight the capability of digital badges as a "potentially powerful and efficient tool to bring meaning to datasets that reflect individuals and their achievements" (p. 3) that can be used as a way to educate and document professional development (Educause, 2014) and non-credit learning accomplishments (Dyjur & Lindstrom, 2017). In addition, digital badges as a form of alternative credentialing can help meet the major shift in the market of adult learners for continuing education "toward shorter, more focused, and intense courses" (Matkin, 2018, p. 3) allowing them greater flexibility and more options that result in immediate value (UPCEA, 2017).

One example where digital badges have effectively been used is seen among a specific learner group with unique needs: refugees. The Chronicle of Higher Education (Ruff, 2016) reported that "for many college graduates who are migrants, documentation has been lost or simply doesn't translate to a European degree, so the program is using digital badges to fill in the gaps

and provide them with evidence of their applicable skills in information technology.” The wide-ranging application of digital badges, particularly among adult learners, shows promise and potential.

Digital badges have also been used at the university level but in an informal learning setting. Law (2015) conducted multiple studies in 2013 and 2014 in an open learning online space that involved a wide range of learners, though the majority were adult learners (age 25 and older), who participated in a digital badging pilot study offered by the Open University in London, England. The findings from Law’s studies show that learners do seek out acknowledgement of learning achievement for informal learning activities. While no formal recognition was given for badge completion, such as a degree or certificate, the digital badges provided a way to motivate and reward this specific learner group.

Conclusion

This review of the literature has considered both the theoretical underpinning and multiple empirical investigations of the use of digital badges. The majority of research on digital badges used in the field in specific learner groups tends to focus more often on higher education. However, it appears that given the characteristics and affordances of digital badges, specifically with regard to flexibility and motivation, that digital badges are well suited to serve adult learner populations in less formal or informal educational settings, as some studies have shown (Diamond & Gonzales, 2014; Law, 2015; Ruff, 2016).

It is also important and not surprising to note that throughout the empirical investigation among various learner groups, outcomes from digital badge use are not always positive. While badges have an array of benefits and characteristics that yield positive learning outcomes, there are also shortcomings. The benefits of motivating learners through a gamified system that

promotes flexibility and autonomy may only have short-term effects. To continue to understand in what context and among which groups digital badges can best be utilized, additional research and consideration among a wider range of specific learner groups is recommended. The perceptions of digital badges among instructors and learners have been found to be polarizing (Foli, Karagory, & Kirby, 2016) as it relates to their ability to motivate learners to learn; this makes it difficult to recommend that digital badges be used in all contexts and with all learner groups. The instructional design of digital badges will also influence the actual and perceived effectiveness (Finkelstein et al., 2013; Shields, R., & Chugh, R. (2017).

Given that digital badges are still new and gaining adoption within educational contexts (Gamrat, et al., 2014), there is a substantial amount of future research needed that can go in multiple directions (Gibson et. al, 2011). After having reviewed much of what has already been studied and published in the literature on digital badges, there are several implications for future research:

1. Digital badges are becoming increasingly embraced and integrated within traditional educational structures (Gamrat, et al., 2014). However, additional studies on the organizational strategies and changes that are required by institutions of higher learning that want to integrate the use and credentialing of digital badges into pedagogy and curriculum would contribute greatly to the literature. If digital badges are to become more mainstream, what are the key organizational and institutional changes that must take place in order to make this transition successful?
2. Further emphasis and study should be done in K-12 contexts.
3. Additional case studies of specific learner groups and learning contexts that use digital badges and identification of perceptions that exist within those milieus. The results of

such research could provide an ability to identify the groups and contexts in which digital badge use has been perceived to be successful and viewed in a favorable light as well as those that are skeptical.

4. Research that explores, analyzes, and identifies best practices for digital badge integration as perceived by instructors would also greatly contribute to the expansion of digital badges. For example, do faculty members tend to embrace digital badges in their pedagogical approaches for a course or do they view their use as inferior to more traditional instructional strategies?
5. With regard to student retention, it would be valuable for the literature and educational practice to better understand how digital badges and learning analytics, using Mah's model, for example, could be leveraged to improve student outcomes.

This literature review contributes to a greater understanding of digital badges, the learning and motivation theories upon which they are based, and the wide range of formal and informal educational setting in which they can be utilized to enhance access to and efficiency in demonstrating competency-based learning. Further studies and investigations regarding the use and implementation of digital badges in educational contexts among higher education, K-12, and adult learner groups are needed. Additional investigation would be beneficial in enhancing the understanding and application of digital badge use and design, providing greater insight into yet another viable technological tool through which learning is delivered and verified.

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CHAPTER 3: UTILIZING DIGITAL BADGES AS A MEANS TO TRAIN STUDENT TUTORS

Abstract

Digital badging systems are a trending educational technology being implemented in many ways across multiple industries and enterprises. Key affordances of digital badges are flexibility for individualized learning and serving as a means to deliver instruction or training through a digital modality. Just-in-time training is a concept of training that aligns with digital badge affordances, enabling specific training for a learner when and where they need it. This paper highlights a phased approach to the implementation of digital badges as it was determined to be an effective platform to deliver and verify training for college students who serve as tutors and mentors to student-athletes. The participating University is a large, comprehensive land-grant institution. The insights of this research offer implications for practice and an identification of future research needs focused on digital badge use as a mechanism for training and instruction.

Keywords: digital badges, just-in-time training, educational technology, student tutors

Introduction

Among the new and trending technological tools that are influencing how education is delivered and assessed is the utilization of digital badges (Friedman, 2017). Digital badges take a competency-based learning approach that allows learners to demonstrate, and others to confirm, “declarative knowledge or skill in a content area as well as intellectual, social, or behavioral growth” (Fontichiaro, 2013, pp. 13; see also Jovanovic & Devedzic, 2015). While digital badges continue to be used in a wide range of learning environments and for multiple purposes, they have

been implemented primarily within higher education settings, though use in the corporate world is on the rise.

This paper depicts a specific use case in which a digital badge system, given its unique affordances, was determined to be an effective platform to deliver and verify tutor training at a large research one university. The implementation process focused upon a three-phased approach specifically for college students who serve as tutors to student-athletes. These three phases are as follows:

- Phase I - Digital Badge Development and Initial Implementation
- Phase II - Review, Revision, and Continued Use
- Phase III - Future Use of Digital Badges

Background

On an annual basis, the University's Athletics Department employs over 100 undergraduate and graduate students to serve as academic tutors to student-athletes in their Academic Tutor Program. These tutors are required to demonstrate a minimum threshold of proficiency in a certain subject matter or college course (having earned a B+ or better) ranging across all disciplines. While some student tutors have experience tutoring from previous years, the majority of them are new to the Athletic Tutor Program and therefore require training. Identifying a digital avenue that would optimize the delivery of the needed training to large numbers of incoming tutors was a priority of the Athletics Department's administration. After recently learning about Passport, a digital badge system, the administration made the decision to utilize the Passport system to create digital badges as a means of providing just-in-time training to student tutors.

Digital badges. As a visual representation or credential of learning or other accomplishment, digital badges and their systems “provide an easy way to capture all formal and informal learning experiences and make this information available to anyone who had access to the digital badging database” (Ellis, Nunn, & Avello, 2016, pp. 10; see also Gibson, Ostashevski, Flintoff, Grant, & Knight, 2015; Kappes & Berto, 2015). Because they are in an online format, digital badges have an “ongoing connection to sources that validate their issue” (Finkelstein, Knight, & Manning, 2013, pp. 2), metadata that includes links to provide context, explanation, and examples of what was required in a given learning activity in order to earn a badge (Gibson et al., 2015; Bowen & Thomas, 2014). This capability is unique and allows for transparency and social capabilities through shareable portfolios (Boticki, Baksa, Seow, & Looi, 2015) and has also been seen as a way to motivate and incentivize learner engagement and completion (Abramovich, Schunn, & Higashi, 2013).

The affordances of digital badge systems can be used in both formal educational contexts such as K-12 and higher education (Rubin, 2018), or in less formal, individualized learning pathways. With the versatility afforded by digital badge systems allowing them to be leveraged for implementation them in a variety of learning environments (Ippoliti, 2014), interest in and utilization of digital badges is increasing. Also, growing interest in workplace and corporate settings as a means to offer professional development and training to employees is also occurring (Clayton, 2012; Gamrat, Zimmerman, Dudek, & Peck, 2014; Gibson et al., 2015). Digital badge systems allow for flexibility, giving learners the ability to complete badges on multiple devices, which is conducive for just-in-time training or consuming content in any setting (Corbeil & Valdes-Corbeil, 2007).

The current conversation surrounding digital badges continues to have multiple interests, including employers' recognition and value of digital badges in the hiring process (Blumenstyk, 2018) and the role that endorsements from industries can play (Everhart, Derryberry, Knight, & Lee, 2016). Many experts are predicting that colleges, universities and companies will be offering "microcredentials" to learners by way of digital badges, massive open online courses, and skills-based certificate programs (Friedman, 2017), while others, however, believe that the use of digital badges is nothing more than a fad that will pass (Blumenstyk, 2018). Casilli and Hickey (2016) state that the "[perception], uptake, and interpretation of badges depend heavily upon the ways badges are created, instituted, and issued" (pp. 127) and each badge -- its creator, issuer, and endorser -- vary. It is true that digital badges have yet to fully become mainstream and prove themselves as a universal way to verify competency due to their infancy. Thus, understanding the affordances of digital badges, such as exhibiting aspects of just-in-time training, as well as ways in which they can be utilized in a variety of settings can contribute to these conversations and where the educational technology may continue in the future.

Just-in-time training. Just-in-time training has origins in the manufacturing industry and is a concept that emerged from efforts to increase and optimize the teaching of technical skills and the quality production, but can easily apply to learning and training initiatives in all types of organizations, including academia (Iannarelli, 2005). One key benefit to just-in-time training systems is that they "deliver training to workers when and where they need it...[rather] than [having them] sitting through hours of traditional classroom training," (Sambataro, 2000, pp.50). Today, just-in-time training has quickly emerged as a means through which needed and relevant training to solve on-the-job problems can be provided on demand (Iannarelli, 2009; Jones, 2001),

and in an age of digital technology and mobile devices, delivering this type of training has never been easier (Iannarelli, 2005).

Ippoliti (2014) highlighted an initiative that incorporated the creation of a digital badge to provide just-in-time customer service training to library employees at a university. Similar examples of digital badges for training purposes have included programs such as teacher professional development (Jones, Hope, & Adams, 2018; Hope & Jones, 2016) and certification and training for learners wishing to develop competency in XSEDE topics and resources (Kappes & Berto, 2015). Although still relatively few, these examples of digital badges utilized as a means of offering just-in-time training support the decision made by the University's Athletic Department to create digital badges as a means to train their student tutors.

Given characteristics associated with this learner audience, it is vital that training utilizes technology capabilities with which they are familiar and focusing on offering training that is relevant to their competency. In other words, just-in-time training is a viable framework and approach to offer the athletic tutor training via digital badges to the student tutors.

Student Tutors. As is true with any group of learners, attempting to train learners in this specific audience brings with it several opportunities or advantages as well as challenges. One potential advantage is that these learners are coming with learning styles that include fluency in multiple media and settings (Dede, 2005). The learners were accustomed to navigating and utilizing digital spaces and devices through which they share and receive information and communicate with others. More specifically, given their age demographic, this learner group is likely to be very familiar with mobile device technologies, such as smartphones. According to a Pew Research Center report (2018), of the Americans between ages 18 and 29 that own any type of cell phone, 94% own a smartphone. This could prove to be a significant advantage to the

Academic Tutor Program's training with the digital badges because usability of the digital badge platform, particularly on a mobile device, may come with little to no training. A potential challenge in offering training to this learner group is a propensity to be distracted, particularly with mobile devices and social media. Thus, obtaining and maintaining attention is a key component of keeping students motivated and engaged in training via digital badges.

Phased Approach of Digital Badge Implementation

Phase I - Digital Badge Development and Initial Implementation

In this specific learning context, as well as in many others, it was determined that digital badges could offer an engaging training experience for the learner. Until recently, the annual training for the student tutors consisted of an in-person session that relied upon a series of PowerPoint presentations. All learners were required to attend at the same time and listen passively as the information was read and discussed for each slide. For what might be obvious reasons, this method of delivery was unengaging for this learner group and was less effective in being able to ensure that all learners adequately understand the content and demonstrate the proper competencies in order to begin tutoring student-athletes. Moreover, providing access to training via the digital badges allowed the learner to return to and review the content when needed, whereas this was not previously available to them through prior training methods.

Using digital badges for the Athletic Tutor Training Program also provided greater flexibility to the staff and the learners. While the supervisory staff were able to set deadlines for the completion of each badge, the learners were able to review and make submissions for badge completion asynchronously when it may better fit their individual schedules. This learner control aligns with principles of just-in-time training.

The Passport system offered flexibility of access by also providing a mobile app version. The mobile app was a significant convenience for the learners as they were able to view content within the badges and make submissions to individual challenges and activities through their smart phone. For example, if submitting a reflection on a given topic or question is a required challenge in the badge, the learner can simply open the mobile app and press a button on his or her smart phone that activated the camera to record a video of them sharing their reflection to a prompt or question as a requirement of the badge. Once the video reflection is finished, it is then immediately submitted to a place where it can be reviewed by the Academic Tutor Program supervisory staff.

Academic Tutor Program’s Digital Badges. Seven digital badges in the Passport system were developed for the Academic Tutor Program (see Figure 2) by the tutor coordinator with some assistance, guidance, and suggestions from an educational technologist at the university. These badges cover topics of ethical conduct, Title IX, learning styles, logging and submitting reports of sessions spent with student athletes, specific information for a tutoring sub-group (Vanguard Mentors), compensation for tutors, and a general overview of the tutor program. Figure 3 provides an example of the Ethical Conduct badge in the Passport system.

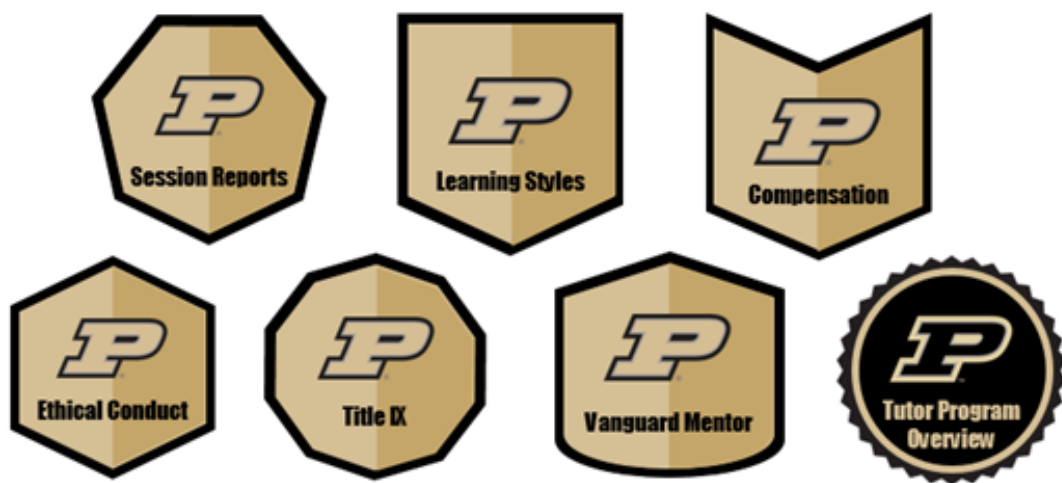


Figure 2. Images of the seven digital badges in the Academic Tutor Program

To complete these badges, students were given important information embedded within the badge for them to read and review prior to completing an activity such as a written or video reflection on a relevant question or topic. Each badge also included a final activity or challenge of completing a multiple-choice quiz to ensure that learners have correctly understood the content of the training. When submissions were made by learners through a written or video reflection, a full-time staff member reviewed the entry and determined whether it met the set criteria for satisfactory completion. This process and the affordances of digital badges allowed the staff to verify that each individual tutor had received training and obtained its corresponding competencies. Using this system ensured that adequate tutor training was provided and also enabled the administration to document its completion in the event that there were any rule violations among the student tutors.

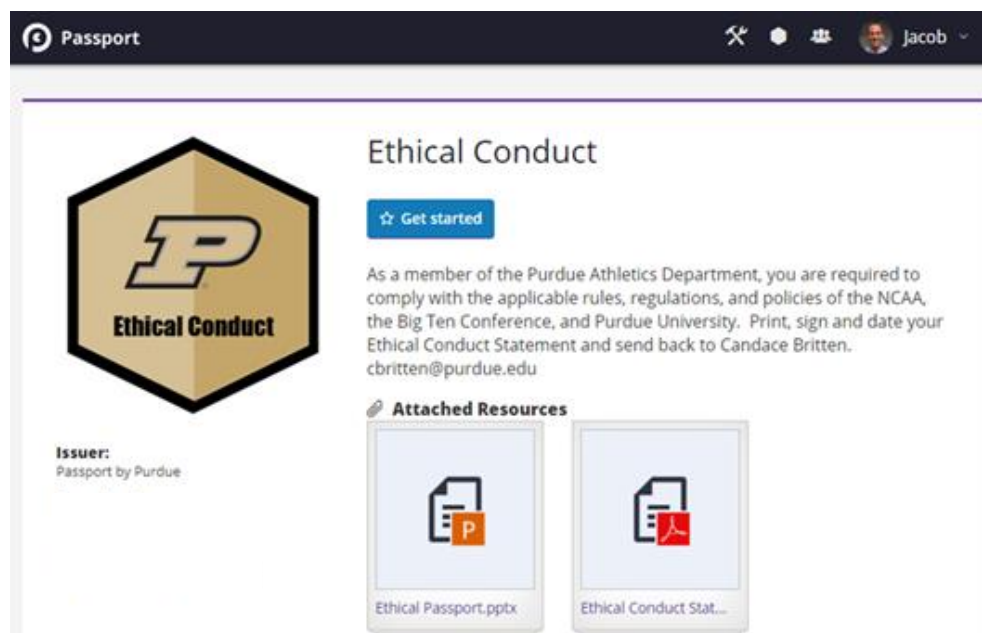


Figure 3. Example image of one of the digital badges in the Passport System.

Phase II - Review, Revise, and Continued Use

The second phase of the digital badge implementation commenced soon after the initial launch of the digital badges. A recommendation was given to the Tutor Coordinator to review the initial set of digital badges for enhanced instructional design quality and overall quality assurance. To accomplish this, assistance was sought from a group of students in a graduate level instructional design course. Following the ADDIE Model (Allen, 2006) and under the guidance of a professor, the graduate student instructional designers worked with the student tutor and mentor coordinator to analyze the training requirements and needs of the student athletes. This was also accomplished by interviewing several of the learners (student tutors). Once this occurred, the instructional design students reviewed the design of the existing digital badges and made development and design changes as needed. Some of these changes included the embedding of other online modules, adding related videos, and providing a clear path for content progression.

After changes and revisions were made, the updated badges were implemented with the learners and Tutor Coordinator, who provided a final evaluation and approval of the changes. Overall, it was emphasized that the digital badges provided a very practical way for the Tutor Coordinator to fulfill her role in the delivery and verification of training for every student and mentor. She wanted to ensure that the use of the digital badges for this program continued.

In addition to the revisions made to the badges as a result of the instructional design work by the graduate students, information was gathered from student tutors/mentors and administrators regarding their experience with and perceptions of the effectiveness of the digital badges as a means of training. Some insights from the student tutors and mentors included that the digital badges were nicely done and easy to understand and follow directions. Additionally, these learners enjoyed the flexibility to complete the training through the badges when it was most convenient for them, especially when compared to the previous in-person training format.

Phase III - Future Use of Digital Badges

The third phase of implementation (and beyond) will be an ongoing process of evaluating the current digital badges and their effectiveness to offer proper training to the student tutors and mentors in the Athletic Tutor Training Program. The use of these digital badges is still very much in its infancy and the full measure of effectiveness in delivering training to student tutors remains to be determined. Nonetheless, this instance in which digital badges were identified as a viable and engaging training tool designed with consideration of the learners reflects the wide application and versatility of digital badges as a means to deliver instructional content and verify or assess competency. The administrators' assumptions regarding the digital badges being able to offer solutions to meet their needs were confirmed after only a relatively short time of implementation. These solutions include: 1) effectively communicating and delivering necessary training information to trainees, 2) actively engaging learners (student tutors) in the training material as a means for offering instruction, and 3) providing full-time staff with greater ability to verify that learning and knowledge acquisition had taken place for each individual tutor. For now, the Athletics Department intends to continue the use of these digital badges for the foreseeable future.

Although the digital badges have seen success in this context, there will be a need for continued improvement and investment in the current set of digital badges in order to ensure their effectiveness. The initial two phases of implementation were made possible due to available resources that all came at no additional cost, including both the access to and use of the Passport system for initial development of the digital badges (Phase I) and access to instructional design support from graduate students (Phase II). If the digital badges are going to remain a viable training solution for the Academic Tutoring Program, administrators should consider more investment to further enhance the instructional design of the badges to make them more engaging for learners, which his specific feedback was given by both student tutors as well as administrators

who worked with the program. It was also suggested that it may be wise to consider using the digital badges in addition to rather than completely in place of the face-to-face training sessions previously used, enabling the digital badges to reinforce in-person training and allow the tutors refresh their knowledge and understanding throughout the year.

Conclusion and Implications for the Future

Similar to other papers that highlight cases of digital badge implementation (Cucchiara, Giglio, Persico, & Raffaghelli, 2014; Hope & Jones, 2016; Ifenthaler, Bellin-Mularski, & Mah, 2016; Wilson, Gasell, Ozyer, & Scrogan, 2016), the use case highlighted in this paper demonstrates that digital badges can be a viable training solution, especially when documentation or record keeping of training and providing flexibility to complete the training are requirements. Institutions, both educational and otherwise, can view this example in their determination regarding whether the implementation of digital badges for training purposes would be a wise investment to meet their specific needs. However, digital badges' potential for application and utilization extend beyond training purposes (Askeroth & Newby, 2020). The decision made by the Athletic Administration at the University regarding digital badges as a viable and more effective training initiative given the digital badge affordances and learner demographics can assist leaders at other universities and corporations make similar implementation decisions. Moreover, implementing digital badges in a training program similar to the Academic Tutor Program demonstrates that the scalability and flexibility of the digital badge system can be applied to a number of other similar use cases.

Because digital badges remain a young technology that is still being introduced, and that there remain to be relatively few empirical studies that examine digital badges as a means of delivering training and instruction, additional use cases and insights from evaluating digital badges

in such cases will be valuable to both practice and literature. As more and more educational institutions and others look to digital badges as a means of offering training, research should be conducted to verify their effectiveness and how they are being received on a large scale.

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CHAPTER 4: INSTRUCTOR PERCEPTIONS OF QUALITY LEARNING IN MOOCS THEY TEACH

Abstract

Included in the discussions regarding the instructional and learning value of massive open online courses (MOOCs) is the question of whether MOOC learners gain much value, if any at all, and has been a continuing debate since MOOCs began. Skeptics argue that MOOCs lack academic rigor and are superficial, while proponents praise them as addressing important global issues of educational access and affordability, providing pathways to more substantial learning opportunities. An important viewpoint in this conversation that warrants consideration is that of the professors/instructors who teach MOOCs and how they perceive the quality of learning that takes place in their MOOCs. In this case study, we used semi-structured qualitative interviews with three MOOC instructors in addition to course and document reviews to identify examples of their perceptions in practice. The findings from this case study suggest that instructors do believe that quality learning can take place within a MOOC and is often accomplished through social constructivism and self-regulated learning approaches. Discussions, dialogues, negotiations, and collaborations as well as learners accomplishing their intended goals in the course were all considered to be manifestations of quality learning in a MOOC. Implications of the findings for additional research and practice are also discussed.

Keywords: massive open online courses, MOOCs, social constructivism, self-regulated learning, online learning, case study

Introduction

Enrollments in, and diversification of, online learning contexts continue to grow (Seaman, Allen, & Seaman, 2018), especially as massive open online courses (commonly referred to as MOOCs) have begun to play a larger role in the online education industry (Palvia et al., 2018). MOOCs stem from a vision to provide free public access to education in large, open courses offered in an online format (Ferguson, Sharples, & Beale, 2015), which intends to address important global issues, such as educational access and affordability (Evans & Myrick, 2015; Ferguson & Clow, 2015; Friedman, 2013). As an emerging online learning context, MOOCs offer unique learning experiences for the learner (Littlejohn, Hood, Milligan, & Mustain, 2016), alter the role of the online instructor (Haavind & Sisteck-Chandler, 2015; Ross, Sinclair, Knox, Bayne, & Macleod, 2014; Zheng, Wisniewski, Rosson, & Carroll, 2016), and tend to attract learners with diverse interests and goals (Walji, Deacon, Small, & Czerniewicz, 2016). Due to these referenced opportunities provided by MOOCs, many institutions and providers are finding new ways to utilize and package MOOCs as pathways toward degree programs and even offer full master's degrees on their platforms (Baker, Passmore, & Mulligan, 2018; Kurzweil, 2018; Reich & Ruipérez-Valiente, 2019).

Ongoing discussions regarding the instructional and learning value of MOOCs vary among scholarly and practitioner arenas (Brahimi & Sarirete, 2015; Czerniewicz, Deacon, Glover, & Walji, 2017; Haggard, Wang, & He, 2014; Honeychurch & Draper, 2013). For example, some correlate the overall low completion rates to poor instructional quality (Onah, Sinclair, & Boyatt, 2014), while others argue that course completion is an inaccurate indicator of MOOC success given the wide variety of reasons that bring learners to a MOOC (DeBoer, Ho, Stump, & Breslow, 2014; Ho et al., 2014; Liu, Kang, & McKelroy, 2015; Zelinski, Hicks, et al., 2017). Furthermore,

some contend that instructional and learning quality are poor in most MOOCs (Margaryan, Bianco, & Littlejohn, 2015), and yet others claim it is feasible that MOOCs meet the standards of quality set for other online courses (Lowenthal & Hodges, 2015). These differing opinions on the uses for and direction of MOOCs warrant further discussion, yet there is a gap in the literature regarding the viewpoints of faculty and instructors of MOOCs (Evans & Myrick, 2015; Lowenthal, Snelson, & Perkins, 2018; Yengin, Karahoca, & Karahoca, 2011).

An instructor's direct contact and experience with course content, instructional design, and the learners in their MOOCs can greatly contribute to relevant literature, scholarship, and practice. The scarcity of instructor perspectives creates a compelling need for this area of the literature to be developed (Deng, Benckendorff, & Gannaway, 2017; Lowenthal et al., 2018). Thus, this case study explored the perceptions of MOOC instructors regarding quality learning in their courses, focusing particularly on learning through social interactions, or social constructivism.

Review of Literature

Social Constructivism in MOOCs

Social constructivism, or social learning, is an increasingly emerging topic in current MOOC research and will continue to be in future MOOC research, and it has become evident that learners prefer socialization in MOOCs (Gasevic, Kovanovic, Joksimovic, & Siemens, 2014). Social constructivism places emphasis on the importance of culture and context (McMahon, 1997) and views meaningful—or quality—learning as a social process that occurs when learners engage in social activities (Kim, 2001; Lave & Wenger, 1991; Vygotsky, 1978). More specifically, social constructivism focuses on how the environment and interactions with others, along with support and scaffolding in the instruction, can influence the individual learning process (Lave & Wenger,

1991; Toven-Lindsey, Rhoads, & Lozano, 2015). Also, social interactions are important in online learning contexts in terms of fostering “a sense of psychological connection that may lead to increased motivation and increased satisfaction with an educational experience” (Shearer, 2012, pp. 253–254). Thus, the principles of social constructivism—focusing on collaboration, dialogue, and social interaction among learners—are compatible with online learning and achievable through MOOCs (Toven-Lindsey et al., 2015), which can bring together learners of diverse backgrounds who “interact with others in the knowledge construction process” (Arbaugh & Benbunan-Fich, 2006, p. 438).

While MOOCs can provide and are providing educators with new ways to scale social learning within global and diverse groups, it is important to recognize that designing for learner engagement in a MOOC can be difficult given the scale and diversity of learners and motivations (Milligan, Littlejohn, & Margaryan, 2013). Walji et al.’s (2016) case study of MOOCs identified important aspects of social constructivism afforded in MOOCs, which included teacher presence, social learning, and peer learning. These aspects were connected to high-quality learning in MOOCs. Social learning, in particular, provides positive learning outcomes: “learners ... benefit from engaging with others through conversations and interactions” (p. 215).

Toven-Lindsey et al. (2015) studied 24 university-level MOOCs from a range of disciplines and found that one third of them implemented or featured a “constructivist-group approach” activity—a dialogue on discussion boards, participation in organized discussion groups, live videoconferencing with the instructor, or peer-reviewed assignments. Their findings suggested that the “constructivist-group teaching approach encourages the highest level of collaboration and critical inquiry among participants” (p. 7) based on the higher level of participation and

engagement in constructivist activities. These results, among other influences, are contributing to MOOCs and their platforms utilizing social constructivist approaches to foster quality learning.

Instructor Perceptions of Quality Learning in MOOCs

Research studies on learning in MOOCs focus heavily on understanding the outcomes and perspectives of the learners (Deng et al., 2017; Evans & Myrick, 2015; Xing, 2019, Zheng et al., 2016), highlighting their experiences, challenges, patterns of engagement (Milligan et al., 2013), outcomes, and motivations for taking the MOOC (Breslow, Pritchard, DeBoer, Stump, Ho, & Seaton, 2013; Emanuel et al., 2013; Liu et al., 2015; Park, Jung, & Reeves, 2015; Walji et al., 2016; Zutshi, O'Hare, & Rodafinos, 2013). General themes emerging from the literature include flexible learning design of MOOCs to accommodate the diverse needs and goals of learners (Park et al., 2015; Walji et al., 2016) and learner satisfaction (Liu et al., 2015). Fewer in number are the studies and articles that give voice to the perspectives of the instructors of the MOOCs (Czerniewicz et al., 2017; Lowenthal et al., 2018; Zelinski et al., 2017). For example, Veletsianos and Shepherdson (2016) reviewed the literature on MOOCs and found that of the 183 studies they reviewed, only 8.2% focused on topics that related to instructors and teaching.

Several studies in the literature to date have focused on MOOC instructors and do offer some helpful insights into their experience. These studies, however, focus on and articulate the experiences, motivations, and viewpoints of MOOC instructors in broad terms, highlighting the experiences and challenges of developing and teaching MOOCs (Haavind & Sistek-Chandler, 2015; Najafi et al., 2015; Zelinski et al., 2017; Zheng et al., 2016) as well as the opportunities to try new pedagogical approaches in a new platform (Evans & Myrick, 2015; Toven-Lindsey et al., 2015). Annaraud and Singh's (2017) study concluded that students and faculty have varying perceptions and enthusiasm regarding MOOCs; a potential cause of the disparity, they said, could

have been the faculty members' deeper understanding of challenges to developing and teaching a MOOC. Another study by Haavind and Sistek-Chandler (2015) highlighted the struggles and challenges of a MOOC instructor, especially that of offering a personalized learning experience for the learner due to the large number of participants in MOOCs.

However, Lowenthal et al. (2018), using an explanatory mixed methods approach, surveyed a large number of previous MOOC instructors and then invited a smaller number from that sample to be interviewed from those who responded in the survey that they would be willing to teach a MOOC again. The researchers found that the majority of instructors believed that their own MOOCs provided high-quality learning experiences for learners. However, the same instructors thought that, overall, MOOCs would not be as good as face-to-face courses. Evans and Myrick's (2015) findings slightly differed in that the faculty member participants in their study "were mixed on the idea that MOOC students learned as well as students in face-to-face courses, perhaps showing how the novelty of the format increased apprehension about learning outcomes compared to online learning at large, where attitudes about student learning have grown more positive" (p. 308).

As MOOCs continue to proliferate and influence online education, understanding the value that they offer to institutions and to learners will be more and more important. Thus, augmenting the means through which the perspectives of MOOC instructors are shared will offer a valuable contribution to further research and scholarship as well as inform practice.

Methods

Using social constructivism (Kim, 2001) as the lens, the purpose of this exploratory case study was to determine instructors' perceptions of quality learning in MOOCs. Specifically, this study was guided by the following research questions:

1. What are MOOC instructors' perceptions of quality learning?
2. What factors do MOOC instructors believe influence or enable quality learning?
3. What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning?
4. How do instructors perceive social learning as influencing quality learning in a MOOC?

We utilized semi-structured interviews with instructors as the primary source of data. Additionally, we used course document reviews as a secondary source to provide examples of their perceptions in practice as well as triangulation. Together these sources were developed into a multiple case study design, one based on exemplars as the basis of replication logic (Yin, 2014). With this type of multiple case study design it is customary to select the cases, conduct the case studies, write individual case reports, and draw cross-case conclusions (Yin, 2014). Given that this is an exploratory study, our analytic technique involved explanation building, with our goal being to develop themes and determine next steps in researching quality learning in MOOCs from a social-constructivist perspective (Yin, 2014).

Context

Access to participants (MOOC instructors) was possible through current working relationships with instructors who have taught at least one MOOC on our institution's MOOC partner's platform, FutureLearn. FutureLearn is based on social constructivism or social learning theory (Ferguson & Clow, 2015; Walji et al., 2016). According to FutureLearn (2016), social learning "enables learners to form online cohorts and communities of practice that support and enrich their learning" (p. 14). FutureLearn's social learning platform leverages the power of

learner communities, “where learners can make immediate use of their newly acquired skills by sharing their knowledge with their peers” (FutureLearn, n.d.).

For each of these instructors, this was the first MOOC any of them had taught. Purposive sampling was used to identify and recruit MOOC instructors from this available pool. Specifically, our three participants were selected based on our criteria for being exemplars; their courses had higher than average scores in areas of total course enrollments, a higher than average number of learners who were actively engaged in the course, and/or a higher than average number of learners who opted to purchase a certificate of completion in the course (see Table 2).

Table 2 includes data that provides an additional depth to the MOOCs of the participating instructors and why they were selected as the case exemplars. Aside from basic information including the number of course runs, it also includes aspects such as total number and average number of active learners. FutureLearn defines “active learners” as learners who have completed at least one step at any time in any course week. Information related to certificate purchases is also included; in this case, in order to purchase a certificate of completion in the course, a learner is required to complete a minimum of 51% of the course activities and pay a minimal fee for a printed certificate of completion. These MOOCs were selected because they had higher averages in one or more of these areas than the institution’s MOOC average, which are also provided.

Table 2. Comparison of Participant MOOCs and Institutional MOOC Average Based on Enrollment and Evidence of Active Participation

MOOC	Number of runs	Total enrollment	Total active learners	Total certificates purchased	Average total enrollment across runs	Average active learners across runs	Average total certificates purchased across runs	Average certificate purchase percent of total enrollment
Institution MOOC Average					2,681	1,167	29	1.07%
Laura's Course	6	25,626	14,048	111	4,271	2,341	19	0.45%
Jane's Course	3	7,183	2,877	105	2,394	959	35	1.46%
Dave's Course 1	4	8,240	3,176	89	2,060	794	30	1.18%
Dave's Course 2	6	10,332	4,652	240	1,722	775	48	2.35%

Procedures and Data Analysis

To collect data for the study, we determined that semi-structured interviews would be most appropriate in answering the stated research questions because they are “sufficiently structured to address specific topics related to the phenomenon of study, while leaving space for participants to offer new meanings to the study focus” (Galletta, 2013, p. 24). Sem-structured interviews afford the ability to create consistency across multiple interviews and provide the researcher the opportunity to probe and ask clarifying questions. Moreover, the semi-structured interviews allow important insights to be gained by developing an authentic narrative regarding the experience of MOOC instructors and what perceptions they have toward the learning in MOOCs.

The interviews all followed the same semi-structured protocol (see Appendix A) with each instance having its own unique variation depending on the direction of the conversation between the participant and the first author (Galletta, 2013). The questions in the interview protocol

focused on aspects of defining quality learning, social learning in MOOCs, MOOC affordances that influence learning, and overall experience teaching MOOCs. Each interview was approximately 60 minutes in length and recorded via an audio recording application. Each interview was then uploaded and stored in a secure, password-protected account and transcribed verbatim.

Transcripts from the interviews were analyzed through a combination of predefined (a priori) codes (see Appendix B) and emergent codes to categorize, summarize, and condense data (Saldana, 2013) into themes. The a priori codes were developed and identified based on relevant literature on MOOCs and the selected theoretical framework, social constructivism. After coding, a streamlined codes-to-theory model (Saldana, 2013) was used to organize the coded segments into categories. Finally, the categories were reviewed and analyzed again to further identify and condense categories into themes based on conceptual overlap and then into broader themes that aligned with principles of social constructivism. Trends and patterns from the data were then developed dependent on the extent to which the themes answered the research questions.

The course document review looked specifically at the discussion threads of the MOOCs taught by participants. Documents, as defined by Yin (2014), are stable and can be viewed repeatedly, are unobtrusive, and can be specific or broad. As Yin (2014) explains, “the most important use of documents is to corroborate and augment evidence from other sources” (p. 107). The threads were reviewed to look for examples of potential social learning taking place; these were revealed through instances of interactions between instructors and students.

To help establish trustworthiness throughout this study, several steps were taken as per Lincoln and Guba’s (1985) criteria. For credibility, we triangulated the data, and member checking was conducted following the data analysis stage to allow participants to review and confirm our

data and interpretations. Transferability was addressed through purposive sampling. An external audit of the research by faculty experts ($N = 3$) served to help with dependability. Finally, confirmability was established by ensuring research protocols were based in the literature.

Results

The following section presents three individual cases, one per each participating MOOC instructor, and will be outlined according to the previously stated research questions. Pseudonyms have been used in place of participants' names. Each case will include a brief description of the course, relevant responses from the semi-structured interviews with each instructor, and examples directly from their courses

Laura. Laura's MOOC was a part of the inaugural group of four FutureLearn courses launched by this institution in April 2017. This was Laura's first experience developing and teaching an online course. Support for the course development was provided to Laura in the form of an instructional designer and video production specialist to get the course ready for its first and subsequent runs on the FutureLearn platform. Since its launch, her MOOC has had six individual runs. Moreover, Laura's MOOC has had the highest enrollment in a single run of any of the institution's FutureLearn courses so far (see Table 2).

What factors do MOOC instructors believe influence or enable quality learning? In addition to this being the first MOOC she had ever taught, Laura's MOOC was also the first experience she had with teaching online. She had initial concerns about how learners in the MOOC would contribute to discussions under anonymous Internet profiles, though many learners used their full first name. However, she noticed that this aspect of a MOOC tended to make many learners more open to comment freely in discussions and share ideas in the discussion threads

throughout the course, especially for students who might otherwise feel muted or less inclined to participate in a traditional classroom.

What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning? To Laura, the online discussion boards in her MOOC seem to make the learning more apparent because learners interact with one another by articulating their own independent thoughts, which can be an indicator of their conceptual knowledge and understanding of the content (Arbaugh & Benbunan-Finch, 2006). Additionally, Laura commented that the sharing of a wide variety of learner perspectives contributed to her being able to verify that learning was occurring: “Being able to see early principles and concepts of what I am teaching come out in students’ comments in a bigger variety is a verification of learning.” Laura also mentioned that the discussion features on the MOOC platform, such as giving learners the ability to immediately read through the comments of others or post their own thoughts alongside each course step, allowed learners to collaborate with one another and that it contributed to how learners looked at the content presented by the instructor. They were able to share variety of insights that allowed them to negotiate meaning for themselves and others.

How do instructors perceive social learning as influencing quality learning in a MOOC? Laura’s perception of how social learning within her MOOC affected the quality of learning included learners’ comments prompting discussions of additional, unplanned topics: “Some people will give each other references and links to other resources and then we talked about whether those resources are valid in the discussion.” Figure 1 is an example of such an occasion, in which learners (all names have been changed to protect identity) in Laura’s course shared or suggested additional resources with one another in one of the discussion threads. Laura was able to participate in the conversation and further facilitate the social learning of the course.

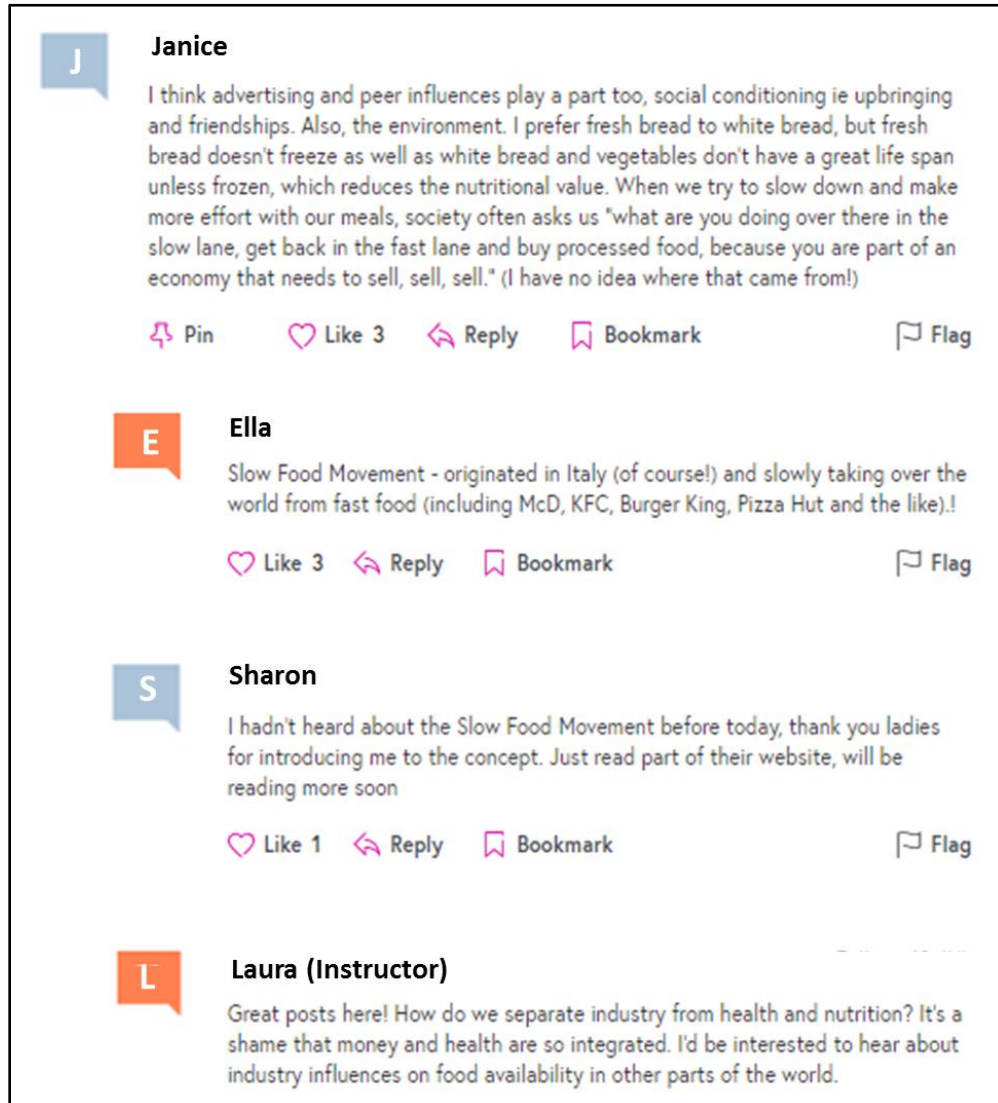


Figure 4. Example of discussion thread demonstrating shared resources from Laura’s MOOC.

Laura additionally remarked on how social interaction in her MOOC has influenced her own learning: “I’ve actually learned from the people that participate because of all the different perspectives and backgrounds. There’s been ... things that have happened historically that have played into how food culture has evolved so it’s been interesting to get a different history or background and that’s been cool.”

Jane. Jane's MOOC on the FutureLearn platform first launched in October 2017 and has since had three runs. While this was her first time teaching a MOOC, Jane had previous experience in teaching online courses. To develop her MOOC, Jane was able to work with the same instructional designer with whom she had worked on her previous online course. She also worked with a video production specialist to script, record, and edit videos for her MOOC.

What factors do MOOC instructors believe influence or enable quality learning? For Jane, the high number of enrollments typical in MOOCs as well as the group of learners that come with diverse backgrounds (e.g., interests, goals, and perspectives) were positive features that encouraged social learning that therefore affected the quality learning. She said, "I thought there would be more retired people but there are not as many. It was very spread out among ages of those who wanted to learn. It surprisingly included people of all ages." The wide range of learner perspectives, Jane continued, also prompted other learners to "think about things in a different way and it allows them (the learners) to express what they're thinking about, what they're feeling about. There has been some disagreements about ideas, which has been interesting, but they work it out." Figure 2 depicts an excerpt from a discussion thread from one of the runs of Jane's MOOC. Again, all names of learners have been changed.

J

John
 I'm so far failing to see anything particularly hispanic. The Spanish Civil War mobilised much of Europe with, surrealism was international, mocking the class system that was reflected in the UK with films such as Lindsay Andersons "If" Monty Python's Ministry of Funny walks type sketches, and the cartoon foot stamping on the end of scenes is you might argue influenced by Bunel or perhaps both were reacting in similar ways to the same international drivers of thought. Wasn't art trying to embrace the new ideas of science? You talk of Freud any psychoanalysis, but there's also Einstein. and the new ideas of space and time.

Pin Like 4 Reply Bookmark Flag

E

Ernesto
 I disagree with John about Buñuel as not representative of Hispanic culture. Surrealism was international but not as global as other cultural movements. It starts in France and some of their followers were Spaniards as Dalí and Buñuel, but apart Man Ray there are not many important Anglo-Saxons artists there. As a Spanish man, watching Viridiana I see our "familiar devils" like the ruling presence of Catholic Church, a hard classism and sex repression, issues shared by French, apart from sex repression of course.

Like 12 Reply Bookmark Flag

J

Jane (Instructor)
 Thanks, Ernesto.
 As you say, French surrealism didn't create Dalí and Buñuel. It would be much more accurate to say that an Aragonese and a Catalan made the definitive first surrealist film that marked everything that came afterward. In general, I am interested in showing that these three fascinating filmmakers influenced cinema outside the borders of their childhood homes, and built parts of world cinematic culture.

Like 13 Reply Bookmark Flag

Figure 5. Example of discussion thread demonstrating varying perspectives from Jane's MOOC.

What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning? Jane also believed that the structure of her MOOC, particularly the discussions that were connected to each activity, allowed her to perceive—or in her words, *evaluate*—learning:

Each week they had articles to read and videos that they had to watch, and ... on every one of these there was a discussion. So basically, they (the learners) discuss whatever they wanted about the question. Sometimes there are very specific questions with a quiz that leads into a final discussion. I guess you could say those were the ways they were evaluated. There was one quiz each week and then there were discussions all along the way.

Jane concluded that learning was taking place often based on the number of comments by learners in the discussions. In addition to this, she also looked at the number of views of course videos. She also interpreted these two analytics as an indicator of how her learners behaved or adjusted their engagement based on their individual interests and goals. She said,

[Participation in discussions] was surprisingly high because people did it because they wanted to. If they didn't think something was interesting I could see that discussion participation was low. There were also some videos that got very low views and I could see that the subject was not very interesting to the students. And they did it for no other reward than because they were interested.

Intrinsic motivation to learn was very salient for Jane that has made teaching a MOOC a rewarding experience.

Dave. Like Jane's experience, Dave's MOOC teaching was not his first experience in developing and teaching in an online format. Like the other participants, Dave worked with an instructional designer and video production specialist for the development of his MOOCs on FutureLearn's platform. To date, Dave has been the institution's most prolific instructor on the FutureLearn platform, having taught multiple MOOCs with multiple runs. Additionally, one of his courses (Dave Course 2; see Table 1) has had the highest average percentage of its learners purchasing a certificate of completion at its conclusion.

How do instructors perceive social learning as influencing quality learning in a MOOC?

During the interview, Dave readily recognized and pointed to the social learning affordances of MOOCs and considered them to be unique and as having a positive influence on learners:

I think the unique thing with the MOOCs is the social learning and the fact that there are students from all over the world with very different perspectives. I have learners that are 70 and I have learners that are 18, and when they're participating and sharing their ideas with one another I think that really contributes to how everyone's looking at the information and helps them grow.

To this end, Dave saw that his own engagement in discussions not only affected the learning of learners but his own as well. He said,

I really tried to get into more of the discussion with the learners this last time in the course. And I feel like I was energized by it and I would assume the learners maybe felt energized as well if they were participating.

Figure 3 depicts an excerpt from a discussion thread from one of the runs of Dave's MOOC. All names of learners have been changed.

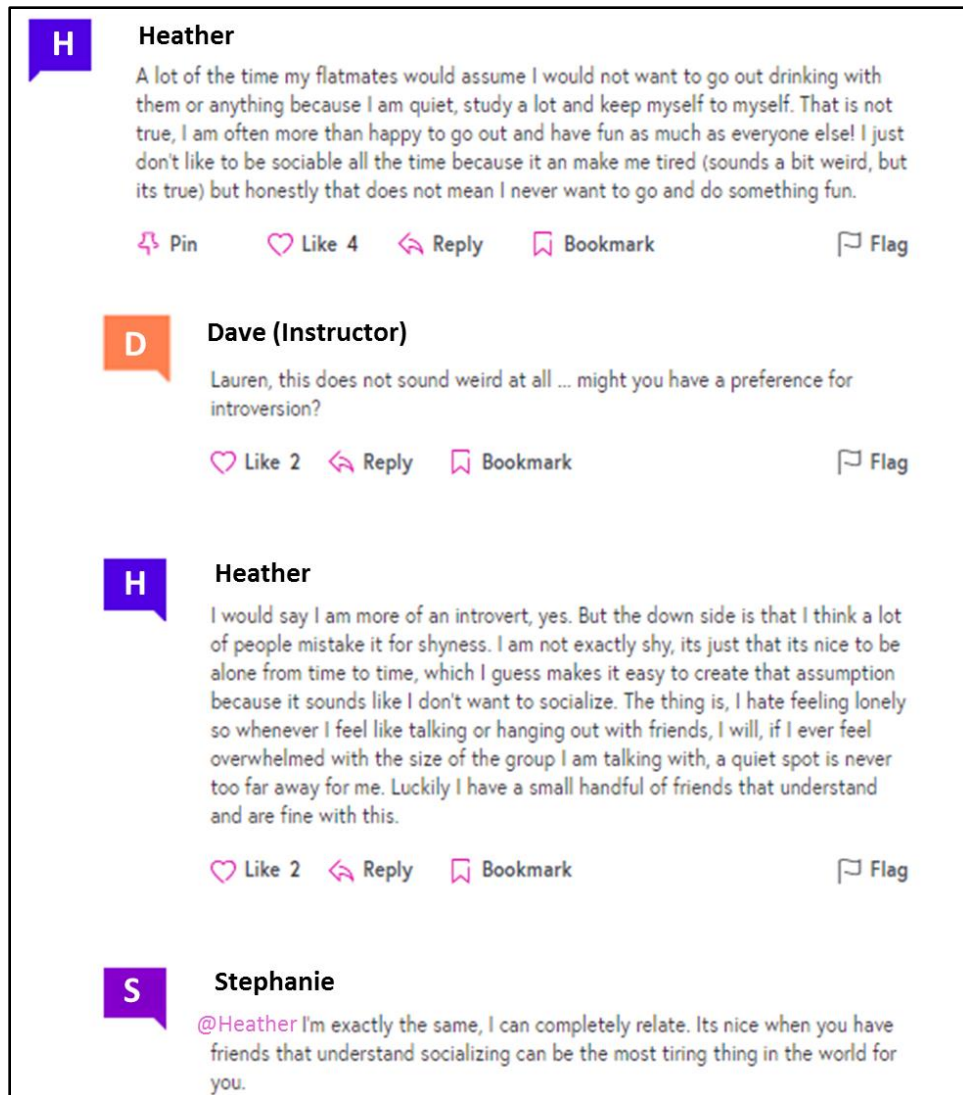


Figure 6. Example of discussion thread demonstrating differing perspectives from Dave's MOOC.

What are MOOC instructors' perceptions of quality learning? What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning?

To Dave, quality learning is linked to a learner's autonomy to self-direct or regulate his or her own learning. One way Dave defines quality learning in a MOOC is whether the learner has gotten out of the course what they had initially intended. He said,

I think the MOOCs allow students to determine how much they're going to learn and I think a traditional class, whether a hybrid, blended, or a professor standing up lecturing them, giving five exams during the semester, is only forcing students to learn whatever level they (the faculty) want in terms of passing the course, earning an "A" or a "C." I don't consider that learning. I consider real learning to be allowing the student to get what they want to get out of the course. I think that can happen in a traditional class and I think it happens in a MOOC.

Cross-Case Synthesis

As previously mentioned, the authors utilized a cross-case synthesis after each individual case study was conducted. This was done in an effort to help provide a framework for the explanation-building process. This included an inductive process through which three themes emerged: (1) instructors perceive that social interactions in MOOCs can foster quality and meaningful learning experiences for both learners and instructors, (2) instructors perceive that learner goals and interests can ultimately influence their participation and learning in MOOCs, and (3) instructors perceive social learning in MOOCs through discussion boards. These three themes do share some overlap, which may or may not be apparent at times.

Social interactions in MOOCs foster quality learning. Social constructivist principles were among the most identified characteristics that demonstrated quality learning in a MOOC by the instructors participating in this case study. This was attributed to the unique features often inherently afforded by MOOCs to bring a wide range of diverse learners into one space. Moreover, the FutureLearn platform in particular allows for frequent and intuitive social interaction, in that each step or activity provides opportunities for learners to comment on and share what they are learning with peers along the way (FutureLearn, n.d.).

Each instructor recognized that inherent features of the MOOCs provided opportunities for both themselves and learners to experience and engage in social learning opportunities. The high

number of enrollments typical in MOOCs as well as the group of learners that come from diverse backgrounds (e.g., interests, goals, and perspectives) were seen as positive features that encourage social learning that therefore impacted the quality learning available to learners. Multiple instructors commented on the role that social learning played in their own learning and the positive experience they had by way of interaction with learners within their MOOC.

The opportunity for social interaction among a large, diverse group afforded to both learners and instructors was viewed as an effective and valuable means to provide quality learning within these instructors' MOOCs. In addition to social interaction, the goals of learners (also diverse) can also influence the learning that occurs in MOOCs.

Learner goals can influence learning in MOOCs. As mentioned, the primary framework for this case study was social constructivism. However, unexpectedly a theme that emerged that could have also been used as another relevant framework for this case study was self-regulated learning (SRL). Many view SRL to be integral to learner behaviors in MOOCs, and many investigative studies that focus on self-regulated learning appear in MOOC literature (Lee, Watson, & Watson, 2017), with reasons being that a wide variety of learners enroll in MOOCs with varying and specific purposes or goals as to what they would like to obtain from the course. Furthermore, SRL provides some insight into learner behaviors and motivation (Kizilcec, Pérez-Sanagustín, & Maldonado, 2017).

Two of the participants spoke frequently about how a MOOC allows learners to come into the course and participate in only those areas or aspects that are of interest to them or fulfill their individual purpose for taking the course. Responses from instructors on this topic seem to align with the first and third phases of Pintrich's (2000) model on self-regulated learning, which are goal setting and controlling and regulating the task, context, and self, respectively.

In Jane's MOOC, she noticed that there were some activities and videos in her MOOC that showed lower numbers of learners viewing the videos and lower accompanying discussion board participation on the given topic of the video or activity. However, some learners did watch the videos to the end and participate in the discussion prompted by the specific video. This might strongly suggest that SRL affordances in MOOCs, or the opportunity for a learner to engage in what is most relevant to them, can "positively affect a sense of academic achievement, as well as motivation and learner behaviours," (Lee et al., 2017, p. 31). Similar to social learning, one way through which these MOOC instructors perceived or observed SRL in their MOOCs was through interactions on discussion boards.

Instructors perceive social learning through discussion boards. The instructors in this case study all remarked how participating in and reading the discussion boards allowed them to get a sense of the learning that was taking place in their MOOC. In particular, discussion boards gave these instructors insights into how learners were collaborating with one another, negotiating meaning, making connections with different areas of knowledge, and learning new perspectives from a diverse group of learners. To multiple instructors, the online discussion boards in their MOOCs, if designed well, seemed to provide a means through which learning could be perceived, because learners interact with one another by articulating their thoughts, which can be an indicator of their conceptual knowledge and understanding of the content (Arbaugh, & Benbunan-Finch, 2006). The discussion board features on the FutureLearn platform were also viewed to encourage and provide opportunity for social learning. All three of these participants also made a number of comments that suggest that social constructivism is a natural and inherent feature of MOOCs.

In summary, there were a number of similarities in each interview that informed the themes that emerged in the data analysis. Table 2 maps and illustrates the intersection of research questions

and the main themes that emerged. Overall, each participant recognized that while there are certain challenges to verifying learning in MOOCs, such as scale, MOOCs that provide opportunities for learners to interact with peers and the instructor foster quality learning. Their perceptions of quality learning heavily involved the social interaction among a large, diverse group of learners common to MOOCs within the discussion boards on the course platform but was not solely limited to it. In addition to social interaction, individual learner goals and interests and their effect on learner engagement emerged as a theme; two instructors also perceived quality learning as entailing a learner achieving their intended goal in the course.

Table 3. Intersection of Research Questions and Main Themes

Research questions	Main Themes		
	Social interactions in MOOCs foster quality learning	Learner goals can influence learning in MOOCs	Instructors perceive social learning through discussion boards in MOOCs
RQ1 – What are MOOC instructors’ perceptions of quality learning?	X	X	
RQ2 – What factors do MOOC instructors believe influence or enable quality learning?			X
RQ3 – What aspects or affordances of MOOCs do MOOC instructors believe allow them to perceive quality learning?	X		
RQ4 – How do instructors perceive social learning as influencing quality learning in MOOCs?	X		X

Discussion

This case study explored instructor perceptions of quality learning in MOOCs. There is still no universal agreement on many MOOC-related issues, including their rightful purpose and their effectiveness in offering meaningful or quality learning experiences (Evans & Myrick, 2015). The main themes that emerged in this case study contribute to discussions on how MOOCs can be used—despite their intended purpose at times—to foster quality learning for people from diverse backgrounds, experiences, and learning goals. The instructors' responses aligned the four research questions of this case study, their perceptions being that quality learning can and does occur in these courses, for both learner and instructor, largely through social learning constructivist components, such as dialogue and discussion, peer interaction, negotiating meaning, collaboration, and peer teaching.

Though similar studies in the literature have helped inform both further scholarship and practice, instructors and institutions consider the reasons for and challenges of developing and teaching MOOCs, this case study took a unique approach to specifically explore the faculty perceptions of learning through the lens of social constructivism. Social constructivism/social learning continues to emerge as a key topic in current MOOC research and will continue to do so in future MOOC research (Gasevic et al., 2014), and the unique different perspectives regarding how instructors think about and view their MOOCs and the extent of their effectiveness in fostering meaningful, quality learning opportunities supports the growing interest in these topics. Moreover, this additional understanding of how instructors perceive quality learning occurring in MOOCs can reinforce and inform instructional design (Najafi et al., 2015) of MOOCs to leverage the opportunities for learners to achieve their learning goals via collaborative, social learning on a

global scale. The emergent themes from this case study can also contribute to a broader framework for evaluating the effectiveness of a MOOC (Zelinski et al., 2017).

In addition to social constructivism or social learning, these instructors also perceived self-regulated learning to be an influential factor to the quality learning in a MOOC, which is consistent with the literature (Lee et al., 2017). More specifically, the responses of these instructors aligned with phases of Pintrich's (2000) model of self-regulated learning in the forms of goal setting and regulation of participation in specific learning tasks. When learners got out of the MOOC what was most important to them, whatever it may have been, these instructors considered it to be a success, though there are limitations of MOOC platforms that inhibit instructors from assessing what the diverse goals of learners are (Douglas, Zielinski, Merzdorf, Diefes-Dux, & Bermel, 2019).

The MOOCs included in the case study were all what would be termed *cMOOCs*, which are heavily based in social constructivist learning design and differ from *xMOOCs*. Therefore, the instructors who developed and taught these courses all perceived that social interactions and learning played a significant role regarding how learners experienced quality learning in their MOOCs. Without this key component or feature, these instructors say that they would have been left to only utilizing multiple-choice quizzes and other automated assessment tools. These instructors appeared to consider the social learning outcomes to be of greater value in the MOOCs because they took advantage of the large and diverse learner population that enabled learners to connect with and learn from a wide range of individuals (Kop, 2011). It is interesting to compare this case study to Haavind and Sistek-Chandler's (2015) case study that concluded that whether in an *cMOOC* (focused on social interaction and collaboration) or an *xMOOC* (primarily using video-based lectures), the role of the instructor is the relatively the same, and real-time engagement with the learners has little effect on the learning that takes place. The study in this paper did not focus

heavily on the instructor's role in and effect of interaction with the learners in the MOOC, which suggests that further inquiry on this subject could be beneficial.

Each instructor commented on how teaching their MOOC(s) changed their perspective on how they defined quality learning in terms of what is possible in online learning environments and, more specifically, MOOCs. This is similar to findings by Evan and Myrick (2015) that describe favorable attitudinal changes toward online learning in general, resulting in and increased acceptance and improved perspectives on the purpose of MOOCs.

Limitations

As with any study, various challenges or limitations exist that are worth considering as conclusions are developed and future research considered. For example, the instructors who participated in this case study utilized and were familiar with only one MOOC platform that is heavily based in social learning theory, and this might therefore skew their perspective. Moreover, participants' specific discipline or course topic may have influenced how they perceived quality learning in a MOOC. Additionally, this study had a small sample size of only three participants, all of whom are from a single institution, as were the instructional designers they worked with, meaning that a particular institutional design process or framework was potentially used, thereby not allowing for variability.

Conclusion

With little current literature that focuses on instructor perceptions in this specific topic, the findings from this case study help to fill a current gap in the MOOC literature. Furthermore, highlighting more viewpoints of instructors of MOOCs can be beneficial to the ongoing research, practice, and discussion regarding MOOCs as viable learning opportunities.

This case study merely scratches the service in exploring and understanding instructor perceptions of quality learning in MOOCs. Further research should follow similar approaches to, for example, compare instructor perceptions of quality learning through social interaction with quantitative data of the levels or patterns of learner engagement (Milligan et al., 2013) within social learning settings, such as MOOC discussion boards. It would also be insightful to include a larger sample to see if the perceptions expressed in this case study have broader application. Finally, it would be important and interesting in future research studies to also include other types of MOOC (e.g., xMOOCs) and MOOC instructors who do not employ social learning theories as a basis for their platforms or course instructional design to see whether they have similar perceptions of quality learning. Additionally, increased understanding of faculty perceptions toward MOOC learning can help inform the instructional design of MOOCs and how learners can learn in these unique online environments. Further research on this and other MOOC-related topics is important and needed because MOOCs can offer increased access to education and can, according to perceptions held by the instructors in this case study, provide meaningful learning opportunities and social connections for people all around the world.

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Appendix A Semi-structured qualitative interview protocol

Participant name: _____ Date: _____

Interview start time: _____ Stop time: _____

Interview Protocol:

- How do you define quality learning?
- Given your specific topic or subject matter, how do you measure or verify learning?
- From your perspective as the professor, how do you determine that quality learning has occurred among learners in your MOOC?
 - (If needed for further clarification) What have you seen from learners in your course that you would consider evidence of their learning?
- What aspects or characteristics of MOOCs do you think contribute to or promote quality learning?
- Are there specific steps or activities in your MOOC that where you felt were conducive to quality learning? Why or why not?
- The MOOC platform that you used is designed to encourage social interaction to promote learning. From your perspective, do you think that this has an impact on the learning that occurs in your MOOC? Why or why not?
- How does the learning in your MOOC compare with other courses that you have taught?
- What limitations to learning, if any, do you see as being inherent in your MOOC?
- Could you describe or share your overall experience having taught a MOOC?
 - What impact, if any, has it had on your perspective as a professor?
 - What impact, if any, has it had on your perceptions of quality learning?
- (If time at end) Do you think that there is anything that could be implemented that would improve learning that takes place in the moves that you've taught?

Appendix B A Priori Codes

Quality Learning

Code	Example/Definition	Cited Source(s)
Definition of quality online learning (QUAL_Def)	Definitions given by the participant on what a quality learning is or what it looks like	Kim (2001); Lave & Wenger (1991); Vygotsky (1978)
Determining or measuring quality learning in any course (QUAL_Measure_Gen)	Verbal examples of determining or measuring quality learning in any course or learning environment	Suen (2014); Toven-Lindsey, Rhoads, & Lozano, (2015)
Example(s) of quality learning in MOOC (QUAL_Examp_MOOC)	Verbal examples provided by the participant illustrating principles of quality learning in MOOC(s)	Walji, Deacon, Small, & Czerniewicz (2016)
Determining or measuring quality learning in MOOC (QUAL_Measure_MOOC)	Verbal examples of determining or measuring quality learning in MOOC(s)	Toven-Lindsey, Rhoads, & Lozano, (2015)

Social Constructivism/Social Learning

Code	Example	Cited Source(s)
Examples of evidence of social constructivism (SocL_Examp)	Verbal examples from participant in which he/she saw evidence of social constructivism/learning occur in MOOC	Herrington & Oliver (1999); Lave & Wenger (1991); Toven-Lindsey, Rhoads, & Lozano (2015)
Dialogue/Discussion (SocL_Dial_Disc)	Verbal example that indicates reference to dialogue or discussions among learners/instructors in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)

Collaboration (SocL_Collab)	Verbal example that indicates reference to collaboration among learners in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)
Negotiation of meaning (SocL_Negot)	Verbal example that indicates reference to negotiation of meaning among learners in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)
Interaction (SocL_Interact)	Verbal example that indicates reference to any other interaction among learners in the MOOC	Toven-Lindsey, Rhoads, & Lozano (2015)

Relationship Between Social Learning and Quality Learning in MOOC

Code	Example	Cited Source(s)
Factors/characteristics that contribute to quality learning in MOOC (QUAL_Contrib_MOOC)	Verbal example of how a particular factor of MOOCs can influence the quality of learning	Arbaugh & Benbunan-Fich (2006)
Intentionality of use of social learning in MOOC (SocL_Intent)	Intentional use or application of Social Learning in MOOC	Gasevic, Kovanovic, Joksimovic, & Siemens (2014)
Examples of social learning in MOOC (SocL_Examp_MOOC)	Verbal examples provided by the participant illustrating principles or evidence of social learning in MOOC(s)	Toven-Lindsey, Rhoads, & Lozano (2015)
Social learning impact on quality learning in MOOC (SocL_Effect_QUAL)	Verbal examples of how social learning impacted the quality of learning in MOOC(s)	Toven-Lindsey, Rhoads, & Lozano (2015)

Perception

Code	Example	
Teaching a MOOC's impact on professor's perspective (PERSP_Change)	Insight given by participant on how their previous perception of quality learning changed after teaching MOOC	Evans & Myrick (2015); Deng, Benckendorff, & Gannaway (2017); Haavind & Sistek-Chandler (2015); Najafi, Rolheiser, Harrison, & Håklev (2015); Zelinski, Hicks, Wang, Douglas, Bermel, Diefes-Dux, & Madhavan (2017); Zheng, Wisniewski, Rosson, & Carroll (2016)
Strategy recommendations for improvement (IMPROVE_Recommend)	Recommendations by participants on improving quality learning in MOOCs	Evans & Myrick (2015); Haavind & Sistek-Chandler (2015); Najafi, Rolheiser, Harrison, & Håklev (2015); Zelinski, Hicks, Wang, Douglas, Bermel, Diefes-Dux, & Madhavan (2017)

CHAPTER 5: DISCUSSION OF CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

Introduction

For years, it has been predicted that technology will continue to have a significant impact on higher education (Glenn, 2008). Trends in higher education reflect increasing opportunities for online learning and the platforms that enable these opportunities continue to emerge and evolve. This warrants ongoing investigation and exploration of how online learning trends are affecting the online learning landscape. Thus, the purpose and intent of this dissertation has been to introduce and discuss relevant questions, topics, and inquiries related to digital badges, MOOCs, and the role they play in the ever-expanding ubiquity of online learning in multiple contexts. Furthermore, this dissertation sought to contribute toward the advancement of the field that focuses on online learning in these two particular types of online platforms by providing answers to important questions through scholarly research and examples of applied potential evidenced-based practices.

This final and concluding chapter will review key implications that its findings have for future research and highlight potential best practices that can assist decision-makers at institutions of higher education to leverage these online learning tools. Additionally, the limitations of studies and inquiry of the academic papers in this dissertation will be discussed. Finally, the author will provide a reflection of what was learned in the research process as well as personal insights into the contribution of this research to the field.

As previously stated, this dissertation focused on the need to better understand how online education promotes learning and can be leveraged by institutions to scale access to education as well as maintain relevance in a rapidly changing industry striving to serve a broader, more diverse

range of learners (BestColleges, 2019; Siragusa & Dixon, 2005). Understanding and adoption of educational technology is crucial for institutions of higher education to keep pace with trends and maintain relevancy (Anderson et al, 2019). Moreover, the scarcity of the literature on digital badges and MOOCs, among other online learning formats (Ma & Lee, 2019), is also compelling justification as to why additional research and understanding is needed (e.g. Newby & Cheng, 2019; Iniesto, McAndrew, Minocha, & Coughlan, 2019). To this end, this dissertation reviewed and identified gaps in the respective literature on digital badges and MOOCs, conducting an empirical inquiry, and offering solutions to challenges and issues, resulting in the three academic papers.

Discussion of Key Findings, Implications, and Contributions

Existing needs and questions in the field of online learning through digital badges and MOOCs prompted and formed the basis of this dissertation and informed three independent academic papers (Chapters 2, 3, and 4). Each paper considered the current literature and strived to highlight examples of application and best practices, and seeking to understand the perspectives of individuals on the frontlines of online education. The findings of these three papers have been described in greater detail in the preceding chapters; Table 4 summarizes and outlines how each paper has addressed key questions and needs initially described in Chapter 1.

Table 4. Summary of Key Questions or Needs Identified and Ways in which Each Chapter Addressed Them

Key Questions or Needs Identified	Chapter 2: Digital Badge Use in Specific Learner Groups	Chapter 3: Utilizing Digital Badges as a Means to Train Student Tutors	Chapter 4: Instructor Perceptions of Quality Learning in MOOCs They Teach
New and emerging online learning platforms (such as digital badges and MOOCs) warrant investigation and exploration to understand their capabilities and how they can be utilized	<ul style="list-style-type: none"> • Key theoretical foundations of digital badges include behaviorism, goal-setting theory, constructivism, and gamification theory • Empirical studies on digital badge use vary in terms of context and purpose 	<ul style="list-style-type: none"> • Use cases of digital badge utilization and implementation can help universities and corporations make similar implementation decisions from evidence-based practices 	<ul style="list-style-type: none"> • Many question and criticize the rigor and quality of MOOCs and the literature has not focused on instructor perceptions of quality learning in their MOOCs
Enhanced understanding is needed to better understand how the delivery of, access to, and perceptions of learning in digital badges and MOOCs are affecting and enabling learning	<ul style="list-style-type: none"> • Though the majority of literature focuses on higher education, digital badges are well-suited for other contexts, especially adult populations • Not all empirical studies on digital badges demonstrate positive outcomes 	<ul style="list-style-type: none"> • Digital badges can be a viable training solution to record training and providing flexibility to complete the training requirements 	<ul style="list-style-type: none"> • MOOC instructors perceive that MOOCs can be used to foster quality learning for diverse learners • MOOC instructors perceive that quality learning can and does occur in MOOCs through social interaction
A gap exists in the literature regarding the effective uses and potential strategies of digital badges and MOOCs and bridge between theory and practice is needed	<ul style="list-style-type: none"> • Research on digital badges is still in infancy, therefore additional research is needed in specific contexts, particularly on use and implementation 	<ul style="list-style-type: none"> • Use case demonstrates scalability and flexibility of the digital badge system that can be applied to a number of other similar use cases • Research should be conducted to verify digital badge effectiveness as more institutions utilize them 	<ul style="list-style-type: none"> • Findings can inform instructional design of MOOCs to leverage collaborative, social learning on a global scale • Findings can inform instructional design of MOOCs to leverage collaborative, social learning on a global scale

Implications for Future Research

Although this dissertation has identified and explored research that has been conducted and published with regards to both digital badges and MOOCs, much research and scholarship still needs to be done in order to increase and develop understanding of online learning, and how organizations and institutions can effectively utilize both of these emerging online learning models and platforms. The research published in the papers that comprise this dissertation adds value to this area of inquiry and can help other scholars and researchers as it provides greater depth and breadth in understanding what is already known as well as future directions for research.

Digital Badges. The research on digital badges can go in multiple directions and should be considered by researchers for future areas of inquiry. Digital badges are becoming increasingly embraced and integrated within traditional educational structures (Gamrat et al., 2014). However, researchers must ask which key organizational strategies and changes are required by institutions of higher learning that want to integrate the use and credentialing of digital badges into pedagogy and curriculum would contribute greatly to the literature. If digital badges are to become more mainstream, what key organizational and institutional changes that must take place in order to make this transition successful is an important question. Further studies and investigations regarding the use and implementation of digital badges in educational contexts among higher education, K-12, and adult learner groups are needed.

Additional investigation would be beneficial in enhancing the understanding and application of digital badge use and instructional design. This could take the form of case studies of specific learner groups, institutions, and learning contexts that use digital badges and identification of perceptions of key stakeholders, such as faculty and students (Sanchez, 2019), that exist within those milieus. The results of such research could provide an ability to identify

the groups and contexts in which digital badge use has been perceived to be successful and viewed in a favorable light, as well as those in which they have not.

While this dissertation has focused primarily on the implementation and use of digital badges and the degree to which they were viewed as effective, it would be beneficial for empirical studies to focus on how and if learning via digital badges can positively influence learning performance. Newby and Cheng (2019) identified and addressed this gap in the literature through a study that tested digital badges among pre-service teachers in a large undergraduate technology integration course. The participants who learned with the digital badges reported both higher levels of confidence with using technology, as well as higher levels of scores and grades in the course. Newby and Cheng acknowledged, however, that additional research that focuses on digital badge elements to foster effective learning outcomes that better enables digital badges to be used as a means of instruction would be beneficial. With regard to other areas of student outcomes, it would also be valuable for the literature of educational practice to better understand how digital badges and learning analytics, using Mah's (2016) model, for example, can help better understand how universal such a model could be applied.

Lastly, the literature review and specific use case of digital badge implementation discussed previously (Chapters 2 and 3) contribute to a greater overall understanding of digital badges. The review of the literature of key learning and motivation theories upon which digital badges are based and the wide range of formal and informal educational settings in which they can be utilized to enhance access to and efficiency in demonstrating competency-based learning also adds to the advancement of the field. However, additional research regarding where digital badges fall short and how they can be improved would contribute much of the field of study and practice. Roy and Clark (2019) noted that due to the fact that most relatively few empirical studies support

that “ the use of digital badges was... a positive way to encourage engagement in learning” (pp. 2,631), not all studies report positive and some report negative outcomes. The perceptions of digital badges can be polarizing (Foli, Karagory, & Kirby, 2016). This provides a compelling case for broader research as well as a thoughtful and thorough plans for digital badge implementation.

MOOCs. Like digital badges, the research and literature on MOOCs remains very young and is in need of additional research directions to enhance understanding and effective practice. It has been noted that a large body of the literature focuses on student experience and learning outcomes in MOOCs (Deng et al., 2017; Evans & Myrick, 2015; Xing, 2019, Zheng et al., 2016). The multiple case study in Chapter 4 of this dissertation sought to fill a current gap in the MOOC literature by focusing on instructor perceptions of quality learning, though this merely scratches the surface. An increased emphasis on highlighting more viewpoints of instructors of MOOCs can be beneficial to the ongoing research, practice, and discussion regarding MOOCs as viable learning opportunities.

Better understanding of teaching and learning within MOOCs merit additional inquiry. While social constructivism within MOOCs was the lens through which Chapter 4 of this dissertation conducted and interpreted, more needs to be done in order to understand how learning can occur in MOOCs through social interaction broadly and across many cultures. For example, Deng, Benckendorff, and Gannaway (2019) conducted an analytical review of MOOC research with regards to teaching and learning. One of their main findings included that “while strong evidence indicates that more active behavioural and online social engagement are associated with higher retention rates and better academic performance, the relationships between many of the key learning and teaching factors in MOOCs have not been clarified” (pp. 58). The understanding

from additional research on learner and instructor experiences and outcomes in various MOOC models will help shape their utilization in the future.

Additional directions and needs for further research on MOOCs include comparing instructor perceptions of quality learning through social interaction with quantitative data of the levels or patterns of learner engagement (Milligan et al., 2013) within social learning settings, such as MOOC discussion boards. It would also be insightful to include a larger sample to see if the perceptions expressed in this case study have any measure of generalizability. Further research on this and other MOOC-related topics is important and needed because MOOCs can offer increased access to education and can, according to perceptions held by the instructors in this case study, provide meaningful learning opportunities and social connections for people all around the world.

Contributions and Implications for Practice

More and more institutions of higher education are looking to transition toward and expand their online offerings (U.S. Department of Education, 2017; Seaman, Allen, & Seaman, 2018) in order to maintain relevancy, market share, and adapt to the needs of adult learners, a population whose needs traditional higher education has been unable to adequately meet (Sutton, 2019). This large shift raises significant questions for leaders and decision makers. While some institutions will be able to leverage a strong brand as they increase online offerings to reach previously untapped markets, what may more strongly influence the extent to which an institution can significantly increase their online offerings will be determined by how they are able to deliver and offer a seamless student experience to working adults (Lederman & Lieberman, 2019). One key question centers on the extent to which an institution can and should invest in the development of the necessary infrastructure itself or if it should look to leverage the resources and expertise in

offering online education from others in the industry, just as Purdue University acquired Kaplan University (now known as Purdue Global) in 2017 (Purdue University, 2017).

As higher education and industry leaders grapple with these and other important considerations, any insight from practical use cases and exploration of how online learning tools can be utilized is valuable. In fact, the very “road to success with technology-delivered education involves thoughtful and purposeful application of complex tools and systems in ways that can enrich the experience for all participants” (UPCEA, n.d., pp. 24). Additionally, Roy and Clark (2019) note that the utilization of online learning technologies such as digital badges requires thoughtful implementation plans. As such, this dissertation’s primary contribution is informing practical decision-making processes for investment in and use of tools like digital badges and MOOCs. Though the penetration of online education through innovations and platforms such as MOOCs and digital badges is too small to identify definitive best practices (Schlögl, Ploder, Spieß & Schöffner, 2019), the findings and insights from this dissertation’s chapters can prove valuable to administrators and practitioners by helping them make informed decisions when working with scarce resources in new and unfamiliar territories.

The main takeaways that resulted from the academic papers in chapters 2-4 that can inform and contribute to the application and practice of digital badges and MOOCs can be briefly summarized as follows:

- **Social learning.** Online learning is not devoid of social interaction; on the contrary, the technologies evident in online learning platforms such as digital badges and MOOCs may require social interaction at times in order to increase the likelihood of learning to occur.
- **Instructional design.** The design of digital badges and MOOCs should focus on ways to prompt learners to interact and to be flexible to allow for a wide range of differing learning

goals from diverse groups of learners. Additionally, an increased understanding of faculty perceptions toward MOOC learning can help inform the instructional design of MOOCs and how learners can thrive in these unique online environments.

- **Modularization of degrees.** Unique affordances in digital badges and MOOCs can allow for an increase in modularized and disaggregated degrees, which are rising in demand from working adult learners.
- **Lifelong learning.** The flexibility of these two particular formats of online learning can foster a greater ability for individuals to pursue lifelong learning goals in a way that meets their needs and goals, tailored to their circumstances.

Trending into the future. This dissertation has primarily looked at how the utilization of digital badges and MOOCs has evolved into what exists today, though the selection of use cases and examples that have been highlighted are certainly limited. It is also important to consider the current trends that can be seen and how those might look as online learning continues into the future. MOOCs and digital badges seem to be especially relevant in the trend and conversation regarding modularization and disaggregation of degrees. While many institutions are still committed to providing access, MOOCs and digital badges are now being leveraged as part of broader institutional strategies. These include efforts to offer microcredentials and other modularized offerings that can lead learners on a pathway to degree programs, and in some cases, entire graduate degrees delivered on these platforms (Gedeon, 2019; Matkin, 2018; Schroeder, 2018; Shah, 2019). The scalability of MOOCs allows for thousands of learners to begin in open courses and then progress through a series of courses that, when successfully completed, can then offer learners option and opportunity of matriculation into the full master's degree program (Ponce-Cueto & Caplice, 2019).

The EDUCAUSE Horizon Report: Higher Education Edition (Alexander et al., 2019) notes that a panel comprised of global leaders in online education “discussed the future of MOOCs, microcredentials, and badges as forms of modularized/disaggregated degree or certificate options that enable learners to have more control over their learning path” (pp. 8). As more and more institutions and organizations look to provide flexibility to evolving learner needs using online learning tools like digital badges and MOOCs, the additional understanding from highlights of the literature, use case examples, and perceptions of learning in MOOCs could prove helpful in the modularization and disaggregation of academic degrees and other online offerings.

Limitations

As is the case with any study of inquiry, there are various challenges and limitations that exist with the papers included in this dissertation that are worth recognizing as conclusions are drawn as well as future research directions are considered. In the literature review in Chapter 2, one limitation is that it was narrowly focused on the specific learner groups, which included higher education, K-12, and adult learners. This clearly did not comprehensively include all other potential groups and contexts in which digital badges have been or are currently being utilized.

A clear inherent limitation when highlighting and scrutinizing a specific use case (such as the one in Chapter 3) is that not all aspects – those that worked or did not work in the use case – are guaranteed to yield the same results when applied in other contexts. While many strategies and practices can have broad application, there are certain to be other circumstantial and institutional aspects that would influence the outcomes from similar implementation.

In the case of the study of MOOC instructor perceptions of quality learning (Chapter 4), one limitation of the study was that only one method was used to collect data (semi-structured qualitative interviews). Additionally, the small sample of instructors who participated in this study

(N = 3) utilized and were familiar with only one MOOC platform that is heavily based in social learning theory, which might skew their perspective. Also, their specific discipline or course topic may influence how quality learning is perceived within a MOOC.

Reflection

I would like to now reflect on what the research and dissertation-writing processes have taught me as I believe there is great value in doing so. I will first reflect on lessons I have learned from conducting each study, analysis, and writing about each academic paper and then I will discuss how these experiences have affected my overall perspective, aptitude, and preparation for the future.

Chapter 2. In Chapter 2, I endeavored to identify and understand the theoretical underpinnings of digital badges and highlight key areas and specific learner groups in which digital badges are being implemented. Accomplishing this involved a robust and comprehensive review of the literature on digital badges and helped me understand key learning and motivation theories in the process. By looking through a pragmatic worldview, the connection between theory and practice became more discernible, and it was especially helpful to discover and better understand how some key learning and motivation theories support many aspects and affordances of digital badges. This has been valuable to me in my professional role at Purdue University, as it requires me to make considerations of educational technologies relevant to online courses. This has also been helpful in understanding how learners are able to engage in and feel motivated toward completing education within these online contexts. Dr. Tim Newby spent a significant amount of time reading various iterations of this manuscript and provided helpful recommendations and edits in order to get this manuscript in a state fit to be accepted for publication in an academic

journal. My experience in working with him also taught me not give up despite receiving rejections from some journals to which we had initially submitted.

Chapter 3. Chapter 3 of this dissertation held particular pragmatic significance, as it helped me in identifying real-life application of emerging educational technologies and how learning and training can occur with digital badges. Being able to closely work with the administrators in the Department of Intercollegiate Athletics to implement digital badges as a means to train student tutors has been invaluable. Specifically, as educational technology continues to advance and evolve, it is important that we find ways through which the technologies and the learning theories that are at their foundation can be used. I feel that only through the process of implementation and evaluation are we able to fully understand the extent to which these new tools can be effective in promoting and providing learning. Dr. Judy Lewandowski's guidance on writing a paper about the experience with implementing these badges took a very practical approach and her suggestions often gave me immediate actions I could take to fully convey how the digital badge implementation could be of value to others in the field. Dr. Lewandowski also helped me appreciate the value of the perspective that I have as a result of my professional role; this provides credibility for others in similar roles at other institutions likely navigating these same challenges and opportunities.

Chapter 4. The fourth chapter was unique from the previous two in that it significantly increased my aptitude and experience with the research process. This was truly the first time in which I was fully immersed in the entire research process from stating the research questions, to identifying an appropriate methodology, to revising the methodology, analyzing the data, and drawing meaningful conclusions. I was often stretched in finding and negotiating the right path in order to make the right decisions to conduct a reliable and credible study. I benefited greatly from

the guidance of a faculty advisor and co-author on the study, Dr. Jennifer Richardson, and owe much thanks to her for the success of this paper. This experience has been very valuable as I plan to continue in the qualitative and quantitative evaluation of the efficacy of online programs with which I work throughout my career.

Overall. My experience in engaging in and conducting research has significantly expanded my own capabilities and has more fully introduced me to the world of scholarly work. In addition, I have come to place greater value on what has been published in the literature regarding the specific topics and questions that are found within the studies of this dissertation. My worldview (pragmatism and social constructivism) has largely remained the same through the entire dissertation process; however, the culmination of all these experiences has taught me to appreciate the research process and the invaluable and integral role it must play in education.

After reflecting on and considering all that I have learned through all of the phases required to write this dissertation, I believe that we will see greater use and continued evolution of the use of digital badges and MOOCs. They have the potential to have a significant impact on the continued evolution of the education due to emerging technologies and ideas. Furthermore, through the experiences of being a doctoral student and as a higher education professional in online education, it seems clear to me that online learning will continue to become a larger and larger part of formal and informal education. Staying abreast of these changes and development on an individual and organizational level will be paramount in order to meet learner demands and needs, especially as a practitioner at an institution whose commitment to online learning has significantly increased in recent years.

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