Eportfolio Adoption's Mediating Influence On Faculty Perspectives: An Activity Theory View

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EPORTFOLIO ADOPTION’S MEDIATING INFLUENCE ON FACULTY PERSPECTIVES: AN ACTIVITY THEORY VIEW

by

Jonathan M. Thomas

A dissertation submitted in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Instructional Technology and Learning Sciences

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UTAH STATE UNIVERSITY
Logan, Utah

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ABSTRACT

Eportfolio Adoption’s Mediating Influence on Faculty Perspectives: An Activity Theory View

by

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Utah State University, 2017

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Department: Instructional Technology & Learning Sciences

A case-comparative mixed methods approach was used to discover how faculty members’ teaching perspectives changed as they adopted an eportfolio tool (Pathbrite). Ten faculty members took the Teaching Perspectives Inventory (TPI) before and after using the tool during Fall semester 2015. Also, systems logs were collected and interviews were conducted after the post survey was completed. Interview data found that faculty members developed a broader view of the potential of eportfolios. Participants also appreciated the long-term benefits that eportfolios would have on their students. However, when use was associated with accreditation standards, gains in student-centered perspectives were minimal. The study suggests cognitive apprenticeship as a model that explains the discovered findings and provides recommendations to administrators who are implementing eportfolios. (199 pages)
ACKNOWLEDGMENTS

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Jonathan M. Thomas
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CHAPTER I
INTRODUCTION

Recent years have seen an increase in the number of higher education institutions interested in eportfolio technologies (“The National Survey of Computing and Information Technology,” 2013). Casey Green, founder of the Campus Computing project, has recently suggested that in the next five years there will likely be more interest in these technologies (Green, 2014). With rising demand and suggested potential for eportfolios it is important that researchers take a moment to determine what is and is not known about these tools.

Eportfolios allow students to collect artifacts of their best work as they progress in a class, or in an overall program. Modern eportfolio tools are built with a student-centered focus in which the role of the student takes prominence (Meyer, Abrami, Wade, Aslan, & Deault, 2010); students choose what is contained in the eportfolio and who their materials are shared with (Barrett & Carney, 2005). While the benefits of eportfolios on students has been widely cited (Huang, Yang, Chiang, & Tzeng, 2012; Lin, 2008; Pelliccione & Raison, 2009), much less has been discovered about the effects that these technologies have on faculty members, particularly the influence they have on faculty members’ teaching beliefs and perspectives. The purpose of this case-comparative mixed methods study is to discover the influence that eportfolio technologies have on faculty members’ teaching perspectives, in concert with contextual elements that accompany
adoption of these student-centered tools.

**Background**

Developing student-centered perspectives of teaching may be the first step in developing a more student-centered campus (Windschitl & Sahl, 2002). Research has already established benefits to students when their teachers have developed student-centered conceptions of teaching, including higher engagement (Bryson & Hand, 2007; Gebre, Saroyan, & Bracewell, 2014) and the development, by students, of student-centered perspectives about learning (Trigwell, Prosser, & Waterhouse, 1999). These results suggest that developing student-centered perspectives on university and college campuses may improve learners’ experiences; however, research has shown that teaching beliefs and perspectives are difficult to change (Ramsden, 1992), including in higher education settings (Light & Calkins, 2008). Research around teaching perspectives, has shown that successful change efforts have taken a great deal of time to implement. Unfortunately, traditional professional development efforts such as one-off workshops and online tutorials have been shown to be ineffective in promoting change (Belland, 2009), and faculty rarely have the time needed to engage in deeper, and more sustained efforts to develop and improve their teaching (Hattie & Marsh, 1996). How then can institutions help their faculty to develop new perspectives around teaching?

One solution may be to discover how contextual variables such as the
cultural expectations and different roles, influence faculty members’ views on teaching. Many have posited that deep change can be facilitated by addressing contextual elements (Chen, 2010; Light, Calkins, Luna, & Drane, 2009; Trigwell & Prosser, 1996). One oft-cited theory in discussions about conceptual change is activity systems theory. Activity systems theory, proposed by educational theorists Leontiev (1978), Luria (1982), and more recently Engeström (2001), suggests that much of human activity is mediated by sociocultural mediators. Being able to identify these mediators has allowed researchers and theorists to discover the hidden influence of the languages we speak, the work we engage in, and the rules that govern our behavior (Feixas & Zellweger, 2010). A particularly significant implication of activity theory is that the use of tools, whether they be physical or psychological, helps to mediate goal-driven behavior (Engeström, 1990). Therefore, provision of tools that support student-centered interactions with students could be considered as one way to influence faculty perspectives.

Modern eportfolio tools may be one such tool. Part of the interest around eportfolios has to do with the ability to track students as they achieve learning outcomes, and to demonstrate student growth through specific learning artifacts (Acosta & Liu, 2006). On the one hand, this functionality allows educational institutions to meet ever more stringent accreditation requirements; on the other, it provides a feedback loop for institutions, departments, and colleges to verify that the results of their teaching efforts match their teaching and learning claims.

But the real promise of modern eportfolios is in encouraging new ways of
teaching. Wide adoption of eportfolios may allow institutions to get away from artificial measures of achievement such as multiple choice, and fill in the blank exams; and instead to use new and innovative forms of assessment that tie into the lived experiences of students. For example, by allowing students to choose which artifacts are aligned with established outcomes, faculty can help students to evaluate the quality of their work (Penny & Kinslow, 2006).

A few studies have reported change towards student-centered perspectives in teachers as they have adopted eportfolios (Carson, McClam, Frank, & Hannum, 2014; Penny & Kinslow, 2006; Swan, 2009). But, with a few exceptions, the current research around eportfolios has largely taken a technological deterministic perspective where technology has been taken as a given, rather than problematized in order to discover theoretical bases to explain findings (Oliver, 2011). For these reasons, there exists a gap in the literature regarding how eportfolios influence faculty towards student-centered perspectives, and the contextual variables that help encourage this influence.

**Purpose of the Study**

The purpose of this case comparative study was to discover the influence of eportfolios on participants’ perspectives in concert with other mediating elements. The adoption of Pathbrite, a modern eportfolio tool served as research context. Pathbrite, the company, supplied the names of faculty participants who were adopting the eportfolio software during Fall semester 2015, and provided usage
data for the participants that agreed to participate in the study.

The study used a case comparative mixed methods design (Ragin & Amoroso, 2010), with the quantitative data supporting the qualitative data (Onwuegbuzie & Johnson, 2006). Interviews with participants were transcribed and coded to discover common and contrasting examples of perspective development. System data, and a demographic survey were used to identify cases. Also, gain scores on the Teaching Perspective Inventory (TPI) were calculated to further inform how eportfolio adoption influenced faculty teaching perspectives.

Research Questions

The research questions that guided this study are:

1. How does the use of eportfolio tools influence faculty members’ student-centered teaching perspectives?

2. How do contextual elements, associated with eportfolio adoption, influence faculty members’ student-centered teaching perspectives?

3. What are the features of modern eportfolio tools that are associated with the development of student-centered teaching perspectives?

Significance of the Study

Many universities have professional development centers that provide teaching help. However, despite this, many faculty do not avail themselves of the resources provided (Ertmer, 2005), and many continue to view teaching primarily in teacher-centered ways (Ebert-May et al., 2011). Understanding how the use of
student-centered tools influence faculty perspectives may help universities and colleges move towards a more student-centered culture for both faculty and students.
CHAPTER II
REVIEW OF THE LITERATURE

Influenced by Lindeman, Knowles (1973) defined the term *andragogy*, or the teaching of adults, as requiring a fundamentally different approach to teaching, as compared with children, which further led to his development of a theory of adult learning (Knowles, Holton, & Swanson, 1998). A central tenet of Knowles's theory of adult learning is that adults are most interested when a subject is relevant to their job or personal life (Knowles et al., 1998). The implication for faculty development has largely focused on aligning program approaches with faculty beliefs and perspectives. While the topic of perspective alignment for faculty development has received much attention and has informed the development of many professional development programs (Garet, Porter, Desimone, Birman, & Yoon, 2001; Owens, 2012; Pedersen & Liu, 2003), encouraging faculty members to change their beliefs is still a challenging prospect; particularly, because teaching perspectives have been reported as difficult to change (Brownell & Tanner, 2012; Lotter, Harwood, & Bonner, 2007; Weiss, Feldman, Pedevillano, & Capobianco, 2004).

Activity theory (AT) is an example of a model that can may shed some light on the elements that influence faculty perspectives (Merriam, Caffarella, & Baumgartner, 2007). AT proposes that all human activities are influenced by social and contextual mediators (Engeström, 1990). By taking into account the cultural, historical, technological, and social influences within an activity system,
researchers can get a clearer view of the changes that take place within these systems (Lattuca, 2005). The purpose of this literature review is to review recent literature around developing student-centered teaching perspectives, to propose a model of faculty perspective change based on activity theory, and to demonstrate how this framework informed the current study's investigation into how adoption of eportfolio technologies influence faculty perspectives.

**Student-Centered Teaching Perspectives**

Research on faculty perspectives has discovered two predominant teaching perspectives: student centered and teacher centered (Gow & Kember, 1993; Nicholls, 2005). The difference between the two perspectives is characterized by whether the faculty member or the students are in control of the planning and flow of the learning activities (Postareff & Lindblom-Ylanne, 2008). Student-centered perspectives also differ from their teacher-centered perspectives in terms of how teachers view their own role, and that of their students within educational contexts. Faculty members demonstrating teacher-centered perspectives describe themselves as purveyors of knowledge, and associate the role of teacher with transmitting information to students (Pratt & Collins, 2000). Faculty members describing student-centered perspectives are more likely to view the student as an individual with unique experiences and view themselves as a facilitator of learning (Hunter, 2006).

Initial views of the two teaching perspectives viewed the two perspectives as
mutually exclusive (Marton & Saljo, 1976), but recent studies have found that teachers often hold contradictory perspectives that are manifest differently depending on context (Akerlind, 2003; Lindblom-Ylanne, Trigwell, Nevgi, & Ashwin, 2006). The current understanding is most clearly demonstrated by the widely-used Approaches to Teaching Inventory (ATI) survey (Gibbs & Coffey, 2004). The instrument has two different scores: teacher focused and student focused. Using this instrument, researchers have found that scores for teacher-focused approaches often remain consistent, whereas student-centered conceptions are more likely to change with intervention (Postareff, Lindblom-Ylanne, & Nevgi, 2007; Stes, Coertjens, & Van Petegem, 2010).

**Teaching Perspectives: Beliefs, and Intentions**

While the term teaching perspectives has often been loosely used to refer to teaching views and personal philosophies, recent research has sought to refine and delineate the different facets of teaching perspectives. These efforts have lead researchers to distinguish between two aspects of teaching perspectives: teaching beliefs, and teaching intentions. Teaching beliefs, or conceptions of teaching, are the deep-seated beliefs that a teacher holds about the purpose or nature of teaching (Postareff & Lindblom-Ylanne, 2008). Teaching intentions, on the other hand, are the teachers’ planned for teaching behaviors when they are taking into account real-world limitations (Kember, 1997; Norton, Richardson, Hartley, Newstead, & Mayes, 2005). In this sense, teaching intentions have been linked with
teaching strategies (Parpala & Lindblom-Ylanne, 2007).

Pratt & Collins (2000) broke down teaching perspectives into three different constructs or teaching commitments: beliefs, intentions, and self-reported actions.

- **Teaching beliefs** are the ideologies, worldviews, and assumptions that are used to interpret teaching experiences.
- **Teaching intentions** are the planned for teaching behaviors of the teacher, taking into account real-world constraints.
- **Teacher self-reported actions** are the teaching behaviors that a teacher describes engaging in.

Evidence suggests that these three constructs are inter-related. Measurements for the three commitments have high levels of collinearity (Collins & Pratt, 2010). Teaching beliefs have been found to correlate with teaching intentions (Kember & Kwan, 2000; Trigwell & Prosser, 1996). And self-reported actions have been linked with intentions (Owens, 2012), although not as closely with beliefs (Henderson & Dancy, 2007; Murray & Macdonald, 1997).

Of particular interest is how intentions, and beliefs relate to observable behaviors in the classroom. Unfortunately, a faculty member’s holding of student-centered beliefs does not always mean that the faculty member will exhibit behavior consistent with these beliefs (Belland, 2009). One reason for the discrepancy may have to do with limitations in the environment that faculty find themselves in and which constrain their planned actions (Norton et al., 2005).
Faculty may change their teaching behaviors for various reasons including the type of students that they are teaching (Lam & Kember, 2006), and may even be unaware of the disconnect between their espoused actions, and actual behaviors (Mellado, Bermejo, Blanco, & Ruiz, 2008).

Based on these results the question could be asked if there is any benefit to studying teaching perspectives? If teaching behaviors do not reflect the beliefs and intentions of faculty members then the benefit to changing such perspectives might be considered minimal (Devlin, 2006). However, this paper proposes that such a view underestimates the advantages of developing faculty student-centered perspectives.

There is some evidence to suggest that the benefits of student-centered teaching perspectives go beyond the observable teaching behaviors exhibited by faculty. For one, faculty who have student-centered perspectives have been found to demonstrate a more expansive view of different approaches to and conceptions about teaching. Student-centered teachers are more aware of the contextual elements that influence their teaching, and have a more informed view of different teaching approaches (Gibbs & Coffey, 2004; Gonzalez, 2009; Prosser & Trigwell, 1997). In addition, there appear to be some notable benefits to the students of teachers who have student-centered views. Courses with student-centered teachers have been linked with deeper approaches to learning (Gibbs & Coffey, 2004), and student engagement (Bryson & Hand, 2007; Gebre et al., 2014). Furthermore, student-centered approaches to teaching have been linked to the development of
student-centered conceptions of learning in students (Trigwell et al., 1999).

Developing teachers’ student-centered perspectives, while not necessarily reflected in changes in teaching behavior, may influence teachers and students in other significant ways. For example, recent interest around teaching beliefs and perspectives have begun investigating the relation between teaching perspectives and other valued teaching characteristics, such as authenticity (Kreber & Klampfleitner, 2013), creativity (Aljughaiman & Mowrer-Reynolds, 2005), and empathy (Guiffrida, 2005; Warren, 2014).

**Challenges with Adopting Student-Centered Teaching Approaches**

The teaching perspectives literature has detailed many challenges associated with changing faculty perspectives (Postareff et al., 2007). One difficulty is that student-centered teaching sometimes leads to behaviors that are not desirable in institutions that have established norms that are conservative and traditional. For example, allowing students to collaboratively develop the course syllabus may be considered a student-centered approach (Blythe, 2001), but may cause concern for administrators who use these documents for reviewing for promotion and tenure, or planning curricula.

In addition, student-centered teaching perspectives can sometimes come across as a lack of preparation, or unprofessional conduct. So and Watkins (2005) found that pre-service teachers in Hong Kong became less coherent in thinking, as
well as less purposeful in planning as they moved toward student-centered perspectives. Like all teaching approaches, student-centered teaching begins with a set of values that inform what is and is not appropriate for classroom interactions. Therefore, student-centered perspectives may cause conflict if they do not align with the contexts in which student-centered teaching is applied (Wang & Farmer, 2008).

At the individual level, the development of student-centered teaching perspectives presents a change in the role of the faculty member. Instead of being the sage on the stage, the faculty member must see him or herself differently and new strategies and skills must be developed; including classroom management strategies, and ways to facilitate dialogue between students. Such a change can be daunting for seasoned teachers who have become comfortable with traditional forms of teaching. The fear of change presented by adopting new roles may be one explanation for why faculty student-centered beliefs sometimes do not match with their teaching behaviors (Cleveland-Innes, 2010).

Similar difficulties are accorded to students as they are required to take ownership of their own learning. The invitation to take on this new role may be met with resistance (Felder & Brent, 1996). Students exposed to student-centered teaching methods have expressed being confused about the lack of structure, and have been burdened by the amount of information they are asked to take in (Brush & Saye, 2000). Observing this phenomenon, Pedersen and Liu (2003) reported that a student-centered learning environment had led to students “floundering.”
wherein the students were not sure how to move forward in solving a problem. Although a certain degree of uncertainty is expected, and even desired, in teaching environments, overwhelming students with tasks and responsibilities that they are incapable of handling is not considered good student-centered pedagogy.

**Difficulty in Changing Perspectives**

In addition to the contextual challenges that get in the way of developing student-centered teaching, studies have shown that it can be very difficult to change the perspectives of college students (Ramsden, 1992), elementary school teachers (Levin & Wadmany, 2006), and preservice educators (So & Watkins, 2005). And there is some evidence that higher education faculty fit within this pattern. A few studies have shown that perspectives of teaching for faculty are relatively stable and only change when changes align with professional development goals (Marra, 2005) or when faculty are dissatisfied with their teaching efforts (Offerdahl & Tomanek, 2011). Several studies have found that traditional forms of professional development such as workshops, and webinars do very little to change teaching beliefs (Ebert-May et al., 2011).

Furthermore, faculty in higher education have been shown to be more resistant to change when contrasted with K-12 teachers (Bouwma-Gearhart & Hora, 2016). This phenomenon may be due to cultural differences in higher education that set college faculty apart from elementary teachers. College faculty frequently have different pressures placed on them as compared to K-12 teachers, including
pressures aligned with promotion and tenure, and the need to publish research (Boyer, 1991). The means of encouraging perspective change in teachers in K-12 setting may not have the same effect as for higher education faculty.

Context and Faculty Perspective Change

Because the pressures inside of higher education teaching environments are unique, understanding the elements of these environments that uniquely influence faculty perspectives can be seen as a prerequisite to implementing successful change initiatives. The next sections will review the literature around two contextual elements that appear within the perspective change literature for higher education institutions, viewing these as potential contributors to faculty change in the current investigation.

Professional development duration. Studies have often shown student benefits after faculty have taken part in long-term professional development activities. For example, one study found increased discussion between students of faculty who had taken a one-year instructional program aimed at developing student-centered perspectives (Stes et al., 2010). Similarly, Ho, Watkins, and Kelly (2001) found that students engaged in more discussion only after faculty participated in two-year professional development program that encouraged the development of student-centered teaching beliefs. Pre/post research designs like these demonstrate not only the benefit of student-centered teaching perspectives, but that these perspectives can be influenced by purposeful interventions that are
of significant length (Gibbs & Coffey, 2004; Kember, 2009; Light et al., 2009).

But there are still many unanswered questions about the effect of program duration on teacher perspectives. For example, while some researchers have concluded that it is the amount of hours that faculty have spent in professional development that leads to perspective change (Postareff et al., 2007) other studies have demonstrated that it is also the duration in time span of professional development, not necessarily just the hours of instruction that has an influence on perspectives (Garet et al., 2001; Ingvarson, Meiers, & Beavis, 2005). Although studies have shown that one day workshops and shorter programs that last a few weeks are rarely effective (Walstad & Salemi, 2011; Stes et al., 2010), the ideal duration of a professional development program is difficult to determine.

The ambiguity around the effect of duration has led some to posit that the influence of duration is mediated by other variables. One line of thought is that the effect of longer professional development programs lessens the influence of teacher anxiety that is associated with the adoption of new methods of teaching (Postareff et al., 2007). Studies around new teaching approaches indicate that high anxiety is linked to failure of new teaching initiatives being adopted (Klenowski, Askew, & Carnell, 2006; Mac Callum, Jeffrey, & Kinshuk, 2014). And teacher-centered approaches correlate with self-reports of anxiety in teaching situations (Trigwell, 2011). However, the specifics of how professional development is related to anxiety in the influence of faculty perspectives have yet to be adequately addressed.
Another element that may influence teaching perspectives is the types of activities that faculty participate in as part of professional development. Often, more active forms of professional development (e.g., coaching, mentoring, learning communities) are also activities that customarily take longer to implement. Indeed, a correlation between type of activity and duration of professional development has already been established for K-12 contexts (Garet et al., 2001). The fact that faculty often prefer professional development activities that are short and that do not interfere with the other pressing demands (Taylor & McQuiggan, 2008) may be one reason that higher education professional development activities often fail to produce desired results.

**Structured reflection activities.** Dewey’s famous quote, “We do not learn from experience; we learn from reflecting on experience,” (Dewey, 1933, p. 78) characterizes the honored position that reflection continues to hold in educational literature. Reflection has been shown to be an important part of pedagogical approaches that involve or approximate real-world learning experiences including service learning, experiential learning, simulations, and situated cognition (Hatton & Smith, 1995; Hubball, Collins, & Pratt, 2005). In comparison with traditional approaches that focus on observable learning objectives, reflection and metacognition focus faculty on their own internal state.

Faculty professional development that uses structured reflection activities provide unique opportunities for faculty participants (Imhof & Picard, 2009). For one, the ability to reflect on teaching practices, or *pedagogical awareness* (Postareff...
& Lindblom-Ylanne, 2008), allows faculty members to identify areas of their teaching that need improvement. In this vein, researchers have found that faculty engagement in reflection correlates with levels of student-centeredness (Felder & Brent, 2010; Kreber, 2005).

Reflection can also be encouraged by exposure to conflicting information. For example, (Chappell, 2007) described how professional development that challenged his assumptions about teaching, encouraged reflection and led to changes in how he viewed teaching. Educational theorists have long known that deep learning is catalyzed by disruption and conflict. Piaget spoke of the interaction between children and how encountering conflicting information enabled children to move forward within age-specific stages (Piaget & Cook, 1952). Also, life-changing events were the impetus for change in Mezirow's theories around transformational learning (Mezirow, 1978).

The difficulty for practitioners has been in discovering how conflict can be leveraged for educational purposes. An important step forward in this regard was the Strike and Posner (1985) model of conceptual change. Strike and Posner's model described four conditions that promote change at a deep conceptual level: (a) dissatisfaction with the existing conceptions; (b) some understanding of the new conception; (c) that the new conception should appear initially plausible; and (d) that the new conception should appear more powerful (Strike & Posner, 1985). The model has been useful in developing educational curriculum for various disciplines from Mathematics (Perkins & Unger, 1994) to Geology (Mora, 2010).
More recently educational theorists have turned their attention to perspective change in teachers. By purposefully exposing teachers to the contradictions in their thinking, Ho’s (2000) model of conceptual change attempted to encourage faculty to think more critically about their role as teachers; conflict resolution thus became a tool to encourage reflection, and perspective change.

Recent studies have looked at how social interactions between faculty and teachers can help them confront alternate perspectives (Carson et al., 2014; Davies & Dunnill, 2008; Sadler, 2012). At the heart these approaches is the acknowledgement that teaching perspectives can be deeply engrained, but that experiences that challenge these perspectives can be useful in encouraging teachers to critically reflect on their performance. A teacher who was part of such a professional development program based on the use eportfolios (Klenowski et al., 2006), described her experiences this way:

At times I have been a bit worried about giving my ideas and not knowing whether they are right or wrong but have begun to realize that this is not an important factor. I think I might have felt like this because of the way I was taught in school and as an adult, in a very formal way with right and wrong answers. I have often judged myself against others and how they perform. The process has helped me see that this is not the way to look at my learning. That learning is an ongoing process and that seeking to learn by taking risks is a much better way of approaching your learning. (p. 277)

By participating in learning activities that challenge a teacher’s assumptions about teaching, the teacher has an opportunity to develop their student-centered views of teaching.
System Activity Theory

To better understand social learning experiences, researchers have often turned to activity system theory (AT). Derived from the Russian socioconstructivists Vygotsky, Leontiev, and Luria, and later operationalized by Engeström, AT posits that there are six common elements within all of human activity: (a) subject, (b) object, (c) tools, (d) rules, (e) community, and (f) division. These six elements are all connected and influence one another. Therefore, to be able to understand human activities, researchers must first come to understand the activity system that surrounds the interaction of interest.

Although educational theorists have proposed models that incorporate activity theory into the process of designing social learning environments (Jonassen & Rohrer-Murphy, 1999; Knight, Tait, & Yorke, 2006) very little of this work takes into account the viewpoints of faculty members. And even less emphasis has been put on implementing programs based on these concepts into practice, raising concerns among researchers in the area (Feixas & Zellweger, 2010). Consequently, there is a need for a framework that takes into account the sociocultural and technological elements that influence faculty members’ student-centered teaching perspectives. In this chapter, a new framework is proposed based on activity theory, that emphasizes how contextual, and technological elements influence the activity of developing faculty members’ student-centered teaching perspectives.
Vygotsky’s original writings underscore how semiotics, or the study of signs and their meaning, came to inform the development of activity theory (Vygotsky, 1980). Based on the ideas of Peirce, Vygotsky proposed that development of a child’s understanding begins first by coming to internalize the signs in the world around them (Roth & Lee, 2007; Walkerdine, 1997). This process, Vygotsky posited, extends beyond child development and actually informs our understanding of how all human development take place. Further building on the semiotics tradition, Vygotsky proposed a triad explaining how tool use enables human development. Figure 1 shows the tool mediation triad of object, subject, and tool that would come to later form the basis for activity theory (Vygotsky, 1980).

Course Activity Development as Tool Mediation
In the simplest of all human activities, a subject pursues an objective. However, this action does not take place alone, the subject must have some means of interacting with the world to achieve the object. The means by which the subject acts is referred to as a tool (Engeström, 1990). Tools can be physical objects that are used to complete a task, as in the case of a hammer, but they can also refer to psychological tools, or tools that are used within social contexts such as languages, processes, and techniques to solve problems (Bonk & Cunningham, 1998)

Vygotsky (1980) used the term “mediating activity” to refer to how tools enable human activity and thus development. A representation of how the tool mediation triad might be adapted to represent a teacher developing a course is shown in Figure 2. The subject in this case would be a faculty member. The objective in the triad would be the designing of course experiences. The tool would be the means by which a faculty member structures the course experiences. Physical tools

\begin{figure}
\centering
\includegraphics[width=\textwidth]{f2.png}
\caption{A tool mediation triad depicting faculty designing course experiences.}
\end{figure}
might include the learning management system, video capture software, content repositories, and training activities. Other mediational tools may include the course design methodologies, discipline specific language related to teaching, and models and metaphors of how students learn (De Lima, Rebelo, & Barreira, 2014).

Figure 3 shows a typical system activity diagram. The bolded lines between subject, object, and community signify the noteworthy relationship between these elements (Kuutti, 1996). The subject-community interaction is mediated by the rules, both explicit and implicit norms. These sociocultural norms may either constrain or enhance the activity. Similarly, the object-community interaction is mediated by the element of division of labor as community members perform
different tasks in pursuit of the objective.

There are two important concepts to take from this brief review of activity theory. First, the concept of conflicts within an activity system refers to elements working against each other, having an effect on the outcome (Lompscher, 1999). Contradictions in an activity system are an expected part of the development and transformation of an activity system (Engeström, 1990). For example, implicit norms within a community may be in period of change with old norms and new norms coming into conflict, requiring the adaptation to new ways of thinking. On the other hand, conflicts may be between different elements of an activity system. In such instances where desired outcomes are not being achieved, activity systems analysis may become a way of discovering and alleviating the contradictions that exist within an activity system (Kirkup & Kirkwood, 2005).

Second, it is important to note that each of these elements has a history in and of itself, but also may have history with the other elements (Roth & Lee, 2007; Shabani, Khatib, & Ebadi, 2010). For example, community values and requirements might lead to the development of more efficient tools that then mediate future activities between subject and object. Another implication of the historicity of activity systems is that they evolve over time as different elements within the activity system change. The introduction of a new tool, the change in the makeup of a community, and alterations in the division of labor, all have an effect on the activity system. Therefore, calculated changes to elements of an activity system may be one way to improve desired outcomes.
Sociocultural Elements Influencing Perspective Change

Higher education has a culture that is distinct from other schooling environments. For example, while K-12 studies often base conclusions on how well particular treatments influence standardized test scores, in higher education there are few systematic program evaluations that can be relied on in the same way (Stes et al., 2010). This presents particular difficulties for educational research in higher education because it makes it difficult to discover whether changes in teaching perspectives actually reflect changes in student performance cross-institutionally. In addition, cultural elements associated with traditional methods of teaching in higher education sometimes contribute to difficulties associated with changing faculty perspectives (Lotter et al., 2007; Ward & Parr, 2010).

Activity theory sheds light on how these cultural elements influence change in faculty perspectives. This section reviews three contextual elements that act as hindrances to faculty perspective change: (a) lack of training, (b) institutional policies, and (c) an emphasis on research over teaching; and demonstrates how activity theory helps to make sense of their influence.

Lack of training. One difficulty that faculty members encounter in higher education is the perceived lack of training opportunities around teaching and learning. Training and professional development are needed in higher education because most faculty come into their positions without ever having been officially trained in pedagogy in their fields (Nicholls, 2005). Although many universities and
colleges have faculty development offices, the number of faculty exposed to these programs, and the impact felt on campus, are often minimal (Ertmer, 2005). Even when professional development programs are offered they often focus on lecture-style presentations, or intensive workshops, with little to no application with the presented skills (Calkins, Johnson, & Light, 2012; Dunkley, 1993). And these issues do not apply to only tenure-track faculty, part-time or adjunct faculty experience similar issues with training (Knight, Baume, Tait, & Yorke, 2007).

However, a lack of training opportunities may not be the only reason why faculty are not getting proper training. In a literature review on the subject, Ertmer (2005) lamented the gap between technology training availability and technology use by faculty and teachers at all levels of education. While modern technologies are prevalent in all facets of teachers’ lives (for communication, calendaring, and entertainment) many faculty members choose not to avail themselves of the training opportunities provided for educational technologies.

**Implications of activity theory.** How might activity theory resolve this dichotomy? From an activity theory perspective, training faculty can be viewed from a few different angles. The training opportunities and resources can be viewed as tools that teachers can utilize in their teaching. Without these tools, faculty members struggle to be able to meet their teaching objectives. Providing better training opportunities may help to alleviate concerns. However, activity theory proposes an additional explanation in that community and sociocultural norms (rules) may also be important elements in the success and use of training
opportunities. Implicit expectations about how training should be provided deter faculty from using provided resources. Furthermore, the faculty member’s objective within the activity system should be considered. On an individual basis, administrators may proclaim the desire that teachers use student-centered teaching approaches; however, the actual objective for the faculty member may be to simply get their course ready using whatever means possible.

**Accountability policies.** During recent years, there has been increased scrutiny regarding the value proposition of higher education. One of the elements influencing this dissatisfaction is unemployment rates among recent graduates. Although unemployment rates for the US population have largely recovered after the Great Recession, a recent study shows that the unemployment rate for recent graduates still sits at about 8.5%, up from 5-6% before 2008; and among those who are working, many are underemployed with a rate of 16.8%, up from approximately 10% (Shierholz, Davis, & Kimball, 2014). The information about these statistics has not gone unnoticed, and calls for accountability have been heard from various governmental officials, including recently President Obama himself (White House Press Secretary, 2013). In a review of the state of higher education, Cleveland-Innes (2010) details the restructuring of government funding, as well as new rigorous standards from accreditation boards across higher education.

However, there is some concern over the effects that such accountability efforts will have. The need for reliable measures of quality often requires an objective view of education (Trevitt, Macduff, & Steed, 2014), a view that is often
incompatible with subjective views of education espoused by proponents of constructivism and student-centered learning. Olanin and Agnello (2008) express concern that the ideals of a liberal education are fading, and that the development of global citizenship is giving way to increased calls for accountability in the form of legislative action.

**Implications of activity theory.** From an activity theory perspective, new requirements for accountability change the rules element within higher education. These rules may constrain the choices that a faculty member has in teaching because of the need to meet external standards. While most would not disagree with higher education institutions being held to standards, concerns arise when the standards themselves limit the ability of higher education faculty to teach more effectively (Bass, 2012).

**Emphasis on research over teaching.** The emphasis in universities on research (at the expense of teaching) in the tenure and promotion process is a well-documented phenomenon in higher education (Green, 2008; Macfarlane, 2012; McLean, Cilliers, & Van Wyk, 2008). Many times faculty see no incentive for improving their teaching efforts and in some cases faculty are even discouraged from improving their teaching practices (Tutty, Sheard, & Avram, 2008). Unfortunately, this can sometimes make it difficult for faculty members to have time to spend on developing their teaching efforts (Bellas & Toutkoushian, 1999). One faculty member in the Carnell (2007) study described the difficulties she experienced this way:
I haven’t been valued for what I’ve done or for the teaching. I’ve got a Ph.D., been involved in funded research but it isn’t a level playing field. I am expected to produce the same sort of articles for prestigious journals that non-teaching colleagues do. (p. 35)

In an environment that does not value student-centered teaching, many faculty fall back to what they have experienced in their own college experiences (Knight et al., 2007). A culture that is overly research focused can adversely affect both faculty motivation to teach well and the time that faculty are willing to put towards improving their teaching efforts (Durning & Jenkins, 2005; Lompscher, 1999).

**Implications of activity theory.** From an activity theory perspective, the emphasis on research over teaching is associated with the division of labor element. Faculty are given the task of producing research. Because of this requirement they frequently do not have the necessary time to improve their teaching efforts (Horta, Dautel, & Veloso, 2012). The community of which faculty are a part, and their identification with that community, also influences faculty perspectives. For example, one study found that teachers who identified themselves more as a scholar than a teacher, were more likely to score higher on measures of teacher-centered perspectives about teaching (Nevgi & L öfstr öm, 2015). Another study found that faculty associate research with their role as scholars very easily, but have a more difficult time associating teaching with a scholarship perspective (Nicholls, 2005). The results of these studies suggest that the identification with the craft of scholarship may be influencing how faculty view their teaching responsibilities.
The Place of Technology in Activity Theory

Technology use can be understood as arising from the needs of faculty and the University at large. Technologies are not value-free, they are built and refined over time by the communities that require these tools (Pedersen & Liu, 2003). One example is found in modern web-based technologies. The values that are espoused by particular cultures and communities inform the development of web-based technologies such as learning management systems, content repositories, and media servers. As mediational tools, these technologies act back upon the individuals that use them (Stevenson, 2008). The reflexive characteristic of tools was first addressed by Vygotsky (1980) who described that when someone first begins to use a tool they do so without really understanding the motives behind the tools development. After using the tool, they begin to understand the purposes for which it was created. The productive use of a tool therefore requires the individual to develop insight into the reason for the tools production. While tools allow individuals to do things they could not do otherwise, they may also restrict certain activities (Engeström, 1990). In this way activity theory identifies the mutually constitutive role that technology plays within social contexts.

For most faculty, technology plays an important part in their role as teachers. Whether it is highly interactive virtualized learning spaces or simply posting announcements in a learning management system, technology in the last thirty years has gone from being a nice-to-have, to an expectation within the classroom. Activity theory demonstrates why ubiquitous technology use could be of interest in
changing faculty perspectives. Teaching technologies, based on certain values, either encourage or discourage faculty from evaluating their role as teachers. Experience with student-centered technologies can therefore present new ideas about teaching, and give faculty opportunities to encounter new teaching perspectives (Chappell, 2007).

**Problematizing the Technology**

Research within educational technology, unfortunately has largely ignored the agentic perspective of technology. Too much of the research in educational technology has been simplistic in how it has treated technology implementations. Simple pre/post survey instrument designs that assume that changes can be attributed to the technology implementation, characterize far too many studies in the field (Kirkwood & Price, 2012). For example, a study may be able to discover what the effects are of a certain technology upon participants, but without deconstructing the social, cultural, and contextual roots of the technologies adoption, the technology becomes the sole stimulus. This technological deterministic perspective treats all technology as if it were a given and does not take into account the theoretical reasons for which the tool was created in the first place. There is a need within the educational literature to *problematize* the theory for the tools that are studied (Oliver, 2011).

One implication that can be drawn from activity systems theory is that tools that are implemented within a school environment can cause conflict in an
organization because they do not align with the values of the environment within which they are implemented (Bhika, Francis, & Miller, 2013; Moron-Garcia, 2002). By ignoring the influence that these technologies have on the environment, institutions may be encouraging approaches to teaching that go against the desired institutional and faculty culture (Verenikina, Wrona, Jones, & Kervin, 2010). For example, one researcher blames Power Point for the degradation of modern education practices by constraining thought processes of teachers and requiring all ideas and concepts to be broken down into bulleted lists (Adams, 2006). Likewise, Coates, James, & Baldwin (2005) expressed concern about the negative effects that LMS technologies were having on faculty conceptions of teaching, citing characteristics of LMS systems at the time; particularly that the LMS systems were largely based on a training paradigm, and that the systems had limited assessment features because of the textual nature of online transmissions.

However, using this same reasoning, value-laden technologies may also have a positive influence on the higher education environment (Amiel & Reeves, 2008); and there is some evidence to suggest such a connection. For example, teachers who experience professional development within online environments demonstrate change in how they perceive their role as an online teachers (Al-Mahmood & McLoughlin, 2004; McQuiggan, 2012). Also, general use of modern technologies has been claimed, in a few different instances, to influence faculty conceptions. The phenomenon has been reported in the adoption of clicker-based systems (Kolikant, Drane, & Calkins, 2010), blogs (Glogoff, 2005), and information communication
technologies (Karasavvidis & Kollias, 2014; Kennewell & Beauchamp, 2007).

Another recent article breathlessly asserted the power of Web 2.0 technologies in helping learners to achieve wisdom (Dede, 2009).

Because of the obvious hype surrounding such technological advances, it is prudent to be careful in relying on such claims, particularly when it comes to something as enigmatic as teacher perspectives. In fact, some have expressed concern that the excitement associated with new technologies may bias research results. This bias can lead to technologies being adopted based on features, rather than student needs (Kirkwood & Price, 2012). The promised benefits of technology adoption can act as technological gravity, leading some to claim its positive impact, even when there is little evidence (Gibbons & MacDonald, 2005). Obviously, support for concluding that technology, by itself, drives teacher perspective changes in conceptions is weak and fraught with methodological concerns. On the other hand, this does not mean that technology has no effect on teacher perspectives. Mixed reports regarding the influence of technology on teacher change may be because teaching perspectives are highly influenced by context (Windschitl & Sahl, 2002). Activity theory helps researchers to frame technology implementations that see beyond technological determinism and take into account the social and historical elements that influence desired outcomes.
Activity Theory Framework for Changing Faculty Perspectives

This paper proposes a framework, based on activity theory that models the influence of student-centered tools on faculty perspectives (see Figure 4). Elements that have appeared within the faculty perspective change literature are embedded within an activity system framework. The circles represent the core elements of subject, object, tool, community, and outcome. The diamonds, on the other hand, represent elements that moderate the interactions between the core elements within the system. For example, the element of required-use moderates the interaction between the faculty member and the institutional community.

The tools at the top of the diagram (in grey) refer to the different tools made available to faculty as they implement the new student-centered technology. The primary tool, or student-centered technology of interest, appears as the apex of the diagram and mediates the subject-object activity. Secondary tools moderate interactions between the student-centered tool and the other core elements. These secondary tools appear as diamonds on their respective interaction lines. The bolded text within these moderating elements signify the salient characteristic that has impact on faculty perspectives during technology adoption.

The term moderates, as opposed to mediates, is used to describe the influence of the different elements upon core elements and eventually the outcomes. The word choice attempts to distinguish the proposed framework from the original activity theory diagram developed by Engeström (1990) which used the
terms espoused by Leontiev and Vygotsky (e.g., *mediating* artifacts). Where the mediational elements in the original activity theory diagram (i.e., tools, rules, and division of labor) were high-level theoretical abstractions, the elements in the current framework are bound to a specific context in which a student-centered tool is adopted within a higher education environment.

This specificity of the framework has implications for core elements as well. For example, the object of *teaching a course using the tool* is linked with both the faculty and institutional community. The object is not to be understood as solely invested within the faculty member, but is a joint objective that is tied to both the faculty member and the institutional community. It is important to note that the idea of a joint objective is aligned with some interpretations of activity theory that propose a community/collective object, as opposed to earlier depictions of the object that were centered exclusively on the individual (Engeström, 1990). This understanding of activity theory has been useful in fields where collective effort is often the focus of research such as organizational behavior (Ghosh, 2004) or business management (Blackler, 1993).

The location of the elements in the framework is considered significant. For example, participation in reflection is an inherently inward activity on the part of the faculty member and therefore has been placed next to the faculty member. Professional development, on the other hand, often takes place as part of a group and is therefore placed closer to the joint objective. Because of this emphasis on placement and location, the framework allows for some insights into how different
elements influence faculty perspectives. For example, the elements on the right-hand side of the framework are aligned more closely with community goals. Therefore, changes to these mediating elements (i.e., professional development and research emphasis) would require higher levels of institutional involvement as compared to the other elements on the left-hand side.

In similar fashion, elements on the left-hand side are more aligned with the individual faculty member and therefore alterations by the community may have less effect. For example, changes in opportunities for reflection does not necessarily
mean that the faculty member will participate in meaningful reflection. From this view of the framework, tech support takes a unique position, appearing right in the center. The positioning of tech support implies that while tech support may not be needed for every individual, it certainly does have an effect on faculty when they require assistance and find themselves without help.

In the final section of this review, modern eportfolio tools are reviewed discussing how the features of eportfolios identify these technologies as student-centered tools and how the use of these tools in higher education might be applied to the conceptual framework detailed in this section.

**Student-Centered Eportfolio Technologies**

The use of portfolios as a way to evaluate student performance has frequently been a subject of interest in educational literature. However, this interest has generally been localized within a few specific disciplines. Traditional paper-based portfolios failed to catch on across the academy partly because they were tied to a physical medium; the prevalent use of portfolios was in fine arts (Gibson & Barrett, 2002). However, with the introduction of digital portfolios, interest in using portfolios as a method of pedagogy has grown exponentially (Bryant & Chittum, 2013). Part of the reason is that the eportfolio can meet the need of several different stakeholders in higher education. At a time when higher education is being criticized for relying on multiple choice exams, the eportfolio promises a holistic approach to assessment (Mason, Pegler, & Weller, 2004). Eportfolios provide
feedback and data that are valuable to both students, faculty, and administrators at the department level upward (Acosta & Liu, 2006). The digital nature of eportfolios allows for detailed data collection around the achievement of established outcomes. Furthermore, the ability to evaluate individual artifacts allows for cross-disciplinary analysis and classification of courses where these items are produced.

Carson et al. (2014) identified eportfolio technologies as unique in that they are both a physical tool, and well as a psychological tool: physical in that they still store artifacts as digital objects, psychological in that many eportfolio tools are designed to encourage specific ways of interacting with students that are discovered as a teachers and students begin to interact with the tool. Jonassen and Rohrer-Murphy (1999) define such technologies as culture-specific tools in that they have features that reflect the values of the culture for which the tool is developed.

**Modern Eportfolio Tools Features**

The features of an eportfolio obviously vary from tool to tool, but in general modern eportfolio tools draw from constructivist perspectives in their development. Student reflection is an emphasis for several eportfolio solutions. There are two different approaches that eportfolio tools take towards reflection: in the moment reflection, and overall reflection on the portfolio process. The first is characterized by a feature in an eportfolio tool called Pathbrite that lets teachers assign reflection assignments to individual artifacts that are submitted within the portfolio. This allows students to think through the small choices that eventually lead up to a
completed portfolio. The second approach is characterized by a feature in the *Bedford St. Martins* portfolio tool that encourages users to create an overall narrative for a portfolio detailing the choices made while assembling the portfolio and lessons learned. These two approaches can be viewed as representative of the two types of reflection identified by Schon (1987): reflection-in-practice, and reflection-on-practice.

Control over the submissions process is another feature that varies across the portfolio solutions. *Prevalu Schoolchapters* allows the teacher fine grained control over the type of files that can be uploaded, as well as the textual elements that will be displayed alongside the artifact. In contrast, *Foliotek* gives students control over the options about what and what not to include. *Foliotek*’s position aligns with a more-student centered approach and characterizes the approach taken by more recent eportfolio solutions.

Many eportfolio tools try to strike a balance between being focused on the assessment features that provide outcome and progress reports on the one hand, and allowing the student to customize and have ownership of the eportfolio on the other. For example, *Pebblepad* provides teachers with templates that they can customize and assign to students to fill in with showcases of their work; students, however, have limited ability to customize the assigned templates. However, by limiting the choices of the student, administrators and teachers can get more detailed reports of how the student is progressing, and whether they have completed the assigned work. On the other hand, *Foliotek* allows much more
customization of the portfolio but correspondingly does not provide as many tools for tracking outcomes or rollup reports.

Finally, customizing the interface is an option that is treated differently across the suite of eportfolio tools. Some tools allow students to customize the interface as much as they want. In this way, the student has complete ownership of the tool. More recent portfolios however provide a list of interfaces that the student can choose from. This allows the student to have ownership of the look and feel of the portfolio while still ensuring a professional appearance.

Modern Eportfolios as
Student-Centered Technologies

Although much has been said about the potential benefits of eportfolios the research is not as clear on how these benefits are manifest in higher education contexts, particularly as it relates to faculty members’ perspectives in implementing eportfolios.

One of the difficulties within eportfolio research is that the term "eportfolio" has been used to describe concepts as varied as a type of pedagogy (Berry & Marx, 2010), and a method of assessment (Diller & Phelps, 2008). Several researchers have attempted to solve this problem of definitions by categorizing the different uses of portfolios. For example, Barrett and Carney (Barrett & Carney, 2005) suggest three different purposes for portfolios: accountability, marketing, and learning. Similarly, Love, McKean, and Gathercoal (2004) use a maturation metaphor to propose five
different layers of portfolios including scrapbook, curriculum vitae, curriculum collaboration, and mentoring. Classifying eportfolios is problematic in that a single eportfolio can often serve multiple purposes (Granberg, 2010).

While the literature defines eportfolios in many different ways, one commonality between them is the distinction between the assessor and curation features of eportfolios and the different roles associated with each category. The assessor role holds the student accountable for the work produced, oftentimes providing a grade for the portfolio and assignments. The curation role, on the other hand, is responsible for selecting the artifacts being placed in the eportfolio, and is in charge of the presentation of the content. Eportfolio features that are targeted at the assessor role include outcomes assessment, rollup reports, and summative feedback (Klenowski et al., 2006); eportfolio features targeted at the curation role include presentation customization options, personalized account settings, student control over submission, and formative feedback.

Unfortunately, the assessment function sometimes makes it difficult for student curators to take full ownership of their portfolios because they must meet the standards of an external authority figure (Barrett & Carney, 2005). This dichotomy presents a contradiction as the tool is used for two different purposes both assessment and curation. However, recent eportfolio solutions have attempted to transcend the contradictions in favor of tool designs that are centered on learning. Modern learning eportfolios are informed by constructivist and student-centered perspectives in which students create new knowledge as they assemble the
eportfolio. While assessment may still be a part of these types of eportfolio tools, the provision for reflection activities, the option for public display, and the persistence of eportfolios beyond the university experience aligns both the assessor and curation role. Therefore, alignment between these two views becomes an important element in the success of eportfolio implementations. The next section will describe the benefits available in these modern learning eportfolios and the challenges that occur when teaching and curation roles are not aligned.

**Reflection and Metacognitive Strategies**

Reflection is a critical component of modern eportfolio tools (Himpsl & Baumgartner, 2009). These tools may require students to submit a written reflection statement, or they may just encourage reflection through textual prompts. In this way eportfolios become a story about the student's development (Riedinger, 2006). Reflection also benefits students by requiring them to determine what to include in a portfolio. By determining what, and what not, to keep students must evaluate their own work. This requirement helps students to develop metacognitive strategies (Meyer et al., 2010). However, these benefits may vary depending on students' goals in completing the reflection task. Students who approach their eportfolio development as an assessment activity may not receive the same benefits as those who approach eportfolio development from a mastery perspective (Huang et al., 2012).
Student Ownership & Control

Although eportfolio tools for learning can be associated with a single course, they are often built to move with student throughout their student experience; and many eportfolio tools are now set up to go beyond graduation as a tool for showcasing the student work to potential employers. This feature of modern eportfolio tools encourages students to take ownership of their eportfolios. It is in this sense, that some researchers have found that the use of eportfolios helps student to develop as self-directed learners (Daunert & Price, 2014; Heinrich, Bhattacharya, & Rayudu, 2007).

Eportfolio tools also encourage students to take ownership by providing opportunities for customization. Selecting the theme and how a portfolio is presented can help the student take part in building the presentation layer of a portfolio. Furthermore, while eportfolios may be used to encourage others participants in a course or organization to peer review each other's work (Bernstein, Burnett, Goodburn, & Savory, 2006), the sharing of eportfolios with trusted others allows students to have a degree of control over who (or who does not) has access to their content. This in contrast to traditional assignments in learning management systems in which often the only one to view assignments is the professor.

Faculty Members as Facilitator

Although much can be said in the literature about the benefits that eportfolios provide to students (Huang et al., 2012; McWhorter, Deelello, Roberts,
Raisor, & Fowler, 2013), less is known about the effect of use of eportfolios on faculty members as facilitators. While faculty members have figured prominently in the research on eportfolios (Trevitt et al., 2014), the role that faculty members take in these studies is more often that of an observer, or another data source (via responses on surveys) for discovering the effects eportfolios have on students. The few available sources have demonstrated that eportfolios are viewed favorably by faculty members and have an influence on the environments in which they are implemented. For example, through a series of interviews with faculty members and supervisors over a period of seven years, one study found that eportfolios have an impact the culture of the community in which they are implemented (Granberg, 2010). In another study, a multiple case study, faculty members acknowledged that eportfolios had helped them to reflect on their own teaching practices, and viewed eportfolios as valuable source of feedback, allowing them to adjust their teaching efforts (Penny & Kinslow, 2006).

**Eportfolios and Activity Theory**

This review of the current eportfolio tools demonstrates the common features available within portfolio tools that encourage student-centered perspectives. Because modern eportfolio tools are designed with student-centered features they may have some influence on teachers’ perspectives. However, little is known about how student-centered tools influence the perspectives of teachers who use them. The interpretation of activity theory presented within this literature
suggests that modern eportfolios may have influence on teacher perspectives in concert with other variables associated with the activity system. Therefore, the following three questions guide this research study:

1. How does the use of eportfolio tools influence faculty members’ student-centered teaching perspectives?

2. How do contextual elements, associated with eportfolio adoption, influence faculty members’ student-centered teaching perspectives?

3. What are the features of modern eportfolio tools that are associated with the development of student-centered teaching perspectives?
CHAPTER III
RESEARCH METHODS

The purpose of the current study was to discover the influence that eportfolio technologies have on faculty members’ teaching perspectives, in concert with contextual elements that accompany adoption of these tools. These teaching perspectives are defined as the intentions, beliefs, and self-reported actions that inform the teaching practices of faculty members and instructors (Pratt & Collins, 2000). In order to properly address the more complex elements of the current study a case-comparative mixed-methods approach was used (Ragin & Amoroso, 2010). Interviews of 10 faculty members provided insight into their experiences as they adopted eportfolios. Pre/post TPI survey data, demographic data, and system log data allowed for the classification of cases.

Research Context and Participants

Pathbrite is an eportfolio company that, in their own words, is trying to “revolutionize the way people learn, teach and grow” (“Pathbrite Portfolios - Show What You Know,” 2015). The company is a recent addition to the eportfolio market, having been founded and launched in 2012 and is currently used in many higher education and K-12 institutions. The Pathbrite eportfolio tool has been developed with an eye towards best practices and student-centered learning environments (Delello, McWhorter, & Mallia, 2013). Input for developing the tool
came from teachers, faculty members, business leaders and the eportfolio literature.

As a modern eportfolio tool, Pathbrite includes features that encourage a student-centered approach to teaching. Pathbrite eportfolios (a) are crafted and managed by students, (b) persist beyond individual courses and beyond graduation, and (c) provide faculty members with the ability to assign reflection exercises. On the program administration front, Pathbrite portfolios allow administrators to see rollup statistics that show how many students are meeting intended outcomes. Pathbrite was chosen for the study for both pragmatic and functional reasons. On the functional side, Pathbrite demonstrates many of the features considered essential in a modern eportfolio tool. Pragmatically, the researcher had connections with the company; this connection presented the opportunity to gather system data, and to send out survey requests to current portfolio users.

Participants for the study included faculty members and higher education instructors who were using Pathbrite during the Fall semester of 2015. Participants responded to an email survey invitation delivered from Pathbrite personnel in October. While the survey was sent out to 430 higher education instructors, the response rate was low with only 14 respondents to the initial survey; and only 10 responding to both the pre and post surveys. Of the ten respondents, all had recently adopted Pathbrite, with the largest amount of time that a participant had used Pathbrite prior to the beginning of the study being two years, and the
shortest being one month. The participants varied in other demographic characteristics. For example, half of the respondents were employed by private universities or colleges, while the rest taught at other institutions including public universities, community colleges, or technical colleges. The level of schooling varied, with six of the respondents holding a terminal doctoral degree in their field (e.g., Ph.D., Ed.D.), and four of the participants having a nonterminal Masters (e.g., M.S.) degree. The respondents were overwhelmingly female, with only two male participants responding to the invitation and completing both the pre and post surveys.

While all of the teachers used Pathbrite within their teaching, not all were teaching a discipline-specific course. For example, both Rubi and Erica were using Pathbrite as part of overall freshman experience course. It is also important to note

Table 1

<table>
<thead>
<tr>
<th>Pseudonym</th>
<th>Sex</th>
<th>Institution Type</th>
<th>Discipline</th>
<th>Educational Attainment</th>
<th>Primary Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alyssa</td>
<td>F</td>
<td>Public</td>
<td>History</td>
<td>Doctoral Degree</td>
<td>Administrator</td>
</tr>
<tr>
<td>Cecille</td>
<td>F</td>
<td>Private</td>
<td>Pharmacy</td>
<td>Post-Doctoral</td>
<td>Teacher</td>
</tr>
<tr>
<td>Erica</td>
<td>F</td>
<td>Public</td>
<td>Freshman Cohort</td>
<td>Doctoral Degree</td>
<td>Teacher</td>
</tr>
<tr>
<td>June</td>
<td>F</td>
<td>Multiple</td>
<td>Photography</td>
<td>Master's Degree</td>
<td>Teacher</td>
</tr>
<tr>
<td>Kimberly</td>
<td>F</td>
<td>Private</td>
<td>Mathematics</td>
<td>Doctoral Degree</td>
<td>Teacher</td>
</tr>
<tr>
<td>Laura</td>
<td>F</td>
<td>Public</td>
<td>Deaf Studies</td>
<td>Master's Degree</td>
<td>Researcher</td>
</tr>
<tr>
<td>Moses</td>
<td>M</td>
<td>Private</td>
<td>Exercise Science</td>
<td>Doctoral Degree</td>
<td>Administrator</td>
</tr>
<tr>
<td>Ralph</td>
<td>M</td>
<td>Public</td>
<td>Architecture</td>
<td>Master's Degree</td>
<td>Administrator</td>
</tr>
<tr>
<td>Rubi</td>
<td>F</td>
<td>Private</td>
<td>First Year Design</td>
<td>Master's Degree</td>
<td>Teacher</td>
</tr>
<tr>
<td>Soraya</td>
<td>F</td>
<td>Private</td>
<td>Rhetoric and Lit.</td>
<td>Doctoral Degree</td>
<td>Teacher</td>
</tr>
</tbody>
</table>
the type of disciplines represented in the sample. While the humanities and artistic fields are represented within the sample, there is only one discipline that is associated with the traditional STEM fields of science, technology, engineering, and math. All participants were involved in teaching courses for their respective institutions; however, teaching was not the primary role for all participants with three participants spending much of their time in administration activities, and one participant who was primarily involved in research and managing grants.

**Procedure**

During October 2015 faculty members were contacted regarding the purposes of the study and were invited to participate. Initially, contact information for the participants was required to remain with Pathbrite administrators in order to meet legal agreements that the company had with their clients. The email, sent by a Pathbrite technician, included a link that directed the faculty member to the online survey. For those that had not finished the survey a follow-up reminder was sent out two weeks later. After the two emails were sent, potential participants were no longer contacted. Any further contact with participants took place only among those who completed the pre-survey and included their contact information. Data collection for system logs took place during the fall semester of 2015.

The follow up survey was opened during the middle of December and data collections for the survey extended into early January. Upon receiving the post-
survey scores, the participants received a follow up invitation for participation in an interview. All participants who successfully completed both the pre and post surveys also accepted the invitation to participate in the interviews. While most post-survey data was collected by early January, there were two participants who did not finish their post-surveys until the middle of January.

**Study Design**

This study used a mixed methods case comparative design (Ragin & Amoroso, 2010). The study is primarily qualitative and quantitative data were also used to further discover trends and support findings within the interview data. The study followed a sequential approach in that the qualitative interviews were conducted after the quantitative data had been collected (Creswell & Clark, 2007).

The design of the study is based on the interpretive model of social research as described by Ragin and Amoroso (2010). This model identifies an approach to social research that draws on both deductive and inductive reasoning to represent the phenomena of interest (see Figure 5). For the purposes of this study, activity systems theory and the conceptual diagram presented in chapter 2 became the analytic frame. Data representations used during the study included data matrices, truth tables, and concept maps. In particular, the use of truth tables took
prominence in the study allowing the researcher to identify potential connections between data sources and identify different roles that faculty engaged in during eportfolio adoption.

Data triangulation allowed quantitative findings to supplement qualitative findings. Patterns that were discovered within the qualitative analyses resulted in follow-up quantitative comparisons. For example, changes in teaching perspectives uncovered in interviews were followed-up with calculations of how much the two groups differed on their TPI gain scores. Also, the responses from the pre-survey were compared against responses on interview questions. This allowed for the verification that survey responses accurately represented faculty members’ experiences. For example, one participant reported participating in structured reflection activities. However, in discussing his professional development activities it was found that the question had been misunderstood.

Figure 5. Interpretive model of social research. Adapted from Ragin and Amoroso (2010).
**Design of Interview Protocol**

The interview protocol used a semi-structured approach (see Appendix A). The interview questions centered around the three commitments of teaching perspectives as identified by Pratt & Collins (2000). Questions were also asked about the influence that context had on these perspectives. The interviews were structured to begin with concrete questions about the behaviors that faculty members engage in when using eportfolios; for example, asking what teaching methods they changed as a result of using the Pathbrite eportfolio tool. Throughout the interview, the participants were asked more abstract questions until finally arriving at questions about their teaching beliefs. Every interview included the same anchor questions, but the use of follow-up probes was used depending on the usefulness of the information. Interviews lasted between 40-60 minutes.

**Use of Teaching Perspectives Inventory**

The Teaching Perspectives Inventory (TPI) is a 45-question survey that provides insight into the overall worldview experienced by a teacher broken down into five different perspectives: transmission, apprenticeship, developmental, nurturing, and social reform (Pratt & Collins, 2000). These perspectives are briefly reviewed below:
• **Transmission.** Courses developed with a transmission teaching perspectives are content-driven. Emphasis is placed on assessment to ensure that content has been retained.

• **Apprenticeship.** Teachers with apprenticeship perspectives incorporate principles of apprenticeship into their teaching. These principles include: establishment of global views before local skill building, expert demonstration, intrinsic motivation, coaching of the student through complex performance, and critical reflection (see Figure 6).

• **Developmental.** For proponents of the developmental perspective, the emphasis is placed on the demonstration of learning. The developmental perspective identifies an approach to teaching that builds on prior knowledge. Students are encouraged to make links between current and past learning.

• **Nurturing.** A nurturing perspective cares first and foremost about the self-efficacy and self-concept of the learner. Efforts are made to ensure that self-concept is not damaged. Priority is placed on student feelings about their own competence.

• **Social Reform.** A social reform perspective is devoted to the betterment of society. It is a unique perspective in that it is tied to a set of values and ideals. Essential is the identification of power relationships and prescriptions of ways to overcome the inequities within our society.
For the purposes of this study only transmission, apprenticeship, and the developmental perspectives were used for analysis. The reason that social reform was not included is that the focus of this perspective is on “social, political, and moral imperatives” (Pratt, 1998, p. 246). The social reform perspective is therefore more heavily represented in disciplines that are based on such imperatives (e.g., women’s health, environmental education, or religious studies). Because this was not the purpose of the study, the social reform perspective was excluded. Also, during analysis it was found that one participant had dropped 11 points on his nurturing score. Therefore, including the nurturing perspective may have biased the results for the nurturing scores. In addition, the nurturing perspective was rarely described within the interviews making it difficult to compare these views across cases. In the end, the decision was made to exclude both nurturing, and social reform perspectives.

**Integrating Quantitative Data**

The usage patterns of Pathbrite were collected through Pathbrite system logs, specifically the system logs showed how many sessions had been logged during

| METHOD ways to promote the development of expertise |
|---------------------------------|----------------|
| Modeling                       | Articulation  |
| Coaching                       | Reflection    |
| Scaffolding                    | Exploration   |

<table>
<thead>
<tr>
<th>SEQUENCING keys to ordering learning activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global before local skills</td>
</tr>
<tr>
<td>Increasing Complexity</td>
</tr>
<tr>
<td>Increasing Diversity</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIOLOGY social characteristics of learning environments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Situated learning</td>
</tr>
<tr>
<td>Community of practice</td>
</tr>
<tr>
<td>Intrinsic motivation</td>
</tr>
<tr>
<td>Cooperation</td>
</tr>
</tbody>
</table>

*Figure 6. Methods, Sequencing, and Sociology of Cognitive Apprenticeship Environments. Adapted from Collins et al. (1991).*
Fall semester, how many sessions had been logged after the initial survey was released, and how many sessions had been logged for all time on the Pathbrite system. Demographic data was also collected during the initial survey. This demographic data provided valuable insight into the context of adoption that surrounded each case.

Noting when and how the quantitative and qualitative portions of a mixed methods study are combined is an established practice in mixed methods research (Creswell & Clark, 2007). For this study the quantitative data served to support or contrast against assertions discovered with the qualitative data. At times, quantitative data was qualitized in order to create descriptors that informed qualitative results. For example, the conversion of demographic data into categorical data allowed the researcher to classify different cases based on their responses on the survey and their system usage.

Data Analysis

Framework for Data Analysis

Figure 7 presents the different phases of data analysis. Underneath the phases are listed the different artifacts that were used within each phase. A case-comparative framework, as articulated most famously by Ragin and Amoroso (2010), guided the making sense of similarities and differences that occurred across and between cases. The focus in case-oriented approach is on the individual case, as opposed to variable-oriented approaches in which the specificity of the case
necessarily disappears into generalizations (Thomas, 2011). The approach allows for the discovery of patterns that may be difficult for variable-oriented approaches to discover. For example, the current study used an effect matrix to identify changes that faculty had experienced and then attempted to discover what had led to those changes.

**Phase 1—Developing a Structured Code Set**

Interviews took place after the quantitative data had been collected. Interviews were transcribed into textual form. The qualitative software analysis tool, NVivo 11, was used to code and process the interview text. Open-coding methods were used initially to identify categories and concepts occurring within the interview data. Further reviews of the interview transcripts expanded this initial list of codes. Once the initial set of codes was established, the text was

![Figure 7. Data analysis phases.](image-url)
systematically reviewed to ensure that salient features of each participant’s responses had been captured.

The initial review of the interview transcripts resulted in 71 codes. An effort was made to condense the codes down and to remove duplicate codes. As the codes were evaluated, a hierarchical coding structure was developed. The activity framework developed within the literature review was used to further refine the initial list of codes. A hierarchical structure of codes was developed with the initial open-coded nodes placed as sub-codes within the conceptual framework. For example, a passage where a faculty member described ignoring portfolio assessment requirements at her University was coded under resistance to mandates under the subcategory of eportfolio adoption, under the category of rules. The final coding structure contained 43 codes.

**Phase 2-Pattern Discovery**

An effect coding matrix is a table that lists the causal elements that lead to changes in the phenomena under investigation (Miles, Huberman, & Saldana, 2013). An effect coding matrix was developed for each participant (see Figure 8) to discover patterns that occurred both within individual participant responses (within-case) and across all participants that were supported by the textual record (between-case).

Patterns were discovered by reviewing the textual passages that described or demonstrated a change in faculty members’ perspectives. Changes identified were
Figure 8. A sample of the effects coding matrix that was used to discover patterns within the data.

<table>
<thead>
<tr>
<th>Name</th>
<th>Change</th>
<th>Actions</th>
<th>Intentions</th>
<th>Beliefs</th>
<th>Tool Influence</th>
<th>Social Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ralph</td>
<td>Turn around time for assignments is faster; can prepare for exams.</td>
<td>Assigned due dates can be right before the exam because they have a digital copy.</td>
<td>&quot;Yeah so it's going to be partly my task in the next year or two to really encourage and support faculty adoption. And so over the summer I'm going to be working on building kind of training and pedagogical resources for the faculty that are Pathbrite specific to try and both support and encourage greater adoption.&quot;</td>
<td>Digital nature of the portfolio</td>
<td></td>
<td>CIO Tasked Her with this. She has dual role in the University</td>
</tr>
<tr>
<td>Soraya</td>
<td>Needs to build materials to get the word out</td>
<td>&quot;with eportfolios I'm now, by default, an evangelizer.&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

placed in an excel spreadsheet. Then, next to each effect, a brief summary was placed within the grid that detailed the causal influence that led to that particular change.

Next, these effects were categorized based on the three commitments of the TPI framework (beliefs, intentions, and self-reported behaviors). Passages in which the faculty member described teaching in specific ways using eportfolios were marked as self-reported actions. When the faculty member described plans to change their teaching approaches or described new planned behaviors these were marked as intentions. Finally, when a teacher described overarching principles unrelated to context or that described feelings about their teaching efforts these were classified as teaching beliefs.
For each effect, the tools and sociocultural elements that seemed to have influence on the effect were listed in separate columns in the spreadsheet. These variables were either explicitly described within the interview transcripts, or were summarized on the part of the researcher based on understandings of each case. Influences that were posited by the researcher were underlined in order to set them apart from evidences that were more concretely linked with the interview text.

**Phase 3—Data Classification**

Classifications were used within NVivo to collect metadata for each participant. A series of classification descriptors began to form around each participant. The data for classifications came from a few sources. Survey data were categorized and served as a data points to describe the participants. Usage data was also used to classify participant responses inside of the NVivo software (Miles et al., 2013). For example, the variable of previous use identified participants where faculty members reported significant experience in using the tool.

As the transcripts were reviewed, additional categories were added to the classification scheme. The criteria for whether a particular variable did or did not enter the classification scheme was whether it was related to the research questions and whether information about the particular variable could be determined from the data for all the participants. For this reason, only a few classification items were added to the classification scheme after the initial subset was created and most of the values were dichotomous (e.g., whether or not the
A coding matrix was developed to better interpret and draw conclusions about the elements associated with the particular changes in perspectives. Coding matrices are a method within mixed-methods research to discover and then test assertions about underlying themes (Miles et al., 2013). The coding matrix was imported into an excel file for easier processing of the data. The series of classifications developed for the classification scheme were the column headers, and each code was listed on a separate row. Each cell contained the number of cases coded that fell into a specific category (see Figure 9).

This display allowed the researcher to discover roles that demonstrated similar classifications across various codes. For example, one of the earliest assertions proposed by the data was that both short-term users (as defined by a response to reported previous experience) and teaching-focused faculty members (as defined by self-report survey data) described appreciating the structure that was provided by eportfolio software. Further reviews of the transcripts and

<table>
<thead>
<tr>
<th>Learning Committee Member</th>
<th>System Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>convenience of using</td>
<td>2</td>
</tr>
<tr>
<td>faculty learning from reflection assignments</td>
<td>5</td>
</tr>
<tr>
<td>moving towards student autonomy</td>
<td>2</td>
</tr>
<tr>
<td>feedback from teacher</td>
<td>2</td>
</tr>
</tbody>
</table>

*Figure 9.* Sample truth table displaying number of cases coded on varying classifications.
classifications discovered additional attributes that applied to these participants. For example, it was found that members of this group also had higher levels of overall system use. When additional attributes were discovered, the researcher returned to the transcripts to verify that the discovered trait applied to the other participants. Continued investigation found that classifications could be grouped together to describe a common experience during eportfolio adoption. A meta-role label was assigned to this set of classifications. In the case of short-term users and new adopters, the label of this meta-role was: eportfolio convert. The coding matrix allowed for the discovery of common roles that faculty members took on during eportfolio adoption. Table 2 gives a brief review of the discovered roles and the attributes that defined each.

Table 2
*Discovered roles and associated classification attributes*

<table>
<thead>
<tr>
<th>Role</th>
<th>Classification Attributes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leader</td>
<td>Previous experience with eportfolios; Leader in department or organization; Heavy participation in committees</td>
</tr>
<tr>
<td>Convert</td>
<td>Pathbrite novices; Little previous experience with eportfolios; Teaching focused; Voluntary adoption</td>
</tr>
<tr>
<td>Spectator</td>
<td>Low system use; Low support; Research or administration focused; Required use</td>
</tr>
</tbody>
</table>
The analysis of these groups was based on the work of Miles, Huberman, and Saldana (2013), who have developed case-oriented approaches to qualitative research that have also been widely used in mixed methods studies. The framework is composed of three elements: data reduction, data displays, and conclusion drawing/verification. The framework was justified for the current study for a few reasons: (a) the use of the framework guided the bringing together of diverse types of data, (b) the data displays advocated by the framework provided an organizing structure for processing the broad and diverse responses discovered in interview transcripts, and (c) following recommended write-up strategies provided transparency into the methods used in the study and how they relate to research questions.

**Phase 4—Assertion Verification**

Assertions were reviewed to discover their alignment with the research questions. In this way assertions for investigation were prioritized. Testing an assertion involved returning to the interview transcripts and quantitative data to see if additional evidence could help identify the reasonableness of the assertion. Ad hoc coding matrices were created within NVivo 11, to gather support that either supported or refuted the assertion. Also, some of the NVivo codes were exported into a software package called Scrivener that allowed the coded segments to be displayed as sets of notecards. Using this notecards view allowed the researcher to rearrange the different quotes so that they could be grouped and compared.
In some cases, the assertion was supported; however, in most cases the assertion was modified based upon a review of the transcripts. Assertions that could not be supported from the data were removed from the table. In this way, the development and exploration of assertions followed an iterative process, creating, modifying, combining, until a select few assertions emerged.

**Phase 5-Discovery and Defining of Themes**

As the set of assertions was reviewed, supported assertions began to suggest overarching patterns within the data. Confirming examples were compared against disconfirming examples. New information which contradicted previous assertions required a return to the data to discover how the new evidence informed these analyses. Assertions that were supported from the data were placed within the conceptual model introduced in chapter two. This allowed the researcher to identify the elements within the activity system that seemed to take prominence in different contexts. Activity system diagrams were highlighted and the interactions between elements was identified (see Figure 10). All activity system diagrams are included in Appendix G.

Ad hoc displays were also created to clarify how contextual influences were associated with described effects. For example, a display was created to further analyze effects associated with changes in views of outcomes. Initial pattern coding had discovered that views of outcomes differed depending on the level that the
Coded references to the different levels were therefore entered into this ad hoc display so that the impact of these variables could be viewed against the types of leadership that faculty members were engaged in.

Several other in-the-moment questions prompted similar ad hoc analyses in order to discover and verify assumptions. An overarching theme related to eportfolio use and its influence on apprenticeship perspectives emerged as clarifications and contradictions were resolved. This theme is presented in the results section and represents the outcomes of this phase.
CHAPTER IV

RESULTS

The overarching finding presented within this chapter was that during eportfolio adoption faculty members moved toward more apprenticeship-centered beliefs in their teaching. This finding was supported by TPI results showing that participants on average increased on their apprenticeship scores more than any other perspective (see Figure 11).

*Figure 11.* Boxplot of Teaching Perspectives Inventory scores depicting an increase on apprenticeship perspective
Faculty Members Exposed to Cognitive Apprenticeship Approaches

Qualitative analyses further supported the discovery that apprenticeship perspectives were influenced by eportfolio adoption efforts. The results in this chapter are organized by assertions, or patterns discovered in the data (Miles et al., 2013). The major assertion that was discovered within the data was that faculty participants’ changes in apprenticeship perspectives as faculty members adopted eportfolios were associated with their being exposed to principles of cognitive apprenticeship as defined by Collins, Brown, and Newman (1989). Four subassertions are detailed in this chapter that demonstrate this relationship (see Figure 12). These subassertions are that (1) involvement in learning communities was associated with modeling of quality practice in a social context, (2) involvement in implementation initiatives was associated with the development of long-term views of eportfolio benefit, (3) overcoming challenges during voluntary adoption was associated with large student-centered perspective changes, and (4) ease of use in interface design encouraged the use of coaching, and reflection on teaching methods.

The assertions presented above are also aligned with the research questions that have guided this study. Figure 12 shows how each assertion is related to a research question. The overarching assertion that began this chapter (i.e., apprenticeship scores increasing across all participants) is associated with research question 1. Research question 2 is related to three separate subassertions; all of
Figure 12. Changes in apprenticeship perspectives as participants encountered principles of cognitive apprenticeship. Assertions relationship to research questions identified.

them different elements of the context in which faculty member experienced eportfolio adoption. Finally, research question 3 is associated with the eportfolio tool itself. This chapter presents each one of these assertions. For each assertion, evidence is provided from interviews, system logs, and the survey data.

Assertion 1: Involvement in Learning Communities Associated With Modeling of Quality Practice in Social Context

The definition of learning communities that most clearly resonates with the current study was given by Baker (1999) who saw learning communities as small groups of teachers, administrators and staff who “have a clear sense of
membership, common goals, and opportunity for extensive face-to-face interaction” (p. 99). Six participants participated in a learning community as part of their professional development around eportfolio adoption (see Figure 13). Most of these participants were faculty leaders. All of the participants described these experiences positively and most described them as being instrumental in helping them to discover how to use eportfolios in their teaching.

Learning communities may have been influential in changing faculty members’ apprenticeship perspectives because they brought together two essential elements of modeling quality practice (a) the opportunity to spend time socializing with others around a common goal, and (b) the opportunity to see real-world examples of how others had implemented eportfolios in their teaching. These characteristics provided faculty members with a secure environment in which to discover the potential of eportfolio technologies. Their experiences with adopting eportfolios and how these experiences changed their perspectives are detailed in this section.

**Socializing with Others**

**Around a Common Goal**

One benefit described by participants of being in a learning community was that it provided a time apart from other responsibilities where faculty members could openly discuss their experiences in using these tools. As Kimberly, one learning community participant, observed:
People would come up and show what they were doing and talk about the different challenges in their classroom and how they got around that. So, there was a formal meeting but it was an informal setting, and very supportive.

This distinction between formal and informal highlights an important attribute of faculty learning communities. While a simplified categorization of professional development efforts might place workshops in an instructivist category, and learning communities in a more constructivist category; the actual strength of the faculty learning communities, as pointed out by Kimberly, is that they combined both of these paradigms. For example, learning communities were structured in that they provided a time and a place for faculty members to meet and followed a pre-established agenda, but the meetings were also open enough that participants felt free to discuss issues and problems openly.

Finding time to take part in training activities was described as a challenge by most.

\begin{figure}
\centering
\begin{tabular}{|l|c|c|c|}
\hline
Participant & Organized Learning Community & Selection Committee & Assessment Committee \\
\hline
Alyssa & * &  & * \\
Moses & * &  &  \\
Kimberly &  & * &  \\
Erica &  &  &  \\
Rubi &  &  &  \\
Cecille &  &  &  \\
June &  &  &  \\
Ralph &  &  &  \\
Laura &  &  &  \\
Soraya &  &  &  \\
\hline
\end{tabular}
\caption{Participation in traditional and embedded learning communities}
\end{figure}
participants. Participants reported being involved in many different activities including teaching, research, administrative duties, and service efforts. While not all participants participated in all of these activities, a large majority (eight out of ten) participated in at least three of these activities on a regular basis. And four out of ten reported participating in all four on a regular basis. This workload was described as being problematic in that it meant that participants needed more time to adopt technologies that could aid in their teaching. For example, one faculty researcher described needing more time for her and her colleagues to learn how to use the eportfolio tool:

The only thing I would say that we would do differently is that we would have a little bit more practice with it before we started. You know, we ended up going with Pathbrite during early summer and with the timeframe to get it in place, and the training and that kind of thing... So, that was kind of a hindrance. So that would be the main thing I would change.

Membership in a faculty learning community partly solved this problem by providing faculty members with an organized time for exploring their teaching while using the eportfolio tool.

In contrast to statements made about workshops, participation in learning communities was not viewed as a passive pursuit. Participants described experiences in which community members were required to actively contribute to the sessions (e.g., reading articles before scheduled meetings, and completing assignments). Such assignments helped faculty members engage with the fellow committee members and provided a starting point for discussions.
Participants perceived learning communities as a longer-term form of professional development as compared to workshops and training which were viewed as a few weeks at most. Even the way participants phrased their experiences in workshop and trainings seemed to minimize their impact.

- “I went to the little orientations in the summer.”
- “there were some smaller sessions.”
- “I started, got a little bit of training, and then, you know, I’ve been kind of plugging away at it since then.”

Faculty learning communities, on the other hand, were often described in ways that emphasized the breadth of the programs and the length of time involved.

- “Well we had, everyone that was doing it, we’d have meetings like every... once a month.”
- “…it will be a permanent thing in one of our colleges.”
- “So we’ve had these learning communities ... last year and again this year.”

Because learning communities lasted longer, faculty participants received consistent exposure to the eportfolio tool and this experience with the tool seemed to have more extensive impact on faculty participants.
Importance of Sharing Examples
Within Learning Communities

Many interviewees noted that learning communities gave them a chance to see examples of successful eportfolio implementations. Similar to Brown and Duguid’s (2000) description of how information is passed between community members through storied examples, participants’ recollection of professional developmental experiences often centered around eportfolio examples they had seen. Examples in this sense were more than demonstrations of the functionality of the tool. Because the examples were created and demonstrated by more experienced faculty members, these interactions helped participants discover new ways in which eportfolios could be used. One participant, Alyssa, described one of the examples to which she had been exposed and how it had influenced her thinking.

We have someone in fashion design and merchandising that shows how students put together a critique of shop windows and that they’re really applying the knowledge that they learned about how you should present merchandise—to actually critique existing shop windows. They take photographs of them and they critique them.

It is important to note that beyond just commenting on how the eportfolio had been used within the class, Alyssa also described how students were applying their knowledge in real-world scenarios; her comments are directed at more than just the functionality of the eportfolio, but at the manner in which the tool was used. Seeing the work of colleagues helped participants to see beyond the surface level functionality of eportfolios and to encounter new ways of teaching.
Erica, another learning community member, described how the examples shared by more knowledgeable peers had helped her to view eportfolios in a new light:

Seeing how they utilized it in the classroom really helped for me, to kind of broaden my perspective on how I might be able to use it for my classes as well... those things really kind of stuck out in my mind as, you know, I can use eportfolios. It's a lot more flexible than I thought it was.

There are two points to be made about Erica's observations. For one, Erica's described changes in perspective were directly tied to seeing examples of her colleagues' work. Additionally, Erica's comments indicate that these examples were more than information to be retrieved at a later time, but served as anecdotes of quality teaching. Her described intentions were to implement these examples within her own teaching.

**Counter Examples of Non-Supportive Communities**

The view that learning communities helped faculty members to be exposed to (a) models of best practices, and (b) social networks that informed their use, is further supported by contrasting cases in which one or both of these elements were not present. In a couple of different cases, faculty members were provided with example materials without the opportunity to be involved in learning communities. In both cases, the materials were placed into the course without much thought for how they would be used or how the other parts of their course would need to be adjusted. For example, Laura describes copying and pasting the materials into her
course stating, “there was a module that was given to us… And I copied it and included and incorporated into my course and went with it that way.”

Another participant, Rubi, similarly described that use of the eportfolio had little change on her teaching methods:

The first-year seminar course had a whole module that was dedicated to the eportfolio. So that was part of the curriculum that everybody was teaching… So, it really didn’t change anything. It was just a matter of having a place where they can, you know, put their artifacts; as opposed to their own computer.

These instances further emphasize the importance of example materials being shared by knowledgeable community peers, as opposed to packaged and delivered as part of a training workshop. Examples provided within the appropriate context served to broaden faculty members’ perspectives; in other contexts, the example modules seemed to have little impact.

**Embedded Learning Communities**

So far the discussion around learning communities has centered around professional development activities organized by a coordinating person or unit. However, according to Baker’s (1999) definition of learning communities, this form of organized gathering is only a small subset of what might be categorized as a learning community.

The current study found that participants were often members of selection and assessment committees that shared many of the characteristics of faculty learning communities. For one, these committees gave the participants
opportunities to meet together regularly to discuss the issues surrounding eportfolio adoption. Within these committees, participants were involved with many of the same activities that were seen as beneficial in the faculty learning communities including: debating the merits of different features of eportfolio technologies, reviewing student work, and discussing the purpose of eportfolio technologies.

Furthermore, there is some evidence that these experiences served as “embedded learning opportunities” (Camburn, 2010, p. 463) as they helped faculty members to become familiar with the potential of eportfolios. One selection committee member, Rubi, described feeling much more comfortable with the eportfolio adoption because of her experience serving on an assessment committee:

Having been brought on to that assessment team of Pathbrite and learning much more about how it works... the whole big picture of everything, I definitely taught it differently.

Rubi’s comments indicate that beyond learning how to operate eportfolio software, participating in these committees gave members insight into the broader purpose for which these tools were designed. For example, reviewing examples of student work helped a few participants to discover how eportfolios could be used to encourage deeper integration with course material. Another participant, Kimberly, described changes that she experienced in being part of an assessment committee:

So, I’m the assessment point person for my department. I’m on the assessment committee for the college. So, all of this, I’ve been really swimming in assessment lately, and just thinking about it from all different kinds of angles. And thinking about it from aspect of just a single course, or a whole department, a whole program, a whole college. So just having that kind
of exposure to assessment has really helped out a lot too.

In describing her experience, Kimberly revealed that her involvement with the committee led her to think deeply about how assessment applied across the whole college. Her views seemed to expand from a more localized view, to an institutional one. In this sense “swimming in assessment” was an apt metaphor that referred to the deep impact that her committee experience had on her. Where previously she had only got her feet wet with regards to assessment and eportfolio technologies, she was now concerned about keeping her head above water as she contemplated the possibilities.

Quantitative results provided some support for the importance of learning communities in helping faculty members to develop broader views of teaching. Averages on the TPI for those that had been part of the learning community group were higher on apprenticeship perspectives compared to their non-learning community counterparts. However, they were also higher on the teacher-centered transmission scores making it difficult to posit a relationship between student-centered teaching perspectives and learning communities.
Assertion 2: Involvement in Implementation Initiatives Was Associated with Changes in How Faculty Members Viewed the Purpose of the Eportfolio

Implementation initiatives on campus took many different forms. Two aspects of implementation were found to have particular influence on faculty members’ perspectives.

- The level of Implementation at which the faculty member was involved
- The motivation for adopting the eportfolio

Each of these topics is addressed in this section.

Level of Implementation and Faculty Members’ Views

One difficulty that organizations experience when adopting new technologies is that faculty members may initially use these tools in ways that align with previously used practices. In the case of eportfolios, faculty members often see the tool as a repository, or compare it to an LMS. However, as they engage with the tool more deeply, existing practices begin to recede and new ways of using the tool are discovered (Swan, 2009).

Several participants described changing in how they viewed the eportfolio tool; these participants largely moved to seeing the eportfolio as useful in both tracking and encouraging student development over the course of a degree. With a few exceptions, exposure to these overarching views encouraged changes in
participants’ views of the purpose of the eportfolio. Of the ten participants interviewed, five participants described changes in how they viewed the purpose of eportfolios. And another three described already existing views of eportfolios that were confirmed by using the tool.

The different ways in which eportfolios came to be viewed were of three different types (see Figure 14). Faculty members described coming to view eportfolios as a (a) digital resume to share with potential employers, (b) valuable capstone experience, and (c) efficient way to track outcomes to ensure that students graduated with desired competencies. In this section, each of these types are described.

**Eportfolio as a digital resume.** Some participants came to view the eportfolio as a digital resume that students could share with potential employers. In this view, future benefit of the eportfolio would come to students as they entered a society willing to hire those that could demonstrate their abilities. The eportfolio could serve that end by providing a profile that represented a student’s

![Figure 14. Different views of the eportfolio described by participants.](image-url)
achievements. As one participant described, “I want them to be able to show a future employer what they’re doing as a result of their education through that portfolio.”

**Eportfolio as a capstone experience.** Some participants discussed the value that students would find in developing a program-level eportfolio that brought together all of the students’ best work. While one participant described how the capstone experience would lead to future employment, other participants saw assembling a program-level eportfolio as valuable in and of itself because it helped students to understand how they had grown during their degree experience. For example, one participant described how students would be able to see how their presentation skills had improved:

> We recorded [the presentation] so that they could upload that into Pathbrite as well. So that they can look at how they’re speaking now in public versus in their fourth year.

Faculty members with this view saw eportfolios as a means for students to reflect on their educational experiences. As students assembled their program-level portfolio they would be able tell their own stories of development. Thus, eportfolios could be viewed as a way of helping students to become more critically reflective individuals.

**Eportfolio as outcomes tracking software.** Participants also described the value of eportfolios was as a way to track outcomes of students as they moved through their respective programs. This was seen as beneficial because it would
help the institutions ensure that students graduated having demonstrated essential competencies.

Associated with the ability to track outcomes was the ability for institutions to review student work through assessment committees. Thus, eportfolios were also seen by a few participants as a feedback mechanism to aid in continuous curriculum improvement. It comes as no surprise, therefore, that several faculty members in the current study were already serving on these committees.

One participant who was also a committee member described how the adoption of Pathbrite at her school was motivated by a desire to better track student outcomes.

So, that’s really why we have integrated it and are linking it with our assessment committee to look at outcomes, and that our students are actually meeting competencies that we want them to.

**Level of Implementation and Long-Term Perspectives**

Participants implemented eportfolios at various levels within their organizations including the course level, the college or departmental level, and across the whole university. An interesting finding in the current study was that changes in how faculty members viewed eportfolios were associated with the level at which the faculty member was implementing eportfolios (see Table 3). These changes followed a pattern with (a) faculty members implementing eportfolios at the course level coming to view the eportfolio as a digital resume, (b) faculty
members implementing eportfolios at the program level moving to a view of the eportfolio as a valuable capstone experience, and (c) faculty members implementing eportfolios at the institution level describing how the tool could be used for outcomes tracking. These changes in perspective largely came about as participants contemplated the benefits that the eportfolio would have for their students. It is important to note that some of these changes were considered facilitated changes meaning that the participant indicated that they had previously held this view.

It is also important to note that all of the participants in the study were fairly recent adopters of Pathbrite tool and therefore all of the benefits described in this section were speculative. While there is good reason to think that the described

Table 3
Described view of eportfolios after use in teaching.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Level of implementation</th>
<th>View of eportfolios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soraya</td>
<td>Institutional Level</td>
<td>capstone experience</td>
</tr>
<tr>
<td>Alyssa</td>
<td>Institutional Level</td>
<td>outcomes tracker</td>
</tr>
<tr>
<td>Moses</td>
<td>Institutional Level</td>
<td>outcomes tracker</td>
</tr>
<tr>
<td>Rubi</td>
<td>Program Level</td>
<td>capstone experience</td>
</tr>
<tr>
<td>Cecille</td>
<td>Program Level</td>
<td>capstone experience &amp; outcomes tracker</td>
</tr>
<tr>
<td>Laura</td>
<td>Course level</td>
<td>digital resume</td>
</tr>
<tr>
<td>Ralph</td>
<td>Course level</td>
<td>digital resume &amp; outcomes tracker</td>
</tr>
<tr>
<td>Erica</td>
<td>Course level</td>
<td>none</td>
</tr>
<tr>
<td>June</td>
<td>Course level</td>
<td>none</td>
</tr>
<tr>
<td>Kimberly</td>
<td>Course level</td>
<td>none</td>
</tr>
</tbody>
</table>

*Note:* Underline indicates that the change facilitated existing views.
benefits would come to pass, faculty members had not yet observed students, or the institution, actually realizing the benefits described. Thus, adoption of the eportfolio encouraged faculty to change how they viewed the long-term benefits that were related to the context in which they were implemented.

Analyses found a few departures from the overall pattern detailed above. A few participants described more than one change in their views. Also, some of the course level participants did not describe any changes in their views regarding the nature of the portfolio; so, it is impossible to determine if these individuals would have fit the pattern. However, there was only one case that went directly against the pattern. Soraya, a recently hired English professor, had a dual appointment in which she was also being tasked with the institutional rollout of the eportfolio, but her changes in view were aligned with the development of program-level capstone experiences. Despite these variations, the patterns did seem to suggest a link between participants’ involvement at certain levels of implementation and changes in how faculty members viewed the purpose of eportfolio tool.

Results from the TPI gain scores supported these findings. Difference scores for the pre-post TPI survey showed program and institution level implementers on average increased on their apprenticeship scores. In contrast, course-level implementation was associated with increased transmission scores.
Motivations for Adopting the Eportfolio

To analyze the motivations for adopting the eportfolio, each case was categorized based on the roles detailed in the previous chapter (see Table 2). The Venn diagram in Figure 15 shows how each case was categorized. In four cases, participants exhibited characteristics of two different roles. For example, Ralph, an architecture professor, was a faculty leader on campus where he was director of the Teaching Excellence center but he was also an eportfolio spectator based on his higher than average participation in research and low system use.

Follow-up analysis confirmed that participants with the same role experienced similar elements as they adopted eportfolios. For example, five of the six faculty leaders described finding value in the reflection feature provided by Pathbrite; whereas only one participant outside of that group discussed being impressed with this feature.

Faculty Leaders Influenced by Accreditation Requirements

Faculty leaders in the study reported serving in various leadership capacities on campus with regard to developing teaching abilities of faculty members. These participants often had previous experience using portfolios and had extensive experience with using Pathbrite. The responsibilities that these faculty leaders took on often meant that they were involved in teaching and training efforts associated with the eportfolio rollout. These participants were not always responsible for
rolling out the eportfolio across campus (some were), but they were affected by implementation activities. While participants adopted eportfolios for several reasons, the most common motivation described by these faculty leaders was to meet the requirements of an external agency such as an accrediting body. Previous research has found that accreditation requirements often lead initially to resistance from faculty members (Julian & Ofori-Dankwa, 2006; Tibi & McLeod, 2010), but for faculty leaders these concerns did not appear. Most participants with accreditation requirements had found eportfolios useful in their teaching. The attitude of these participants was most clearly stated by Cecille, a pharmacy professor who was asked
whether her eportfolio use was driven by accreditation or by administrative decisions.

I think it’s both...We’ve adopted Pathbrite and how do we get the most out of it? And how do we build this mentor, mentee relationship? How do we best help our students be the best pharmacists that they can be? And that’s one of the ways we’re going to use Pathbrite to do it. And I wouldn’t say that’s part of us getting accredited. I mean, I think it just shows that—it will show the accreditors that we’re getting outside the box and we’re trying to do things that other schools probably haven’t done.

Accreditation may have been the motivation for bringing the eportfolio onto their campuses; however, like Cecille most of the faculty leaders were interested in using the eportfolio efficiently and seemed interested in the success of these initiatives.

While faculty leaders as a group described possessing student-centered views of teaching, they were also sometimes tentative in responding to how their teaching beliefs had changed as they used the Pathbrite portfolio. The careful wording demonstrated in the following response was common among faculty leaders when asked about how their views of teaching changed when using eportfolios.

Oh, my views about teaching are always changing. I kind of feel like, and this is a lot of other things that I’ve been exposed to on campus as well but it’s really important to realize that the purpose of the university isn’t to convey content but to convey critical thinking skills and practice, with using that in the context of our discipline.

Follow-up questions often found that changes could be attributable to both eportfolio adoption as well as other elements that have already been touched on (e.g., participating in committees, and previous experience with eportfolios). In
describing changes to their views, faculty leaders would often state that the tool had helped them to do what they were already doing, but better, or more conveniently. For faculty leaders, the eportfolio was thus viewed through a much larger lens that encompassed other initiatives, trainings, and experiences.

In addition, faculty leaders were different from the other groups in their confidence in their teaching convictions. These participants usually had much experience in their fields and well-established teaching views. They often viewed motivation as the most important element in quality teaching. One of the faculty participant’s description of the adoption of Pathbrite is illustrative of this point. In her response to the interviewer, Alyssa suggested that her goals and pedagogical beliefs were already established.

We have our goals, we sort of have the pedagogy but now here's a better way to do it, and here's some additional things that’s really pushed us to think very creatively about how to do this even better... You can't just say, “okay I’m going to use an eportfolio, I don't know what my goals are, but I’m sure it will work.” I mean, you have to have very specific pedagogical goals, and know what you want students to learn going into it.

Alyssa’s statement indicates that she viewed individual initiative as a prerequisite for intended changes. From this view the use of tool was only influential insofar as it served as a catalyst in helping the participant to act upon these already existing conceptions of teaching.

Faculty Leaders and Eportfolio Implementation

Faculty leaders were likely to have a wide variety of responsibilities within their institutions. Because of their varied responsibilities, faculty leaders were
mindful of the need for eportfolios to meet the needs of both students and
teachers as well as external agents such as accreditors, and employers.

An important difference between faculty leaders and other users was in how
they talked about policies surrounding eportfolio adoption. Faculty leaders were
not the only ones who discussed these policies; however, faculty leaders were more
prone refer to these requirements using action-oriented verbs such “we pull”, “we
are requiring”, as in the following interview quotes:

- “We are trying to move toward portfolios throughout the freshman
  experience, but that’s not necessarily housed in any one department.”
- “And then we were looking at potentially a student requirement where
  students would create a portfolio centered on their GE courses. So
  actually build a GE portfolio and reflect on all their kind of GE
  coursework.”
- “We get accredited every eight years in architecture. And wouldn’t it be
great to be able to pull examples from all eight years? As it is now we
tend to pull examples from the last two years.”

Non-leader faculty members, on the other hand, more often referred to
requirements using a passive tone, as in the following interview quotes:

- “I think that all the students at [University] coming in now are required
to have a portfolio on Pathbrite.”
“At the University, it requires all the students are involved with collegiate learning, they have to make and keep portfolios.”

The differences in how these requirements were described revealed a larger difference in how these participants approached university accreditation requirements. Faculty leaders were in a position where they were exposed to discussions around accreditation that extended beyond the local departmental level. Where most users viewed these changes as being outside of their control, faculty leaders were very aware of the how these efforts would be implemented across their institutions. This led faculty leaders to be much more involved in changes taking place and being cognizant of what their job responsibilities would require if eportfolios were used more extensively for tracking outcomes.

However, the fact that these faculty leaders were responsible for rolling out eportfolios and implementing accreditation requirements did not mean that they always viewed the efforts in a positive light. And this difference between their private views on teaching and the needs of the university was a cause of tension in a few cases. One participant, Moses, described the conflict he experienced in being the head of the teaching and learning center on campus, but also in opposing the standardized way of grading that accompanied eportfolio standardization efforts.

So assessment, as a bad word, plays into all of this with electronic portfolios.... Because honestly it is an ideal way of figuring out whether students have met the outcomes.... So I think assessment, we’re trying to standardize, or normalize the portfolio so that we can see the same things in everybody’s portfolio, which takes away the individualism of a portfolio.
Despite Moses’s opposition to standardized approaches to the tracking of learning outcomes, he also acknowledged that there were institutional needs that sometimes made these efforts a necessity, particularly when money was involved.

I direct our teaching and learning center, I report directly to the Provost, same as all the Deans of the colleges. And the Provost asks the question like, should we only have one portfolio system on our campus... Part of it is that we are spending money in multiple college budgets, for multiple different portfolio systems. Part of it is a financial business decision of the institution. Part of it is a disagreement on the role of the portfolio

Moses’s experience illustrates how faculty leaders sometimes held student-centered views of teaching in their own classrooms, but also were likely to be part of accreditation and standardization requirements across their campuses.

Difference scores for the pre-post TPI survey supported the findings in this section. On average, the faculty leader group (n=5) increased on their teacher-centered perspectives; whereas the majority of the non-leader group decreased. Furthermore, it’s important to note that the measure for every perspective was more teacher-centered for leaders (i.e., transmission gain scores were higher and apprenticeship and developmental scores were lower) as compared to non-leaders.

**Assertion 3: Overcoming Challenges During Voluntary Adoption Was Associated with Large Student-Centered Gains**

Where faculty leaders had already overcome many of the challenges associated with adopting the software, eportfolio converts and spectators were sometimes still in the process of discovering how even the most basic functionality
worked. Many of these participants had only recently finished up their first semester with the tool. This gave the course-level implementers a unique perspective.

Overall, portfolio converts and spectators reported more issues with implementing Pathbrite. These participants described more difficulties with navigating the interface, working through the LMS integration, commenting on items, and in getting their students to upload their files correctly. Previous research has shown that the challenges faculty members experience as they adopt new technologies can have a negative impact on their student-centered perspectives (Abrami et al., 2008), but eportfolio converts and spectators were varied in how they responded to the challenges they experienced. This section will discuss the experiences of these users.

**Rushed Rollout Schedules Present Challenges to Eportfolio Spectators and Converts**

One of the issues that eportfolio converts and spectators expressed frustration around was how the eportfolio was introduced to campus. These concerns were primarily related to the speed with which they were expected to implement eportfolios. Because of quick timelines, many felt or had felt unprepared during their first time teaching using Pathbrite. This often led to additional workload for participants as they were required to move quickly in order to get their coursework set up. For some participants, this meant that they took on additional
responsibilities. For example, one participant described being responsible for both integrating eportfolios into her own classes, and also the training of her less experienced colleagues.

The reasons for rushed implementation schedules seemed to be varied. One participant had been abruptly tasked with teaching during an upcoming semester and felt pressed to get her course ready. For another participant, technical issues with the tool during the first semester meant that rollout dates were delayed and all professional development was abbreviated.

The lack of support caused by rushed schedules demonstrates how deficiencies in one element in an activity system affect other elements of the activity system. Because of the rushed timelines, faculty members were not able to get the support that they needed and therefore did not always feel prepared to teach using eportfolio technologies. This left these faculty members with only two paths in adopting the tool: (a) proceed with a course that was not adequately set up to bring on portfolio technologies, or (b) take on additional workload to bring the course up to speed. The first path was described by Kimberly who, after a speedy rollout, expressed concerns about how the technology was integrating with her course:

I feel like I have a lot of trouble incorporating it into what I’m doing in the classroom. And I don’t really understand how to do that in a way that’s really cohesive and blends well with my goals of what I want to do when I’m with the students.

Kimberly’s comments indicate that she saw the need to integrate the new tool in to her course; however, lack of support and rushed schedules resulted in her
simply tacking on eportfolio requirements to her course. One implication of the short timelines was that even when they desired to use the tool appropriately, faculty members were prevented from doing so.

The other option for faculty members with rushed timelines was to work extra hours, sometimes without compensation to get their materials ready. The provisioning of support services and trainings became particularly important with such short timelines. Here again, the rushed schedules within the activity system led to adjustments in another element; in this case, the additional workload corresponded to the division of labor element.

Despite the challenges experienced by course implementers, this study found that faculty members responded differently to these difficulties depending on the context that surrounded their adoption. In this section the findings of two very different responses to the rushed rollout schedules are discussed.

**Eportfolio Spectators and Required Use**

One group that was particularly affected with rushed rollout schedules was eportfolio spectators. Eportfolio spectators had low system activity (see Figure 16) and were more likely to describe Pathbrite by its technical features rather than the pedagogical affordances it provided. This does not mean that these faculty members did not describe being influenced by using the tool. Based on their limited experience with the tool, a few of these participants did describe changes to their views of teaching. However, descriptions of these changes were most often
non-specific observations of the characteristics of the tool. For example, in describing a change she experienced one participant made reference to the “interactivity” of the tool:

It’s expanded my view on what kind of tools I can use in the classroom, and what good teaching looks like. It doesn’t necessarily have to be you and your expertise in the classroom. It’s more interactive. I think students learn better when they’re able to interact anyways. So, I find it a good tool to use. Especially now, more that I’m getting better... better acquainted with it.

This response is interesting in that there is no specific identification of what part of the tool was interactive. The term “interactivity” in this case could have been used to describe any software package that engages students’ attention.

In describing the attributes of the tool, eportfolio spectators would often describe the ease and accessibility provided by the tool. However, very few of these participants described features that were unique to eportfolios. For example, eportfolio spectators talked about how Pathbrite made it easier to grade assignments, provide feedback, upload media, and view student work. Again, these were statements that could have been equally applied to a learning management system. Thus, the value that eportfolio spectators discovered in the interface of the tool seemed more focused on functionality with which they were already familiar.

**The Differential Effects of Challenges on Participants**

Not all users were influenced by challenges during adoption the same way. In fact, some of the participants who experienced the most challenges were also the ones who experienced the largest gains in their student-centered perspective scores.
This discovery presented a contradiction within the findings. If the lack of support and rushed timelines caused eportfolio spectators to stumble as they adopted eportfolios, why was this same pattern not observed for other faculty members with the many of the same characteristics?

There is some evidence to suggest that eportfolio converts had different motivations as compared to eportfolio spectators. Eportfolio spectators adopted the tool because they were required to by a supervisor or because of requirements for their job. The eportfolio converts often described adopting the tool voluntarily because they had seen the potential of eportfolios at a conference, or because colleagues had encouraged them to do so. This difference in motivation seemed to be associated with resilience around solving technical issues that arose. For example, Erica described her approach to solving issues that she encountered.

I’ve really gotten used to having to figure out technology. I’ve gotten used to how figure out apps and how to figure out new software. So, you know, I’m pretty... I can do that pretty well.

Furthermore, this same resilience was described as an attribute that these users were trying to inculcate in their students.

They complain so much about having to do that [learn how to use Pathbrite]. But I just want to say, you know, suck it up folks. You’re going to go to a company and you’re going to say, “ooh I don’t want to learn excel, I don’t want to learn this, I don’t want to learn that.” That’s not the way the world works.

Another finding that may explain the difference between these participants was that a few of the eportfolio converts seemed to be questioning fundamental elements of their teaching style. This finding presents the possibility that tensions
experienced by eportfolio converts may have been a precursor in helping them to develop new views of teaching. In this view, tensions may have acted as a triggering event in challenging existing assumptions of teaching (Brookfield, 1992).

As one participant observed:

When you introduce a new technology like that, I have to say the biggest impact on your teaching methods if you’re a decent teacher is that, all of a sudden your perspective through the lens of the student becomes much more acute.

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**Figure 16.** Sessions logged during Fall semester 2015. Eportfolio spectators had fewer sessions logged than other participants.
The experience of June, an art professor, provides a glimpse into how significant challenges in setting up a course might have encouraged a shift towards student-centered views of teaching. June taught two different courses at two different universities. She taught both courses using the Pathbrite tool. One was a standard photography course; another was a history of art course. While the photography course fit very well within an eportfolio approach and complimented existing practices, the history of art course was very difficult to integrate with eportfolios. Part of the difficulty that June experienced was in realizing that she needed to adapt her course materials for a new teaching approach. This new format placed June in a very uncomfortable position and her concerns for the upcoming semester were obvious. She noted:

Now I'm still lecturing but then we're doing a lot more group work. And so I'm really kind of, you know, on the open seas in that class. I'm, you know, hoping that it's gonna come together into a kinda more coherent, you know, classroom experience...but I think it will, I think it will, yeah, so...

This description by June of her experience as she adopted eportfolios is revealing. She describes feeling like she is on “open seas”, and describes how she feels uncomfortable in giving up control. In addition, June described having to give up some of her more lecture-based content in order to give students time to complete the student-centered projects which were now part of her course; this left her feeling vulnerable:

You know, the old lecture model man, I know where I stand. And, you know, in a certain sense I am the expert, I mean, I don't know in my ten years if I really ever had another student in the class who could rival my knowledge of...you know. So, in that sense I was very secure about my role, and sort of
the way I graded and all that. And in this way of teaching, a lot of times the students have way more experience using technology.

There is the sense within these comments that June is questioning underlying assumptions and that she is struggling to let go of more lecture-based modes of teaching. For example, when asked about how her approaches to teaching had changed, she responded.

It’s been hard, and I’ve also really condensed the early part of the history of photography, which, you know, I feel really mixed about, because for me and my love of the history of photography—I hate to see all that stuff go.

June’s description of the challenges she had seem to follow the phases of a “disorienting dilemma”, as described by Mezirow (1990). First of all, June described realizing that she needed to change her teaching methods to better help her students. However, as she began this process she described feeling concerned and uneasy about what she was giving up. She describes evaluating the assumptions of value associated with lecture-based methods that she was used to and the new methods that she was moving to. In this way, the adoption of eportfolios may have allowed June to reformulate her teaching experiences (Cranton, 1994).

This view is further supported by a statement in June’s interview where she was discussing the reasons she adopted Pathbrite.

So, I guess it’s just been a number of, you know, trying to think about what I really am teaching them and what’s going to be meaningful and what they’re going to take from it and maybe this would be a good way to move that along

It is important to note how the eportfolio tool is described by June. The eportfolio is not the motivation behind her move to more student-centered
practices. Similar to her previous statements, she described the eportfolio as providing an opportunity for an already existing view of teaching to take root in her teaching practice. In June's words the eportfolio helped to “move that along”. However, June's experience also illustrates how challenging experiences can bring these matters to a head. In this case, June came to the point where she seemed to be questioning her previous teaching practices. The discovery of the new teaching technology provided June with an avenue to further these more student-centered views of teaching.

For Soraya, another eportfolio convert and a recent PhD graduate, a disorienting dilemma seemed to be triggered as she began teaching students who were younger and less motivated than what she had experienced in her grad school teaching.

Um... yes. I mean I will say this semester... very unrelated to Pathbrite and just some issues with students that I hadn't encountered before, I realized that I... want to do some more reading and cultivate a clear sense of my own pedagogical framework. Like I have, you know, we took a.... I don't necessarily have the clarity that I'd like in terms of... um... particularly when I have to make difficult decisions or really thinking... even thinking through like why I'm doing things the way that I'm doing them. I want more clarity around that.

The conflict that Soraya experienced during her first semester teaching as a professor had caused her to rethink how she wanted to approach her teaching. Soraya’s teaching practices had failed to achieve desired results. This seemed to trigger a disorienting dilemma that led her to critically reflect upon her current abilities and to reevaluate her goals for teaching.
While this example does not provide insight into how eportfolio adoption influences faculty members’ perspectives, the case does illustrate how other unrelated events influenced the activity system of interest. These localized events (that each participant experienced at one level or another) arose from various unidentified activity systems. In Soraya’s case, her desire to learn better how to teach was an outcome of another activity system; an activity system that had as its object, the teaching of her first college freshman course. The outcomes of that activity system included Soraya’s desires to better understand her pedagogical approach. These outcomes then fed into the activity system associated with eportfolio adoption.

It is considered noteworthy that both cases of deep perspective change came from the eportfolio converts group. In both instances, the faculty member showed signs of questioning their teaching beliefs as they adopted eportfolios. In addition, in both instances they were relatively new to the tool and were largely self-motivated adopters. These findings suggest the need for additional research into how faculty members encounter disorienting dilemmas during technology adoptions and the circumstances under which these experiences encourage perspective change.

Results for eportfolio converts and spectators on the TPI survey showed support for the findings presented in this section. Measurements on the TPI found that eportfolio converts on average exhibited increases in their student-centered
views. In contrast, the eportfolio spectators on average increased on their teacher-centered scores.

**Assertion 4: Ease of Use in Interface Design of the Eportfolio Tool Encouraged the Use of Coaching and Reflection Teaching Methods**

Another element that faculty members found useful about Pathbrite is that the tool acted as a support in helping them to teach in more student-centered ways; in this sense, the tool acted as a template of student-centered teaching methods that they were able to adapt to their various contexts. The affordances provided by the Pathbrite that allowed faculty members to discover these new forms of teaching were twofold and initially seemed to present a contradiction. These characteristics were described by participants as: (a) the eportfolio tool providing needed structure, and (b) the eportfolio tool being flexible in adapting to the teaching methods of faculty.

For one, the tool guided faculty members’ interactions with students and acted as guardrails in preventing them from going too far afield in their teaching. These guardrails were comprised of the software prompts, notifications, views, and workflows that provided a structure for faculty members to teach in ways that they had been unable to previously. Participants appreciated how the tool provided a platform upon which they could build their courses and recognized the benefit they had received. For example, when asked about how the eportfolio influenced her,
June described how the eportfolio had helped her to teach in ways that seemed out of reach.

I’m not sure I’m going to be able to articulate what it was. But I absolutely do feel that having that tool... provided a framework for doing this that I really wouldn’t have had otherwise.

In later comments June discussed giving up lectures in order to focus more on project learning. Thus, the eportfolio provided an opportunity for this faculty member to try new approaches to teaching; the tool became a support that allowed her to do things that she thought were out of her reach.

On the other hand, faculty members also appreciated the versatility of the tool in being able to adapt to their desired teaching methods. Faculty members described how the tool allowed them to use already established teaching practices including experiential, group, and project-based approaches. Also, participants found that the tool accommodated their discipline-specific views of portfolio approaches; to the business professor the eportfolio was a digital resume, and for the art major the eportfolio was a collection of their students’ finest pieces.

The eportfolio allowed teachers to use different teaching techniques, but also provided a student-centered structure. The combination of these contradictory elements seemed to provide faculty members with a tool that was at once convenient and assertive. For example, in describing how using the tool had helped her Laura related how the tool cleared up confusion in her course.

One [piece of] feedback that came from the students before all this was that there was a lot of confusion. But my goal and my expectations of the students were a bit confused on my part. And you know that’s what I wanted
to really steer away from is so much confusion. As a teacher, I think that this experience has really taught me to be a little more clear. My structure and my style is a lot more structured—there’s a lot more clarity.

Similar to June’s case, Laura describes that she was confused and that using the tool allowed her to be more structured. But perhaps even more significant is how she describes that this confusion was largely centered around her goals and expectations. From Laura’s perspective, the eportfolio tool filled a need in that gave her clarity around her goals; the tool not only provided structure, it provided vision of what she should be working towards.

Features of Pathbrite

The way in which the tool helped faculty members to have clarity around their goals seemed to be related to the features that they used. Qualitative analyses discovered three features of Pathbrite that were mentioned with relative consistency across interview transcripts and that were described as being beneficial to participants. These features were (a) the ability to assign reflection assignments, (b) the ability to require revisions of work, and (c) the ability to share eportfolios. In this section a brief discussion of each feature is presented. How these features influenced faculty members’ perspectives is also discussed.

Assigning Reflection to Assignments

An important feature in Pathbrite is the ability for faculty members to require students to rate and provide feedback on their assignment submissions. The feedback that is submitted by students is usually not very long (one participant
described that it was very difficult to navigate if it got longer than a few sentences),
but it does give the student an opportunity to think about the quality of their work.

Reflection assignments allowed faculty members to get a snapshot of students’
thoughts when they were submitting the assignment. This allowed for the use of
reflection even in disciplines where reflection has not been traditionally used. For
example, one participant found that he was able to use reflection within a
mathematics class.

This is back to that idea of a little reflection there... So, once I got them to
understand that I wanted a decent answer. And it’s just a short sentence or
two. I’m not asking for great reflection; I’m not asking for their deepest and
innermost secrets.

Pathbrite’s simple approach to reflection, and simple design interface helped
faculty members to be able to easily access the reflection tool. This simplicity of
adding reflection to an assignment seemed to encourage its use. Overall, six of the
participants specifically mentioned using the reflection tool. And at least three of
these participants were newly adopting the Pathbrite tool. One of these newer
participants made reference to how simple it was to get students to reflect on their
work.

And then I had a few just little—you know, there’s a couple of places—like at
the top where you can put—I would just have them answer a few little
questions. You know, like self-reflection. “How did you feel with technical
problems on this assignment?” you know, “What was your most successful
image?” you know, stuff like that.

Again, the word choice used by the teacher portrays a sense of simplicity in
using the tool. The reflection assignments are not big, they are “little questions”.

The place to put the reflection is at “the top”. In this way, the ease of adding a reflection component to their assignments was one element that seemed to help faculty members to see the value in this established student-centered practice.

**Revising and Resubmitting Work**

Another important feature of Pathbrite described by participants was the ability to revise and resubmit assignments. The students were able to make and save revisions in draft mode before they submitted their assignments, and the faculty member could easily require resubmissions after the student submitted a, perhaps unsatisfactory, artifact.

Discussion about revisions and drafts had an important place in the interviews. This was unexpected in that the revision functionality was thought to be standard functionality for eportfolios and related software (e.g., LMS, CMS). Part of the reason for interest in this feature may have to do, again, with the usability and ease of use Pathbrite provides. One faculty member detailed why she found this feature particularly useful:

Yeah, I mean I like, I like that it has version control... That, you know, students could upload a version, I could comment on it, and then they could upload a new version and it was all contained in the same space.

The ease with which faculty participants could communicate the need for additional work encouraged an iterative approach to assignments that both students and faculty members had not encountered before. This finding was supported by multiple faculty members commenting how the versioning feature
would be helpful in their future classes. For example, when asked how they would teach differently if they taught again, a few participants commented on the need to move due dates up for initial drafts so that more time could be given to students to make corrections.

However, possibly the most important aspect about the draft feature was that it provided a communication channel for faculty members that they did not have previously. In particular, faculty members were now able to see the progression of a document through a series of phases to the final product. One participant attributed changes to this component when asked how her teaching perspective had changed over the semester:

I feel like we as faculty need to give the students opportunities to do different drafts, that they will learn from us giving them feedback throughout the process. And it does have to do with Pathbrite because I would see that students would go in and improve their reflections based on our feedback... We had some students that would come to us early—they’d upload in Pathbrite early and say, “Can you look at this and tell me what you think?” Well their presentations were so much better than those that did not do that at all and didn't get our feedback. So, I really learned, maybe making early drafts for feedback mandatory, because they’re going to learn from each one of those drafts, and their end product is going to be so much better.

The fact that the revision cycle was built into the interface prompted some of the faculty members to be able to send the document back for revision. As they used the tool, their view of the importance of drafts seemed to change as well.

**The Showcase Tool**

Another feature that faculty members expressed interest in was the showcase feature. The showcase feature allowed eportfolios to be published publicly
so that other class members could view them and then give comments on them. This was particularly useful for group projects and peer review type assignments.

A few faculty members expressed frustration about some of the behavior of the showcase tool. For example, a couple of participants described wanting to be able to assign groups to a single portfolio. Although the showcase tool did not seem to encourage group work, it did facilitate that need for participants who desired it. Therefore, while the first two features reviewed in this section were identified as providing influence to faculty members’ perspectives, the showcase tool simply facilitated already existing approaches to teaching.

**Lessons from a Review of the Features**

There is an important distinction between the element of tool use and many of the other elements discussed in this paper. While the elements of (a) participation in learning communities, or (b) level of implementation were thought to encourage engagement with the tool and thus help faculty members to be exposed to principles of cognitive apprenticeship, this section looked at the specific contents of that interaction. In the case of the reflection feature, faculty members themselves were confronted with a feedback loop that encouraged their reflection on the coursework they had assigned. The versioning feature gave faculty members experience in coaching students through multiple drafts to arrive at a final product.

The conceptual model provides insight into how such interactions could influence faculty members’ perspectives. In this case, the intentions of the
developers, designers, and educational specialists came together to build the tool. This study found that the features of the tool were translated into real world insights on the part of the faculty members that used these features. Reflection activities and revision assignments were examples of the change motivated by use of the tool. The use of these features allowed faculty members and students to begin operating in a student-centered paradigm that they had not had available to them previously.

It is important to note that in activity theory the influence between tool and community can also go in the opposite direction, with community members influencing the tool. While the initial development of the tool was informed by these community members, this influence continued to be felt as new features were requested. One participant described contacting Pathbrite to request new features sets that allowed her and her colleagues to teach better.

Pathbrite actually developed some new features... Several of the campuses that they were working with requested it. So for instance, when we first adopted Pathbrite, there was no way to type a document right in Pathbrite—you always had to upload the word document. This wasn’t something that particularly bothered me, but a lot of faculty members both here and on other campuses said, “No, no, sometimes we want students to write a short paragraph, and we don’t want them to have to go out of Pathbrite, type a word document, and then upload it, we want them to be able to type it.” So they introduced it.

Thus, tool use influenced faculty members’ perspectives, and faculty members’ feedback helped the developers to continue align the tool to their needs.
Summary of Analysis

Analyses in the current study suggested that participants’ teaching perspectives were influenced during their eportfolio adoption experience. While some of these changes were directly linked to their experiences with using Pathbrite, most were a mix of the tool features, community support, and social contexts in which the tool was encountered. This chapter has broken down these experiences into assertions and provided insight into faculty members’ adoption experience including their (a) involvement in learning communities, (b) responsibility for institutional implementation, (c) overcoming challenges during voluntary adoption, and (d) exposure to new features and teaching methods.

In addition to using traditional learning communities, the analysis discovered the presence of embedded learning communities and found that they exhibited many of the same attributes as traditional learning communities. Learning communities were described by participants as helpful in helping them to understand how to use the tool, and in some cases seemed to help faculty to develop student-centered views.

Faculty members who were responsible for implementing the eportfolio adoption effort moved towards student-centered perspectives. However, faculty leaders who were motivated by accreditation efforts increased on their transmission scores. This may indicate a contradiction that faculty leaders encounter as they bring on eportfolios.
Finally, this chapter concluded with a description of the features that influenced faculty towards adopting student-centered practices. Reflection, and versioning helped faculty to adopt new practices; whereas the showcase tool facilitated already existing practices.
CHAPTER V
DISCUSSION

Previous research has portrayed faculty members’ teaching perspectives as difficult to change (Lotter et al., 2007). The current study found several examples of changes in perspectives in which faculty members’ perspective became more student-centered. These changes were described in interviews and were further supported by changes in TPI survey scores. These and the other results presented in the previous chapter confirm the potential of using eportfolio adoption to develop student-centered perspectives and, suggest that exposure to elements of cognitive apprenticeship during eportfolio adoption increased faculty members’ apprenticeship beliefs. In this chapter these results are positioned within previous research on technology adoption and its influence on teaching perspectives.

Interpretation of Results

Similar to previous research on student-centered tools, the current study found that the adoption of a student-centered tool can have a positive effect not only on students, but also on the teachers who implement them (Meyer et al., 2010). Overall, participants expressed that the adoption of the eportfolio tool had helped them to develop broader perspectives regarding how portfolio methods could aid their students. This parallels previous research that has found that technology adoption can encourage faculty members and students to move...
towards more student-centered perspectives (Kolikant et al., 2010; McQuiggan, 2012). The described move towards student-centered perspectives within interview transcripts was supported by gains on the pre/post TPI survey scores that showed that, overall, participants’ student-centered perspectives increased.

Specifically, the current study found that faculty increased on their apprenticeship scores, while remaining unchanged on average for both their transmission and developmental scores. This is an interesting finding in that a majority of previous studies that have used TPI pre/post comparisons have reported a move by faculty members towards a developmental perspective.

Another difference between this study and previous research was the finding that the move towards apprenticeship perspectives was a result of faculty being exposed to principles of cognitive apprenticeship. This finding departs from some of the previous research on technological adoption that suggested that it is exposure to communities of practice that encourage faculty members’ change in teaching views (Carson et al., 2014; Deglau & O’Sullivan, 2006). The findings in this study did not support this view for a few reasons. For one, the experiences described by participants did not have the characteristics that have been identified for communities of practice (Barab & Duffy, 2000). For example, although these experiences were considered to be long-term, they were not considered persistent in that their advent had been relatively recent (Wubbels, 2007). Also, while faculty members learned from more experienced peers, a vital component of communities of practice, the notion of a discipline around which these participants found
common ground and identity was missing (Wenger, 1998). Thus, this study takes a similar position to those researchers who have questioned the ability of institutional leaders to implement authentic communities of practice (Barab & Duffy, 2000; Evans & Powell, 2007). That is not to say that the discovered learning communities would not eventually develop into communities of practice; however, like King (2002) this study suggests that the purposeful development of a community of practice takes time and is usually met with varied results.

What the findings in the current study provided was insight into how elements of cognitive apprenticeship were experienced during the adoption of a student-centered tool, and how exposure to these principles influenced faculty. These findings are promising in that cognitive apprenticeship is a set of methods and practices as compared to communities of practice, which is a theoretical framework; therefore, cognitive apprenticeship methods may be more adaptable by administrators and other individuals responsible for faculty teaching development (Stalmeijer et al., 2013). In this section, these discovered elements of cognitive apprenticeship will be reviewed and connections to the literature will be identified.

**Learning Communities**

One of the important elements that aided faculty members as they brought on eportfolios was their involvement in faculty learning communities. Similar to previous research, the establishment of faculty learning communities was
described by participants as helpful in developing their understanding of eportfolio technologies and in helping them to understand how they could use eportfolios in their teaching (Carson et al., 2014; Lin, 2008; Matthews-DeNatale, 2013; Vescio, Ross, & Adams, 2008).

**Why Duration Matters**

The duration of faculty learning communities was considered to be one reason for their effectiveness. This finding parallels past research that has found that longer professional development interventions are an important element in faculty members’ integrating new technologies into their classrooms (Bhika et al., 2013; Ingvarson et al., 2005). However, without pedagogical guidance even long-term experiences can encourage tool use that mirrors already existing teacher-centered approaches (Gerard, Varma, Corliss, & Linn, 2011). One finding in the current study was that long-term learning communities encouraged faculty members to develop experience with the tool while at the same time providing pedagogical guidance on its use. Learning communities were able to encourage these interactions for a few reasons.

First of all, and rather pragmatically, the current study found that learning communities allowed faculty members to have a time apart from their other responsibilities to work on their teaching skills. This finding echoes the work of Horowitz (2011) who found that faculty “need space in their schedule when they can tinker with their courses with the aid of supervision” (p. 27). In addition, this
study identified the combination of both organizing aspects (such as the coordination of schedules) and informal aspects (such as open discussion) as making learning communities uniquely valuable to faculty (Alvarez, Blair, Monske, & Wolf, 2005). This confirms previous research that has found that faculty members prefer some level of organization and are dissatisfied if there is not someone serving as an intermediary (Wicks, Craft, Mason, Gritter, & Bolding, 2015).

Second, the current study found that faculty viewed learning communities as being more long-term, lasting, and established than workshops and training sessions. While previous research has already identified the intensive nature of learning communities (Beach & Cox, 2009), the findings in the current study revealed that cultural expectations exist that may influence faculty members even before they begin participating in them. Thus, the effectiveness of learning communities may be a self-fulfilling prophecy in which behavior is changed to meet already existing expectations and beliefs (Hardré, 2012).

Finally, faculty learning communities were found to be the only long-term approach to faculty development that was available among study participants. This parallels past research that has found learning communities to be an oft-used and effective form of professional development in higher education environments (Cox, 2013). That being said, the majority of professional development in higher education still takes place through traditional workshops and training sessions (Ebert-May et al., 2011; Ertmer, 2005). Thus, this study suggests that learning
communities may be an underused resource for faculty during technology adoption.

**How Social Relationships Support Sharing of Examples**

Recent research in the field of cognitive apprenticeship has focused on how modern technologies can help learners develop as practitioners. Unfortunately, this effort has led to an emphasis on designing learning environments largely devoid of social presence (Hwang, Yang, Tsai, & Yang, 2009; Lee, 2011; Wu, Hwang, Su, & Huang, 2012); however, results of the current study suggest that this focus may be problematic particularly for the development of teaching views in higher education. The current study supports research that has identified social presence as a vital element in the use of technology enhanced cognitive apprenticeship environments such as the eportfolios (Kopcha & Alger, 2014). In the current study, participants described collegiality as a critical element in the success of their learning experiences. Of particular interest to the current study was that these collegial connections were discovered to be the foundation on which the impact of other elements of the cognitive apprenticeship (McQuiggan, 2012) were based. Thus, when social connections were missing the impact of learning materials, or engagement of the software seemed also to be missing.

Social relationships were found to increase the effectiveness of learning communities for a few reasons. First, as suggested by Huston and Weaver (2008)
these experiences gave faculty members an opportunity to be able to receive peer feedback, a vital characteristic of cognitive apprenticeship and social learning approaches. Learning communities in the current study were also found to be sites where faculty might be asked to contribute by giving a presentation or by examples of their work. Thus, the framework of a learning community provided an opportunity for faculty participants to collaboratively reflect on best practices (Carson et al., 2014).

Secondly, the seeing of others participants’ examples was mentioned by several faculty members as an important element of their learning community experiences. The concept of modeling, as defined in models of cognitive apprenticeship, explains why examples shared in learning communities were more effective than curated examples given out in workshops (Brown & Duguid, 2000). In this view, the helpfulness of encountering example assignments was more than just discovering the ways in which the eportfolio could be used, but was also associated with observing the thinking that was demonstrated in the use of the tool (Collins, Brown, & Holum, 1991). These findings echo the sentiments of Vescio and Adams (2008) who identified a strength of learning communities in that they allow members to “deprivatize practice” (p. 81); while these authors were speaking of elementary and secondary environments, the result in the current study suggest an application in higher education as well.
Impact of Embedded Learning Communities

Though much of the research on developing faculty abilities during technology adoption has focused on traditional faculty learning communities (Alvarez et al., 2005; McQuiggan, 2012), this study found that participation in selection and assessment committees provided faculty with many of the same opportunities. These findings support previous research that has suggested that embedded learning opportunities may also encourage faculty members’ movement toward student-centered views (Camburn, 2010; Stein, Isaacs, & Andrews, 2004).

An interesting finding in the current study was that embedded learning communities were also found to be an efficient substitute to traditional learning communities. There are a few reasons why these activities were seen as efficient. First of all, these experiences were characterized as efficient because they reduced the amount of training that faculty members were in need of. In fact, a couple participants became the department go-to person after being part of an embedded learning community. Second, these experiences provided value to the organization as faculty members took part in selection and assessment initiatives. Thus, with tightening budgets and limited resources in higher education (Just & Huffman, 2009), embedded learning communities may be an interesting alternative to more traditional methods of technology adoption and training.

Another related finding was that embedded learning communities were efficient because the purpose or object of these experiences was different than organized learning communities. For traditional learning communities the
The objective of coming together was to learn from other group members (Avalos, 2011). For embedded learning communities, the sharing of artifacts and the discussing of implementation strategies were not ends in and of themselves, but served to fulfill an authentic need (Sharpe, 2004). This finding is reminiscent of the description of legitimate peripheral participation proposed by Lave and Wenger (1991) and expounded on by proponents of situated cognition and cognitive apprenticeship (Dennen & Burner, 2008). From this view, participation in embedded learning communities may have been effective because it allowed participants to engage in legitimate peripheral tasks that were aligned with their personal goals (Carson et al., 2014).

Furthermore, from an activity system view, these findings may suggest an interesting reversal in which the institutional organizing unit, as subject, attempts to encourage and motivate a desired outcome, the object. For example, the director of the learning center might bring faculty members together to discuss assessment in eportfolios to improve assessment on campus. Figure 17 illustrates how an organized faculty learning community, as a more limited view of learning community, may be insufficient in developing faculty members’ perspectives because it essentially becomes a tool, associated with the top half of the activity system diagram (Knight et al., 2006).

Consequently, embedded learning communities may prove to be a promising alternative to traditional forms of professional development because they maintain the rich, and contextual view of community on which
socioconstructivist theories are based on. This finding has important implications for researchers of student-centered tools in that it suggests that the purpose or object of professional development for eportfolios may lead to differential influence on faculty (Engeström, 1990).

Obstacles to Engaging with Eportfolios

Another important finding within the current study were the elements that seemed to prevent participants from fully engaging with the eportfolio tool. Short rollout schedules made it difficult for faculty instructors to fully engage with the

Figure 17. Conceptual diagram depicting influence of both organized faculty and embedded learning communities
tool. This finding supports previous research that has found time constraints to have a negative influence on portfolio adoption (Dysthe & Engelsen, 2004; Strudler & Wetzel, 2005). As reported in the previous chapter, these challenges were reported by both *eportfolio converts* and *eportfolio spectators* but seemed to impact the latter’s ability to use the tool more negatively. However, this study suggests that there may have been another element that contributed to the difference between these two groups; specifically, the difference may have had to do less with the difficulties encountered and may have had to do more with their dispositions towards eportfolio adoption. This finding parallels past research that has found a self-directed orientation associated with greater benefits for teachers as compared to a performativity orientation (Huang et al., 2012; Imhof & Picard, 2009), and has suggested that mandatory use of technology polarizes faculty members into enthusiastic supporters and those who are resistant and do not engage with the tool (Ajjan & Hartshorne, 2008; Clegg, Hudson, & Steel, 2003).

**Level of Implementation and Accreditation**

Another interesting finding related to the influence that institutional responsibilities can have on faculty perspectives. As first reported by Granberg (2010), the current study found that as users got more experience with the eportfolio their views changed based on the context in which the eportfolio was being implemented. One important finding in the current study was that these changes were associated with the level at which the faculty member was
implementing the tool. This finding supports previous research that has found that cultural elements at the departmental and program level can affect teaching and learning attitudes (Coffey & Ashford-Rowe, 2014; Matthews-DeNatale, 2013; Peacock, Gordon, Murray, Morss, & Dunlop, 2010; Trowler, 2005). Of particular interest was that the views described by participants were speculative and were associated with anticipated benefits for students or the institution as eportfolios were adopted. This finding has implications for research regarding the motivational aspects of technology adoption. While previous research has found that tangible rewards can encourage the adoption of student-centered technologies in teaching (Sabagh & Saroyan, 2014; Steinert, 2012), there are some who have cautioned that the changes encouraged by such methods are superficial at best, particularly for faculty in higher education (Brenner, 2006). In contrast to this more behaviorist approach to faculty development, this study may provide insight into how motivation can be encouraged by giving faculty members experiences that help them to see the long-term views of their efforts.

Also interesting to note was how closely these different views of benefit aligned with the three different types of eportfolios described by Barrett and Carney (2005): accounting, marketing, and learning. Of particular interest, was how institutional leaders were influenced given that their views were associated with both the learning and the accounting types; two approaches to eportfolio use that are based in distinct theoretical paradigms.
This contradiction and the resulting conflicts were most clearly illustrated by participants who were involved with accreditation efforts and who also saw the largest teacher-centered gains. These results and the suggested association between accreditation and teacher-centered views echoes the work of Trevitt et al. (2014), who suggested a tension between the assessment and learning use of eportfolios.

A few reasons for this association in the current study are given here. First of all, as suggested previously, it may be that the focus on accountability for those in accreditation efforts may have moved faculty to an institution-centric view of teaching in which standardization of outcomes became the priority. Another explanation for this discrepancy may be related to the findings of Welsh and Metcalf (2003) who discovered that institutional initiatives that were motivated by external entities (such as accreditation bodies) were not viewed as favorably by faculty as those that were linked to program and institutional improvements (Crossley & Wang, 2010; Marrs, 2009). In the current study, Moses’s distaste for the accreditation requirements may have been an example of this frustration. Finally, the results may indicate a change in the views of faculty leaders that is associated with their work responsibilities and may have little to do with their teaching efforts. In fact, there is some research that has shown that faculty who have higher student-centered views also develop a deeper understanding of other approaches to teaching (Gibbs & Coffey, 2004; Gonzalez, 2009). Therefore, part of the increase
in transmission perspectives may have been due to faculty leaders coming to understand both teacher-centered and student-centered perspectives better.

What the current study adds to the discussion is an understanding of how the movement to teacher-centered perspectives may be tempered by giving faculty leaders opportunities in which they are exposed to the long-term goals and purposes of eportfolio initiatives. In support of this proposition is the finding that the implementation of the eportfolios at the program and institutional levels was associated with descriptions of long-term benefits for student learning. Encouraging this more holistic view of the eportfolio and its ability to track student progress may be one way to balance institutional accountability with student-centered views of teaching for faculty leaders.

**Mediating Influence of Eportfolios**

Reflection and coaching are two additional cognitive apprenticeship approaches that were observed in the study. As was discussed in the results section, these two methods were found to have parallels with features of the eportfolio tool: namely the assignment reflection feature, and the versioning feature.

**Reflection.** One interesting finding in the current study was that smaller reflection assignments were viewed favorably by participants because it reduced the workload for both faculty members and students. While it is acknowledged that the reflection assignments discussed in this study are a far cry from the deep
reflection advocated for by proponents of cognitive apprenticeship (Boling et al., 2014), the finding that the eportfolio tool encouraged any reflection at all was considered noteworthy; particularly because a few participants indicated that they had not used reflection assignments previous to adopting eportfolios. In addition, this finding may provide insight into a method for encouraging a habit of continuous reflection as advocated by Dewey (1933). Short reflection assignments has been a topic that has recently attracted within the literature on reflection (Abu-Shakra, 2014; Bleicher & Correia, 2011).

**Coaching.** While previous research has suggested that technology be used to encourage coaching methods, it is interesting that the versioning feature in particular encouraged this approach (Yang, 2011). The reason this is interesting is that almost any system could provide this feature. In fact, researchers have previously described how both Skype (Kitsantas & Dabbagh, 2011) and email (Gotel et al., 2009) could be used to implement coaching methods. However, where the current study departs from this previous work was that the coaching methods in the current study seemed to arise naturally out of using the tool; it was ease of interface design within the eportfolio tool that seemed to be deciding element in the adoption of both of reflection and coaching.

The findings that participants adopted reflection and coaching methods as they used eportfolio features further supports the idea that eportfolios take a mediating role in the learning environments of faculty teachers (Kolikant et al., 2010). In the current study, using specific features exposed (or reminded)
participants of these effective methods of teaching. This work supports past research that has suggested that technology may act as a structure or framework for student-centered ways of teaching (Marra, 2005). Perhaps even more compelling is the discovery that it was a specific flavor of student-centered perspectives (apprenticeship) that was influenced. These findings further support the main contention of this study; that it was exposure to elements of cognitive apprenticeship that influenced faculty perspectives.

**Cognitive Apprenticeship Methods and Eportfolio Adoption**

It is acknowledged that not all elements of cognitive apprenticeship were demonstrated in the study. For example, articulation is a practice described within cognitive apprenticeship in which students are asked to articulate what they are learning (Dennen & Burner, 2008). Yet, examples of articulation were not observed in the study. In addition, exploration is another principle in which the learner is invited to try out newly acquired knowledge in a supporting environment where it is okay to fail. While faculty did describe some elements of exploration, it was difficult to determine if these experiences were just natural parts of the learning process or something that was having an influence on their perspectives.

It is also important to note that this study was considered exploratory in nature; therefore, the intent of the study was never to discover examples of cognitive apprenticeship. Indeed, initial expectations based on previous research
were that faculty members’ developmental perspectives would we be most influenced by adoption efforts (Jarvis-Selinger, 2002). The discovery of apprenticeship elements both within interviews, and on the resulting TPI scores was surprising and required a reassessment of how eportfolio adoption was influencing faculty. Cognitive apprenticeship arose as a powerful explanatory model because of its emphasis on applying principles of apprenticeship outside of a real-world apprenticeship activities (Herrington, Reeves, & Oliver, 2009). This finding is considered an important contribution to the literature on technology adoption in higher education. One area for potential future research would be to discover how the other principles of cognitive apprenticeship might be successfully implemented within higher education during technology adoption initiatives.

**Implications**

The results of the study provided insight into how the adoption of eportfolios can move faculty towards more student-centered view of teaching. There are several implications that these findings have for both the faculty instructors who use these tools, as well as faculty implementers who are responsible for rolling these initiatives out on their campuses. In this section these implications are applied to these groups and recommendations are provided.
Implications for Instructors

The implications that this study has for faculty instructors largely relate to how eportfolio initiatives are rolled out on campus. While there is some evidence that faculty instructors prefer short-term training sessions (Taylor & McQuiggan, 2008), these experiences are not likely to have a lasting impact on faculty instructors (Belland, 2009). The findings of the current study suggest that impactful learning communities are those that provide (a) long-term engagement, (b) opportunities for social interactions, and (c) a chance to see examples of best practice. These recommendations are supported by socioconstructivist views of learning that describe how learning takes place within social groups (Brown & Duguid, 2000), and previous research on the benefits of faculty learning communities (Cox, 2013). Cautions should be taken to ensure that the learning community gatherings are more than monthly workshops and that faculty are exposed to not only expert examples, but also the thinking that went into developing them (Nirula & Peskin, 2008).

Furthermore, the discovery of embedded learning communities suggests an alternative approach to faculty technology adoption in which existing and embedded learning opportunities are sought out and adapted to meet institutional needs. For example, based on the patterns discovered in this study, faculty meetings might similarly be leveraged as an established social gathering in higher education (Gallagher, Griffin, Parker, Kitchen, & Figg, 2011). Other embedded
learning opportunities may include the use of governance bodies, new faculty orientation meetings, and other committees that faculty serve on (Sharpe, 2004).

Figure 18 presents the elements that were found to influence faculty instructors' perspectives. Efforts to rollout eportfolios should take into account these elements and make efforts to reduce the challenges and support the elements that are associated with increases in student-centered views. Learning communities were a special case in that quantitative support did not match qualitative descriptions. Thus, learning communities in this diagram are represented by a smaller arrow.

**Rolling Out the Eportfolio to Faculty Instructors**

One of the struggles experienced by faculty instructors was short rollout schedules and associated lack of training. As previously reported, this finding was not universal in that for some participants these challenges were associated with increases in student-centered views. It was posited that this contradiction might have been due to the voluntary motivation exhibited by some eportfolio converts and may have been an example of transformative models of change (Mezirow, 1978). The implications of these findings for faculty instructors suggest a differential approach to rolling out eportfolios in which the needs of both eportfolio converts and spectators are considered. If the eportfolio is to be rolled out as a requirement, institutions should ensure that training and professional development timelines are carefully selected (Garrett, MacPhee, & Jackson, 2013).
On the other hand, if the eportfolio is rolled out voluntarily institutions should provide resources on an as needed basis and ensure that these support services are published (Matthews-DeNatale, 2013).

The tradeoffs between these options, and which one is more desirable, are obviously related to the scale of the initiative. While the required use of eportfolios will likely result in more faculty members adopting the tool, it may not have the desired influence on faculty members or the institution. Alternatively, voluntary adoption may not generate enough interest among faculty members to reach institutional.

*Figure 18.* Force field diagram showing the different elements influencing faculty instructors
Implications for Higher Education Administrators

Where previous research has largely focused on course-level participants (Driessen, Muijtjens, Van Tartwijk, & Van Der Vleuten, 2007; Nicolle & Lou, 2008; Swan, 2009), the current study was based on a sample with over half of the participants being institutional leaders. As described in the results section, these institutional leaders were more informed about eportfolio technologies and had more experience with using these tools.

However, it is interesting to note how they too, were influenced by eportfolio adoption. The current study found that involvement in implementation activities at higher levels of the organization were associated with the development of global views. Long-term views were often speculative and related to the potential benefits students would see as the institution began using eportfolios. As has been reported previously, these findings suggest a connection between long-term vision and the development of more student-centered views of teaching (Chambers & Wickersham, 2007; Hardman, 2009). The findings in this study may indicate the need for administrators to help faculty members understand the long-term views of eportfolios that are not associated with their level implementation (e.g., helping course-level participants understand how the eportfolio is being used for outcomes tracking). In addition, administrators may want to consider models of distributed leadership (Bolden, Petrov, & Gosling, 2009) that provide more faculty members a chance to take part in implementation activities.
Administrators were also involved in accreditation activities. This finding has important implications for administrators of eportfolio initiatives because of the divergent theoretical underpinnings that are represented by assessment and learning efforts (Barrett & Carney, 2005). Figure 19 details how eportfolio adoption efforts may influence faculty leaders teaching perspectives. The responsibilities taken on by administrators seemed to influence faculty administrators in two very different ways. Being involved at the upper levels of implementation seemed to provide participants with a broader view of the potential of eportfolios. These participants were able to get a global view of the eportfolio initiative before they began implementing the eportfolio within their own courses. However, the
pressure to meet accreditation requirements may have encouraged some faculty members to develop more transmission-centered perspectives as institutional requirements began to take priority. Thus, the need to standardize assessment efforts seemed to encourage teacher-centered views.

**Limitations**

The limitations of this study can largely be categorized as limitations associated with the conceptual diagram, the response rate, and technical difficulties encountered during the recording of interview data.

**Limitations of Conceptual Diagram**

Limitations within the current study made it difficult to determine the conceptual framework’s fidelity as a model of influence of a student-centered tool on faculty members’ perspectives. For one, some elements of the conceptual framework did not appear within the data collected for this study, making it difficult to draw conclusions about their influence. Structured reflection activities, for example, have been demonstrated to be a valuable practice in professional development (Hatton & Smith, 1995), but participants in the current study had not taken part in these types of professional development experiences. Also, tool support as an element was only discussed in depth when faculty members felt that the support had been lacking, making it difficult to discover how faculty members might have been benefited when support had been present. Additional research is
needed to determine how effective the model is at representing these additional elements.

**Response Rate**

As previously discussed, one difficulty was a very low response rate. When there is a low response rate, a study is more subject to non-response bias meaning that the study is biased towards those who answered (Berg & Kempf-Leonard, 2005). Having a large number of leaders in the sample was likely a result of this non-response bias. The response rate also influenced the study in other ways. Initially the study was designed to be more quantitative focused. Because of the low response rate a study that was originally intended to be big quant/little qual was changed so that the qualitative piece received the emphasis and was supported by quantitative data. This resulted in the adjustment of some of the planned methods of analysis.

**Technical Difficulties**

Technical difficulties were experienced while recording a couple of the interviews. Because the interviews were conducted over Skype, bandwidth limitations sometimes caused the buffering of audio content. In one interview, approximately a minute and a half of data was lost because of complications with recording that were not discovered until transcribing. In another case, the problem was discovered immediately and the participant was asked to call back in to the conference. This seemed to alleviate the problem.
Recommendations for Further Research

This study has suggested elements that appear to be associated with perspective change during eportfolio adoption, however the results of this study, though meaningful, cannot be considered generalizable. Future research should further examine the influence of these elements and other elements that are relevant. Indeed, path analysis has already been used to study web technologies (Ajjan & Hartshorne, 2008) and technology adoption in general (Nicolle & Lou, 2008) to these ends. The researcher knows of no similar effort around eportfolios.

Another area of potential study discovered within this study related to the impact that learning communities had on faculty perspectives during adoption. Understanding how learning communities influence faculty, particularly the embedded learning communities discovered in the current study would be critical in understanding how to use these experiences to help faculty during eportfolio adoption. While the current study found an increase in transmission gain scores for learning community participants, there seemed to be a difference between those who had taken part in traditional versus embedded learning communities. In addition, the interview transcripts seemed to indicate an influence on learning community members’ perspectives towards more student-centered views.

Finally, the current study presented cognitive apprenticeship methods as a useful tool in encouraging student-centered views during technology adoption. However, it is unknown whether the same result would be found for other
student-centered technologies. Further research is needed to discover whether the results in this study are localized to eportfolios or if other technologies provide the same results.

Conclusion

This study has used a case-oriented mixed methods design to discover the mediating elements that support perspective change as faculty adopted an eportfolio tool (Miles et al., 2013). This approach allowed for the discovery of patterns that occurred both within and across cases, while still preserving the unique experience that identified each case (Ragin & Amoroso, 2010). While previous studies have looked at eportfolio adoption from students’ perspectives, the experience of faculty members during eportfolio adoption has not received as much attention in the literature (Carson et al., 2014; Penny & Kinslow, 2006). This is problematic, considering that implementation of eportfolios happens first and foremost through a faculty instructor.

The current study has shed light on the experience of faculty members when eportfolios are adopted by higher education institutions. Overall, engagement with eportfolio adoption seemed to encourage faculty to develop broader perspectives of the potential of these tools in helping their students. However, mandated use either through administrative mandate, or through the implementation of accreditation standards seemed to discourage the development of student-centered perspectives.
This study has suggested cognitive apprenticeship principles as instrumental in moving faculty towards student-centered teaching views as they adopt eportfolios. In using cognitive apprenticeship methods, administrators should take into account the sociocultural expectations that surround eportfolio adoption. In doing so, they may be able to take advantage of embedded learning opportunities that exist within their organizations (Camburn, 2010). Understanding how student-centered growth can be encouraged will allow institutions to be more purposeful in their adoption of eportfolios. These findings have the potential to help administrators and faculty leaders improve the adoption of other student-centered technologies. In doing so there is the potential to change not only the views of individual faculty members, but the cultures of departments, colleges, and institutions. It is hoped that this study will contribute, however minutely, to that end.
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projects: Lessons for industry. In Proceedingds of the 2nd India Software Engineering Conference (pp. 117–126). ACM.


Kopcha, T. J., & Alger, C. (2014). Student teacher communication and performance during a clinical experience supported by a technology-enhanced cognitive


APPENDICES
Appendix A: INTERVIEW PROTOCOL
Interview Protocol

[Thank the participant for taking the time to take part in the study. Explain that you are conducting a study regarding eportfolio adoption and that you would just like to ask a few questions related to his/her experience with using Pathbrite during the last semester. Reaffirm that it is okay to record the interview, and let the participant know that the interview will remain confidential, and will only be viewed by the researcher. Explain that the interview will take about 30-45 minutes]

Actions & Intentions

• What changes did you need to make to your teaching methods in order to use eportfolios?
  - What changes did using Pathbrite have on your teaching methods?
  - What was it about the tool that encouraged this change?
• If you were to teach this semester over again, knowing what you know now, what would you do differently?
  - Why would you change that?
  - How would the change make things go smoother?

Contextual Elements

• What were your reasons for using Pathbrite this semester?
  - Were there any other teachers in your area using the tool?
  - How many of your assignments did you use Pathbrite for?
• Was there any professional development provided for your use of Pathbrite?
• What was it like?
• Was structured reflection part of the professional development?
  • Who did you get help from when you ran into problems using Pathbrite?
    • What was your experience like?
    • Was the support adequate to meet your needs?
  • Were you able to use Pathbrite to its fullest extent possible?
    • What are the features that you found most useful in Pathbrite? Least useful?
    • What got in the way of your using Pathbrite as effectively as you would have liked?

Beliefs

• How has your view of teaching changed as you’ve used eportfolios in your teaching?
• How has the use of Pathbrite changed how you view your role as a teacher?
  What was it about your experience that changed your perspective?
Appendix B: DEMOGRAPHIC QUESTIONNAIRE
Demographics Survey

1. What type of college or university do you teach at?
   a. Private University
   b. Public University
   c. Community College
   d. Technical College or Institute of Technology
   e. For-profit University or College

2. What is the discipline or disciplines that you are using Pathbrite for (e.g., Biology, Mathematics)?

3. What is the highest level of schooling that you have achieved?
   a. High school or GED
   b. Associates degree
   c. Bachelors degree
   d. Masters degree
   e. Doctoral degree
   f. Post-doctoral work

4. Which of the following describe your teaching role in higher education?
   (Check all that apply)
   a. Adjunct or part-time faculty
   b. Tenure track
   c. Career line
   d. Full-time teaching (salary)
5. Have long have you been using Pathbrite? ______ months

6. What type training or professional development have you received in conjunction with adopting Pathbrite? (Check all that apply)
   a. Workshops
   b. Online trainings or webinars
   c. Other online resources (forums, articles, blogs)
   d. Participation in a formal learning community established by my institution
   e. Help from other faculty members or teachers in my department.
   f. Structured reflection activities and/or journaling
   g. Other __________________
   h. None (Continue to question 7)

7. How long have you been participating in professional development activities in conjunction with adopting Pathbrite (e.g., a few weeks, several months) ________________

8. What percentage of your time is spent in the following activities:
   a. Teaching _________
   b. Research _________
   c. Service _________
   d. Administration _______
9. Which of the following are reasons that you are using Pathbrite this semester:

   a. It is required by my boss and/or school administration.
   b. I want to find out more about how eportfolios could help me be a better teacher.
   c. A friend or colleague got me interested in using eportfolios.
   d. I am interested in how the use of eportfolios will effect student learning in the classes I am teaching.
   e. Other ___________________________
Appendix C: TEACHING PERSPECTIVES INVENTORY
Teaching Perspectives Inventory
Likert Scale Survey (strongly disagree, disagree, neutral, agree, strongly agree)

1. Learning is enhanced by having predetermined objectives.

2. To be a good teacher, one must be a good practitioner.

3. Most of all, learning depends on what one already knows.

4. It’s important that I acknowledge learners’ emotional reactions.

5. My teaching focuses on societal change, not the individual learner.

6. Teachers should be virtuoso performers of their subject matter.

7. The best learning comes from working alongside good practitioners.

8. Teaching should focus on developing qualitative changes in thinking.

9. In my teaching, building self-confidence in learners is a priority.

10. Individual learning without social change is not enough.

11. Effective teachers must first be experts in their own subject.

12. Knowledge and its application cannot be separated.

13. Teaching should build upon what people already know.

14. People’s effort should be rewarded as much as achievement.

15. For me, teaching is a moral act as much as an intellectual activity.

16. My goal is to prepare people for content-related examinations.

17. My goal is to demonstrate how to perform or work in real situations.

18. My goal is to help people develop more complex ways of reasoning.

19. My goal is to build people’s self-confidence and self-esteem as learners.

20. My goal is to challenge people to seriously reconsider their values.
21. I expect people will master a lot of information related to the subject.
22. I expect people to know how to apply the subject matter in real settings.
23. I expect people to develop new ways of reasoning about the subject.
24. I expect that people will enhance their self-esteem through my teaching.
25. I expect people to be committed to changing our society.
26. I want people to score well on examinations as a result of my teaching.
27. I want people to understand the realities of working in the real world.
28. I want people to see how complex and inter-related things really are.
29. I want to provide a balance between caring and challenging as I teach.
30. I want to make apparent what people take for granted about society.
31. I cover the required content accurately and in the allotted time.
32. I link the subject matter with real settings of practice or application.
33. I ask a lot of questions while teaching.
34. I find something to compliment in everyone’s work or contribution.
35. I use the subject matter as a way to teach about higher ideals.
36. My teaching is governed by the course objectives.
37. I model the skills and methods of good practice.
38. I challenge familiar ways of understanding the subject matter.
39. I encourage expressions of feeling and emotion.
40. I emphasize values more than knowledge in my teaching.
41. I make it very clear to people what they are to learn.
42. I see to it that novices learn from more experienced people.
43. I encourage people to challenge each others’ thinking.

44. I share my own feelings and expect my learners to do the same.

45. I link instructional goals to necessary changes in society.
Appendix D: INFORMED CONSENT WEB FORM
Informed Consent
Faculty members’ Use of Eportfolio Technologies Study

**Introduction/ Purpose** A graduate study in the Department of Instructional Technology and Learning Sciences at Utah State University is conducting a research study to find out more about the variables associated with the adoption of eportfolios and impacts to teaching beliefs and intentions during adoption of these tools. You have been asked to take part because you are using the Pathbrite eportfolio tool during Fall semester of 2015. There will be approximately 100 total participants in this research.

**Procedures** Participants will be asked to complete two online surveys that may last about 20-25 minutes each. After the final survey, the participants may be asked to be part of a phone interview lasting about 45 minutes. Recording software will be used during the interviews. Also, data logs regarding your use of the Pathbrite tool will be retrieved. Both the data logs and the audio recordings will be destroyed on September 18, 2017.

**Risks** Participation in this research study may involve some added risks or discomforts. There is a small risk of loss of confidentiality but we will take steps to reduce this risk as much as possible.

**Benefits** By participating in this study you will be helping to improve our understanding of the influence of eportfolios in higher education. You will experience direct benefit as you learn more about your own personal beliefs and approaches to teaching.

**Voluntary nature of participation and right to withdraw without consequence.** Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence or loss of benefits.

**Confidentiality** To ensure confidentiality, your name will be replaced with a code on the survey, the interview, and any system logs. The code list will be stored on an encrypted drive and will be kept in the locked office of Jon Thomas inside of a locked filing cabinet. The encrypted drive will be destroyed after two years on Sep 18, 2017.

**IRB Approval Statement** The Institutional Review Board for the protection of human participants at Utah State University has approved this research study. If
you have any questions or concerns about your rights or a research-related injury
and would like to contact someone other than the research team, you may contact
the IRB Administrator or email to obtain information or to offer input.

Brian Belland
Principal Investigator

Jonathan M. Thomas
Student Researcher
Informed Consent
Faculty members’ Use of Eportfolio Technologies Study

I agree to allow the data about my usage of the Pathbrite tool during Fall 2015 to be retrieved and agree to take part in a pre/post survey (20 minutes each).

I agree to be recorded if I take part in a follow up interview (40 minutes). I understand that my name will not be specifically identified on the recording. Once the recordings have been transcribed, they will be destroyed.

I understand that I may withdraw at any time by contacting Brian Belland at (801) 797-2535, by email at, or by contacting Jon Thomas at (801) 906-3320 at email of jon.thomas@utah.edu

I am signifying that I am aware of the benefits and risks of participation and am willing to participate in this study.

___ Yes, I agree to participate in this study.

___ No, I decline participating in this study.
Appendix E: CODING FRAMEWORK
### DIVISION OF LABOR

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### time constraints

- adopting at the same time as other technologies
- eportfolios streamline process
- eportfolios take more time
- time required for training

### FACULTY

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### OUTCOME

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### RULES

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<td><strong>STUDENTS</strong></td>
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Appendix F: CASE CLASSIFICATIONS
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<td>Support: Workshops</td>
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<tr>
<td>Level of Requirement</td>
<td>required by department</td>
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<td>required by job</td>
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<td></td>
<td>voluntary use</td>
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<tr>
<td>Teaching Career</td>
<td>Tenure Track Faculty</td>
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<td>Full-Time Teaching (salary)</td>
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<tr>
<td></td>
<td>Full-Time Teaching (hourly)</td>
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<td>Career line</td>
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<td>Adjunct or Part-Time Faculty</td>
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<td>Schooling Level</td>
<td>Doctoral Degree</td>
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<td>Masters Degree</td>
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<td>Post-Doctoral Work</td>
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<tr>
<td>Semester Use</td>
<td>end</td>
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<td></td>
<td>throughout</td>
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<tr>
<td>System Use</td>
<td>High</td>
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<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Teaching Portfolio</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Technical Support</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
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</table>
Appendix G: CONCEPTUAL FRAMEWORK DIAGRAMS
Figure G.1. Activity system diagram for learning community participants
Figure G.2. Activity system diagram for spectators

- **Subject**
- **Tool: Division of Labor**
  - With short timelines participants take on additional responsibilities: training colleagues and attempting to integrate with their own materials.
- **Tool: Rules**
  - Mandated use leads to rushed rollout schedules.
- **Tool: Tech Support**
- **Object: Teach course using tool**
- **Tool: Prof Dev**
- **Tool: Reflection**
- **Student-Centered Tool**
- **Not enough time for using the tool in depth**
- **Lower level of student-centered change**
Figure G.3. Activity system diagram for program/institutional implementers
Figure G.4. Activity system diagram for faculty members motivated by accreditation standards
Figure G.5. Activity system diagram for converts
Appendix H: VITAE
ACADEMIC BACKGROUND

Brigham Young University
 Marriott School of Management
 Degree: B.S. in Business Management
 Graduation Date: April 2002

Utah State University
 Emma Eccles College of Education
 Degree: M.S. in Instructional Technology & Learning Sciences
 Graduation Date: April 2007

Utah State University
 Emma Eccles College of Education
 Degree: Ph.D. in Instructional Technology & Learning Sciences
 Graduation Date: May 2017

PUBLICATIONS


PRESENTATIONS


WORK EXPERIENCE

Director

*Teaching and Learning Technologies*  
*July 2014 – Present*  
*University of Utah*

- Oversee and direct initiatives related to the teaching and learning mission of the university
- Attended meetings to inform the strategic direction of the university
- Oversee the submission of budgets for the departments in the department
- Ensure teams are trained and are involved in needed professional development activities

Associate Director & Manager of Course Support

*Teaching and Learning Technologies*  
*June 2011 – June 2014*  
*University of Utah*

- Managed teams of professional staff, coordinating work assignments, facilitating a cooperative work environment, mentoring, and providing guidance on teaching and learning projects
- Attended meetings and performed administrative duties on Director’s behalf
- Managed the submission of budgets for various software and hardware solutions in the department
- Coordinated resources between university departments and external vendors to support systems including the media infrastructure, exam center software, the university LMS & content repository
Open Source Web Programmer
enPraxis/COSL  Apr 2005 – Oct 2009  Utah State University
• Helped develop a CMS for openly licensed and copyright-free resources (eduCommons)
• Managed the development of an add-on product that imported Moodle, Blackboard, and MIT content packages into eduCommons
• Migrated previously created translation files to provide eduCommons tool in different languages.

Systems Programmer
Wal-Mart Corporation  Jun 2002 – Sep 2003  Corporate Office
• Managed Microsoft’s Systems Management Server (SMS) for remote installation of software in corporate offices all over the world
• Developed website for reporting status of SMS transfers
• Supported other Linux and Windows based packages that transferred data from corporate office in Bentonville to Wal-Mart offices and stores

VOLUNTEER EXPERIENCE
BSA Varsity Leader  Jun 2012 – Aug 2013  Boy Scouts
Canvas Migration Committee  Jan 2010 – Apr 2011  Utah State University
After School Games Club  Spring 2010  Edith Bowen Elementary
AECT 2007 Conference Intern  Oct 2007  AECT Conference
Assistant BSA Scoutmaster  2007-2009  Boy Scouts
Open Education Conference  Sep 2007  Open Ed Conference
Alumni Rep for ITLS  Fall 2004, Spring 2005  Utah State University

CONFERENCES ATTENDED
InstructureCon 2016  Jun 2016  Key Stone, CO
OLC International Conference  Oct 2015  Orlando, FL
InstructureCon 2014  Jun 2014  Park City, UT
UCAT Conference 2014  Jun 2014  Tooele, UT
Educause 2013  Oct 2013  Anaheim, CA
AERA Annual Conference  Apr 2011  New Orleans, LA
TTIX Conference  Jun 2010  Salt Lake City, Utah
Intermountain Graduate Symposia  Apr 2010  Logan, UT
Utah Open Source Conference  Aug 2008  Salt Lake City, Utah
Zope 3 Camp 5 and BBQ Sprint  Mar 2007  Chapel Hill, North Carolina
AECT International Convention  Oct 2007  Anaheim, California
Open Education Conference  Sep 2007  Logan, UT
Plone Conference  Oct 2006  Seattle, Washington
Open Education Conference  Sep 2006  Logan, UT
San Francisco Plone Bootcamp  Jun 2006  San Francisco, California