# TEACHER MOTIVATIONS FOR INNOVATING WITH TECHNOLOGY

By

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ABSTRACT

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This project used qualitative research methodology to explore teacher motivation for integrating or resisting technology innovation through a lens of Expectancy Value Theory (EVT). Case study methodology explored the research question, “What motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices?” Two teachers with which the researcher had a prior professional relationship participated in a series of multiple interviews and observations during one instructional content unit for a period of two weeks each. Collection of artifacts including lesson plans, student work samples, blank assignments, classroom photographs, and policy documents contributed acted as data sources as well. Methods including triangulation of data, thick, rich description, member checking, secondary coding, and bracketing were all used to maintain the quality and rigor of the research. Coding of the data revealed the following major themes for one or both teachers: the complexity of motivation, the influence of beliefs, the role of technology, and the universal limitation of time. Examination across cases revealed major influences to teacher motivation to be complex and highly related to individual beliefs and attitudes with an awareness of time management. Areas of future research could address the nature of these entangled relationships, the maximization of time management for innovation, identification and minimization to the barriers of technology, and improving the quality of innovation and integration through a better understanding of the teacher’s perspective.

This dissertation is dedicated to my family. Thank you.

ACKNOWLEDGEMENTS

Thank you to everyone who has helped me along the way. You support has made all the difference in my achieving this goal.

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## KEY TO ABBREVIATIONS

AEQ – Achievement Emotions Questionnaire

CVT – Control Value Theory

EVT – Expectancy Value Theory

NHS – National Honor Society

TPACK – Technological Pedagogical Content Knowledge

TCK – Technological Content Knowledge

# CHAPTER 1: Introduction

## Introduction

The word "motivation" is used almost daily by parents, teachers, coaches, students, managers, athletes, counselors, executives, and other professionals. Many high school locker rooms are plastered with posters designed to encourage and inspire student-athletes. Business leaders strive to motivate workers into having higher production rates with fewer mistakes. Teachers search for activities that drive student interest and motivate their pupils to complete work and to master material, which varies based on the specific needs of students and the content area of instruction. These everyday uses of the word *motivation*, though, mask the varied and complex nature of the construct.

Scholars have also struggled to consistently understand and use this "fuzzy but powerful construct" (Pintrich, 1994, p. 139). The omission of an explanation for motivation by some scholars signifies that the meaning has often been assumed as self-evident. For instance, studies that have included motivation as an outcome, but not defined it operationally, are examples of omission (e.g., Assor, 2009; Barbour, 2010; Emo, 2015; Wright & Custer, 1998). Still other studies have provided examples of instruments used to measure motivation, but not articulated an explanation of motivation itself (e.g., Gao, Luo, & Zhang, 2012; Hobbs, Renee, & Sait Tuzel, 2015).

Other scholars have provided explicit explanations of motivation, which are tied to the particulars of their research purpose, data type, and analytic approach. The result is a Rashomon Effect (Heider, 1988), where many explanations by different people appear for the same label, in the literature on motivation. For example, Spinath (2014) provides a conation-like explanation of motivation, casting it as an "inner force that energizes and directs behavior" (para. 1). Whereas, Schunk, Meece, & Pintrich (2014) offered an activity-like explanation, "Motivation is the process whereby goal-directed activities are instigated and sustained" (p. 5). These empirical and explanatory differences highlight one of the most complexifying aspects of explaining motivation: it is extremely difficult to detect motivation through direct observation. Rather, motivation is inferred indirectly from the actions, artifacts, and verbiage that signify the goals being formed and sustained (Schunk, et al., 2014).

Given the challenges of explaining motivation and observing it indirectly, the "many definitions of [it] and [the] disagreement over its precise nature," is not surprising (Schunk, et al., 2014, p. 4). Each explanation of motivation articulates its conceptual components and mechanisms in a slightly different way, and in doing so, highlights the driving contingencies, contexts, and purposes behind the scholarly work being done.

Thus, motivation is not a monolithic construct, but a heterogeneous confederation of explanations. This heterogeneity poses a challenge when studying the 'motivation behind' or why people integrate—or resist—something like digital technology innovations into the classroom. What exactly is the meaning of motivation that animates teachers to the use, or the non-use, of digital technologies for teaching and learning? Which explanation in the motivation literature best 'fits' with the technology medium, research purpose, data type, and analytic approach to be used? To answer these questions, I introduce four widely-used theories of motivation in the following sections and compare them more fully in Chapter 2. For each framework, I provide a brief overview of the theory, point out distinct characteristics, and evaluate its use for examining teacher motivations in the specific context of integration of technology innovation.

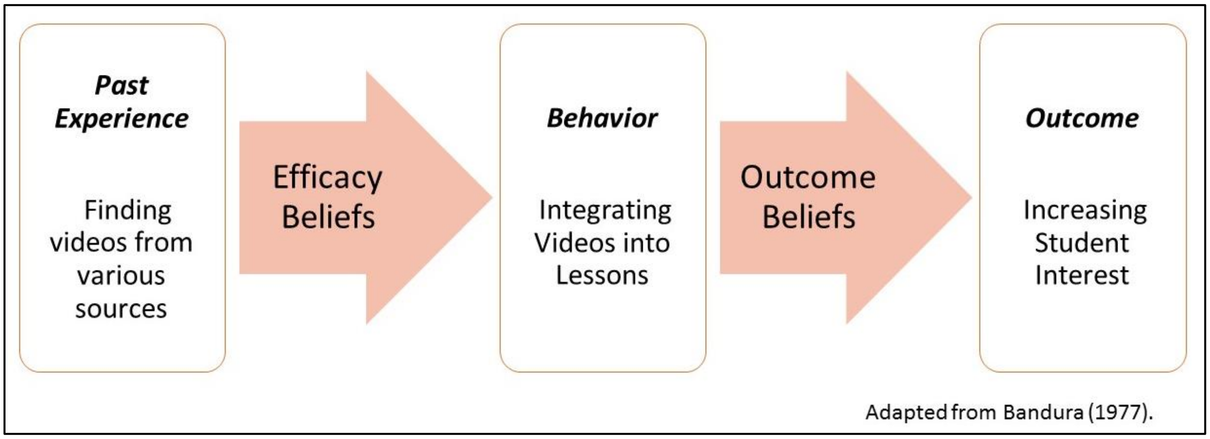
# Motivation

## Self-efficacy

One of the explanations of motivation that has been widely used in educational research is that of *self-efficacy*. A simple search through the Michigan State University Library for peer-reviewed journal articles containing “self-efficacy” and “teacher” results in over 20,000 hits. Furthermore, this theory is a foundational component of many introductory educational psychology courses and appears within many psychology handbooks and textbooks (College Board, 2017).

Self-efficacy was originally explained as the “conviction that one can successfully execute the behavior required to produce the outcomes” (Bandura, 1977, p. 193), or the belief that one can perform a certain behavior. The construct identified two types of convictions, also referred to as expectations: (a) outcome expectations, which identify whether one task will lead to a given outcome, and (b) efficacy expectations, which identify one’s belief about whether they can complete the task that will lead to a given outcome. Efficacy beliefs focus on the ability to complete a task. If a teacher has experience finding videos through library services, search engines, or YouTube, she may feel very confident in her ability to include a video in a lesson. This is the efficacy belief, based on the teacher’s expectation of success in the behavior. Outcome beliefs focus on the expected results of completing a task. An example of an outcome expectation is when a teacher believes that including a short video clip in a lesson will increase the interest of students. In this case, the teacher’s behavior, including a video clip, has a direct result, increasing the interest of students. Figure 1 illustrates the difference in efficacy and outcome beliefs.

Figure 1: Efficacy Beliefs vs. Outcome Beliefs




Efficacy beliefs differ in their magnitude, strength, and generality (Bandura, 1977). The magnitude of a belief is related to the complexity of a task for that individual with simpler tasks having smaller magnitudes and complex tasks having larger magnitudes. The strength of a belief indicates how easily disconfirming experiences can change it. The weaker a belief is, the easier it is to change. The stronger a belief is, the harder it is to change, and the more disconfirming experiences will be needed to alter it. Generality of a belief indicates how wide an influence the belief will have. Some beliefs will be very specific to particular tasks, times, and settings. Others will be more encompassing and will extend beyond the specific constraints. For instance, teachers may dislike all Apple products, both in and out of school, believing that their platform leads to more time-consuming operation. This is a very general outcome belief as it expresses concern that using apple products in all contexts leads to an outcome of wasted time. However, a teacher who believes that watching videos on iPods increases student engagement in biology review stations is a specific belief where the behavior, watching videos, is tied to the outcome, increased engagement, is only held within a very specific context, a biology review station. Efficacy beliefs are created and/or influenced by performance accomplishments, vicarious experience, verbal persuasion, and physiological status (Bandura, 1977). These experiences can either confirm a belief, increasing its strength or disconfirm a belief, weakening it. Positive outcomes lead to engaging in particular behaviors. "Persistence in activities that are subjectively threatening but in fact relatively safe produces, through experiences of mastery, further enhancement of self-efficacy and corresponding reductions in defensive behavior" (Bandura, 1977, p. 191) In other words, practicing a new skill that seems difficult or challenging and having success will increase self-efficacy. The increased self-efficacy will result in decreased defensive or avoidance behaviors.

Not all of these experiences (performance accomplishments, vicarious experience, verbal persuasion, and physiological status) are equally influential, with performance accomplishments having the strongest influence over a belief (Maddux & Stanley, 1986). The strength of a belief and the influence of the confirming/disconfirming experience will vary greatly across individuals. A weak vicarious behavior may not be sufficient to influence a strong, well-established efficacy belief.

Critics of self-efficacy theory, as well as Bandura himself, note that expectations cannot overcome a lack of incentive (Bandura, 1977; Maddux & Stanley, 1986). A teacher may have a strong belief in her ability to move writing assignments from a traditional pen-and-paper setting to a digital blog space, but without incentive to do so, she is unlikely to undertake the activity. Another concern with using self-efficacy to predict behavior is the specific nature of efficacy beliefs. Self-efficacy is task-specific and context-specific (Bong & Skaalvik, 2003). Efficacy beliefs are measured for single tasks in a certain context and are not generalized beyond these situations. Predicting behavior for more generalized situations using efficacy beliefs results in inaccuracies. "Discrepancies between efficacy expectations and performance are most likely to arise under conditions in which situational and task factors are ambiguous" (Bandura, 1977, p.

203). Because self-efficacy is task specific, educators do not talk about an individual's self-efficacy for a broad, overarching category of tasks, but rather for specific tasks and tools such as searching for videos on YouTube, posting pictures with a social media app like Instagram, or summarizing classroom activities on the microblog Twitter.

There are two limitations to using self-efficacy as a theoretical lens for examining teacher motivations when integrating or resisting technology innovation. First, as noted by Bandura (1977), expectancy beliefs cannot overcome a lack of incentive. This makes it difficult to predict the innovation of new tasks when incentives may not be present for teachers. For example, a classroom teacher does not receive a stipend, extra planning time, or any other reward for incorporating Delicious or Diigo, digital bookmarking and annotation platforms, into research lessons. Second, the theory is task- and context-specific (Bong & Skaalvik, 2003). Technology innovations are broad categories involving many possible platforms, devices, and tools. Teacher contexts are also widely varied, changing with each group of students, course assignment, and content standard, leading to a large quantity of unique circumstances, rather than a narrowly-defined, singular context.

**Self-concept**

Another prevalent and important theory of motivation is *self-concept*. This theory is significantly older and more prevalent in the educational and educational psychology research literature, producing well over 100,000 hits through the Michigan State University library collections in journal article searches that date prior to 1900. Pajares & Miller (1994) authored a single article employing this theory that has been cited over 1,000 times in the field. Furthermore, the theory is applicable across many fields, maintaining a presence of over 10,000 citations in the literature of psychology, education, social work, sociology, history/archeology, and medicine.

Self-concept is defined as “a person’s perception of himself [and] . . . is inferred from a person’s response to situations” (Shavelson, et al., 1976, p. 411). Therefore, self-concept, like any motivation, cannot be directly observed. “Self-concept. . . is a critical variable in education and in educational evaluation and research” (Shavelson, Hubner, & Stanton, 1976, p. 408). It is essential to understanding students and their learning. While both self-concept and self-efficacy call for subjective judgements (Bong & Skaalvik, 2003), there are several key differences in the theories and are sometimes inaccurately used interchangeably.

Self-concept measures one’s perceived competence in a given domain (Bong & Skaalvik, 2003). This is different from self-efficacy, which is task specific. For example, self-efficacy could measure a teacher’s perceived ability to create a video of narrated PowerPoint slides for a special education class that needs support. This is a single, specific task using one type of media and one platform in a limited context. Self-concept could measure a teacher’s perceived ability to utilize multimedia sources compared to other teachers in the same grade level. This is a broad area that includes many tools and types of sources across a wide and ever-growing variety of platforms.

Self-concept is best understood as multidimensional (Roche & Marsh, 2000) with seven critical features of the construct: “organized, multifaceted, hierarchical, stable, developmental, evaluative, differentiable” (Shavelson, Hubner, & Stanton, 1976). These adjectives, which are further explored through theoretical and empirical research in Chapter 2, describe a theory where various components, which differentiated through various measures, are organized hierarchically in a way that moves from specific to more complex. The overall idea of self-concept is resistant to change once established, but does develop in individuals over time.

It is also essential to note that self-concept is based on social interactions (Snyder, 1965). Therefore, it is only possible to examine one's task performance through social comparisons. For example, self-concept can be evaluated using statements such as, "I use a wide variety of technological tools when compared to my peers," and "I struggle more than other teachers to include technology in my lessons." These are hierarchical, requiring teachers to rank themselves compared to others.

Self-concept refers to one's perceived competence when compared to peers, rather than the confidence of self-efficacy (Bong and Skaalvik, 2003). It is important to note that the nature of self-concept makes it highly susceptible to social desirability effects, or choosing the socially 'right' answer, rather than answering honestly (Shavelson, Hubner, & Stanton, 1976). Because the construct is formed by comparing one's self to peers, it is likely that respondents will provide an answer they perceive as right, rather than the answer that is accurate. Because self-concept is based on peer comparison, it is heavily influenced by views of peers, unlike self-efficacy which is shaped most heavily by past experiences (Bong and Skaalvik, 2003).

The body of literature surrounding self-concept holds some critiques. In a review, Shavelson, et al. note that, "definitions of self-concept are imprecise and vary from one study to the next" (1976, p. 408). Shavelson, et al.'s work offered the previously provided definition as a solution and called for more research to be done, which has since lessened this problem. There is a more current contention in the field over whether or not emotional responses to tasks contribute to self-concept (Bong & Skaalvik, 2003). Lacking a central definition for the construct itself leads to wide variety in what self-concept actually is and what it is not. Lacking a central definition in the creation of the theory limits the generalizability of early work and calls into question the foundational empirical work. Echoing Marsh (1986), Bong & Skaalvik (2003) state, "some self-concept researchers suggest that students further compare their academic capability in other domains. Such ipsative comparison makes performance improvement in one domain cause decrease in self-concepts in other areas" (p. 9). More plainly, students see math ability and reading ability as directly comparable, despite needing different academic skills to complete computational and comprehension tasks. Students then continue those comparisons and claim the increase in computation or math skills represents a decrease in reading comprehension.

There are two limitations to using self-concept as a theoretical lens for examining teacher motivations when integrating or resisting technology innovation. First, as noted by Bong & Skaalvik, "self-concept embodies fairly stable perceptions of the self that are past-oriented" (2003, p. 10). In the context of ever-changing technology, the stability of a self-concept perception limits insight into teacher motivations over time. Second, the theory is hierarchical and requires individuals to compare themselves to peers (Roche & Marsh, 2000). To evaluate self-concept, a teacher would identify a peer, another teacher in a similar setting, as a frame of reference, and then compare herself to that peer hierarchically, either being more or less proficient. In the context of teacher technology innovations, variations in content area, assigned courses, learning standards, student attitudes, and available technologies make it practically impossible to compare across classrooms because of large number of unique and uncontrollable variables.

**Control Value Theory**

Another theory of motivation present in the education literature is *control value theory of achievement emotions (CVT)*. Newer and not as widely present as self-efficacy or self-concept, this theory still has a strong influence in the literature. Google Scholar produces over 1,000 results for a "control value theory" search. A single article, Pekrun (2006), ranks in the top 25% of all research outputs by Altmetric, an online data tracking platform that tracks conversations and citations of published academic research (Altmetric). The theory appears in educational psychology textbooks, including *The Handbook of Motivation at School* (Wentzel & Wigfield, 2009) and *Emotion, Motivation, and Self-Regulation: A Handbook for Teachers* (Hall & Goetz, 2013).

In brief, CVT explains motivation in terms of control: the more control one has in a situation and the greater the value of success, the more motivated an individual is to perform. In one explanation Pekrun states that the, "control-value theory of achievement emotions addresses cognitively mediated emotions, and by implication, habitualized emotions, as well as social influences on the development of such emotions" (Pekrun, 2000, p. 148). In other words, control-value is based on emotions that one feels, whether those emotions are in the moment or regular habits, like feeling anxiety when a password is entered incorrectly. This theory takes into account emotions that are retrospective, current, and prospective (Frenzel & Stephens, 2013). This means that past experiences, current feelings, and future predictions can all influence emotions and, therefore, motivation. Achievement emotions are defined as, "emotions tied directly to achievement activities or achievement outcomes" (Pekrun, et al., 2011, p. 15). These achievement outcomes and emotions can be positive, like pride and satisfaction, or negative, like shame and disappointment.

There are two types of central cognition that are a part of this theory: control and value. Control-related cognitions are frequently causal, meaning that they are based on cause-effect relationships, borrowing and building on achievement motivation and self-efficacy theories

(Pekrun, 2000). One example of a causal cognition is believing that teaching students how to navigate a new computer program results in wasting time where the cause, teaching students to navigate a new computer program, results in the effect, wasting time. As Pekrun and colleagues write: "Subjective control over achievement activities and their outcomes is assumed to depend on causal expectancies and causal attributions that imply appraisals of control" (Pekrun, Frenzel, Goetz, and Perry, 2011, p. 18). In other words, one must believe in the cause-effect relationship between one's actions and a desired outcome in order to believe he/she has control over a situation. If a teacher does believe that using a smartphone app to record writing conferences will allow students to remember more about the notes, then she believes in the cause-effect relationship (using the app to record conferences → students' remembering more about notes). That belief in the cause-effect relationship gives the teacher a belief of subjective control over the situation.

Causal expectancies are classified into three types: situation-outcome, or what to expect with no action, action-control, or the ability to initiate and perform a suitable action, and action-outcome, or the positive/negative consequences for a certain action (Pekrun, 2000). For example, a teacher examining student learning with traditional pen-and-paper assessment would view the current achievement levels with situation-outcome cognition because in this situation there would be no action taken by the teacher herself. Creating and executing a lesson of writing a persuasive essay using Chromebooks would be an action-control cognition as she is evaluating her ability to initiate and perform a suitable action. Expecting the lesson to go well because of thorough planning would be an action-outcome cognition, as it involves the positive consequences for an action.

The second type of cognitions, value-related cognitions, are the intrinsic or extrinsic value that an action holds for an individual (Pekrun, 2000). For example, a teacher may love using social media to interact with students, an intrinsic value, or she may be striving for a technology award from within her school district, an extrinsic value. To summarize, "control-value theory postulates that control- and value- related cognitions are of primary importance for achievement emotions" (Pekrun, 2000, p. 150). Simply stated, Pekrun, et. al (2011) explain that, "individuals experience specific achievement emotions when they feel in control of, or out of control of, achievement activities and outcomes that are subjectively important to them" (p. 16).

There is one limitation to using control-value theory as a lens for examining teacher motivations when integrating or resisting technology innovation. CVT has a narrower range of task value components than other theories, such as Expectancy Value Theory, which is explored below (Wigfield & Cambria, 2010). The breakdown of task value that occurs in Expectancy Value Theory allows for a more detailed study of why a particular task holds value for an individual. This increased intensity sheds greater light on the task itself. Tasks, specifically those that include innovation with technology and integration of digital tools into the classroom are a primary focus in this study. The motivation behind those specific tasks is germane to the research question. Therefore, it is important to have as clear an understanding of the components of task value as possible. Using CVT in this context could lead to misinterpreting valuable data or misidentification of true motivations because it does not provide a fine-grained and detailed a view of the value various tasks have.

**Expectancy Value Theory**

While motivational theories such as self-efficacy, self-concept, and control-value share a similar theoretical purpose—to explain and predict motivation for different behaviors—they have characteristics that limit their explanatory power when used as a lens for examining teacher motivation with technology. The features of each theory that make it well-suited to examining other phenomena are the same features that do not align with characteristics needed to examine teacher motivation for integrating or resisting technology innovation, which will be explained in detail later in the text of the document. For example, self-efficacy is well suited to examining a teacher's belief in her ability to provide student feedback using a GoogleDoc platform, rather than that of traditional pen-and-paper comments because it is very task-specific and oriented in the ability to complete feedback and communicate it to the student. This is not the goal of this research study, however, as it does not address why the teacher would initiate that task. Similarly, self-concept is well suited to examining a teacher's perceived status as a teacher of digital writing when compared to peers, but this does not address the differences in tool availability or initial student ability level, making comparisons difficult.

The theory of motivation that best aligns with the characteristics of integrating or resisting technology innovation is Expectancy Value Theory (EVT). In a review of motivational research, Eccles & Wigfield (2002) identify "modern" motivational research as that which explores the beliefs, values, and goals and their relationships with one's actions. Essentially, EVT explains that value beliefs, either positive or negative, and expectancy beliefs, are the main constructs underlying motivation.

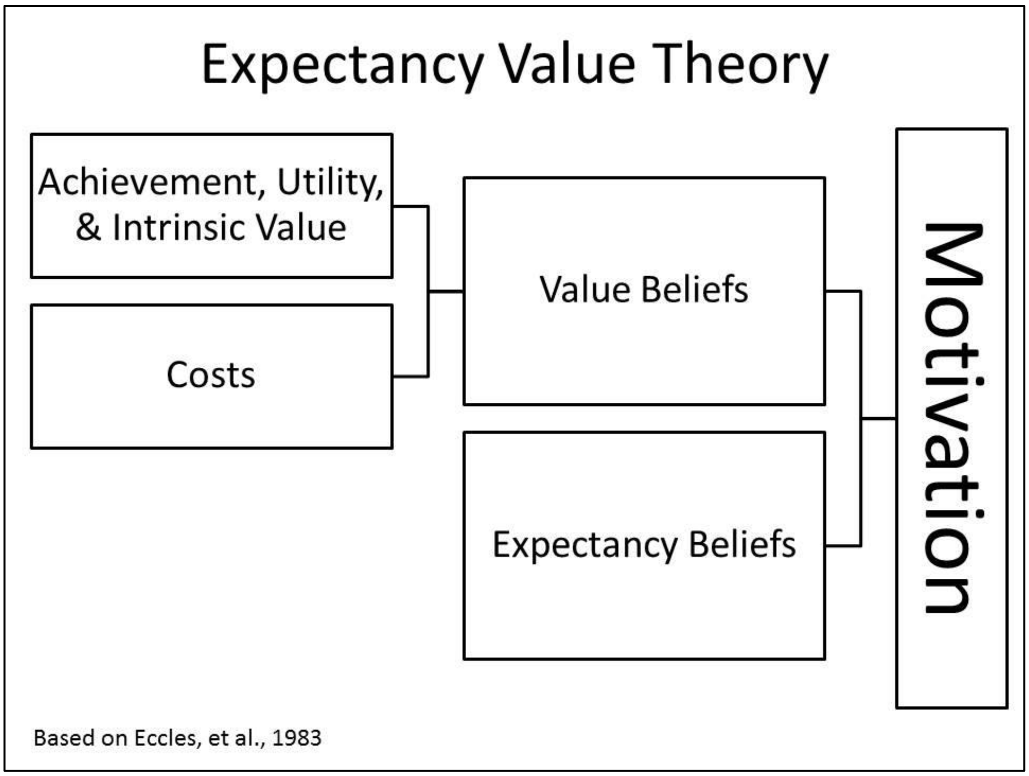
Expectancy beliefs, as defined by Eccles, et al. (1983) are the beliefs one holds in his or her ability to be successful in a general area. These beliefs can be influenced by knowledge that teachers have from professional development opportunities or coursework in teacher preparation programs. Teachers follow this pattern as their beliefs have a strong connection to their goals and behaviors (Pajares, 1996; Bandura, 1997). However, several empirical studies demonstrate that beliefs alone are not enough to influence behavior: other factors must be present. The theoretical constructs that explain these other factors affecting behavior will be further explored in Chapter 2, along with select samples of supporting empirical work.

Value beliefs are judgments about why one would complete a task. Put another way, task value beliefs answer the question, “Is this useful?” (Schunk, et al., 2014). These can be either positive or negative beliefs, where positive value beliefs increase motivation, and negative value beliefs decrease motivation. Task-value beliefs are an amalgamation of four constructs: attainment value, intrinsic value, utility value, and cost (Eccles, et al., 1983)

Attainment value is the amount of importance to one’s personal views. Teachers could find attainment value in earning competency certificates that represent them as examples of excellence in their fields. Intrinsic value is how much one enjoys or likes a particular topic (Eccles, et al., 1983). The personal pleasure one receives from engaging with a task is the intrinsic value. Teachers may find intrinsic value from using technology to explore a personal interest or teaching style. Utility value is the usefulness of a domain, particularly in relation to goals (Eccles, et al., 1983). Technology can provide utility value to teachers in a number of ways including grading more efficiently, managing late student work, reaching struggling students, etc. Cost, the final component of task-value beliefs, includes all the negative aspects of completing a task (Eccles, et, al., 1983). Cost value, as defined by Eccles, et al. (1983) is the value of whatever is given up in order to include the technological innovation. This can take many forms including prep time, material to learn, breaking old habits, financial requirements, lack of administrative support, and parental pressure for traditional lessons, difficulty in content application, etc. Technology specifically often comes with a high start-up cost for teachers in time and fiscal resources.  Beliefs, which should be strong predictors of behavior (Pajares, 1996;

Bandura, 1997), sometimes conflict with behaviors. It is these costs help to explain why beliefs are not always solid predictors of behavior. Motivation, therefore, is the combined influence of value beliefs, including achievement, utility, and intrinsic value and costs, and expectancy beliefs. Figure 2 illustrates the construction of EVT.

Figure 2: Expectancy Value Theory




The relationships between these various components of EVT and the nature of how they fit together is further explored in Chapter 2.

EVT adds theoretical value to the examination of teacher motivations for integrating or resisting technology innovation for three reasons. First, it examines *domain-focused beliefs*, like the use of technology in a classroom, rather than *task-focused beliefs,* like the creation of a PowerPoint presentation. To examine teacher technology use, the theoretical lens must be broad enough to capture any innovations that a teacher attempts. This requires a wider focus than any specific task behavior.  Second, it allows for more flexible views of self and does not necessitate hierarchical comparisons in order to make evaluations. The frequent changing nature of technology make more rigid theoretical constructs difficult, and the unique circumstances of each classroom make comparisons to peers based on technology alone problematic. Finally, this theory offers more variety in the components of task value by breaking value beliefs into four smaller categories. This added detail makes it better suited to examining the behavior of technology integration, rather than generic academic achievement as it includes the task itself and the positive or negative aspects associated with the task as a possible motivating factor. Further explanation of the theory and the research that exists in relation to it and the topic is presented in Chapter 2 of the study, the literature review.

There are few, if any, limitations for using EVT as a theoretical lens for examining teacher motivations when integrating or resisting technology innovation. It requires a domain-specific focus, allowing for the exploration of a wide range of technological innovations. It is not hierarchical; therefore, teachers can make judgments about themselves solely within the context of their own classrooms. It allows for an in-depth view of task value, a central focus of technology integration. These characteristics make it a more ideal theoretical model than self-efficacy, self-concept, or control value for examining teacher motivations for integrating or resisting technology innovation.

Motivation is a complicated construct with a plethora of everyday uses and numerous theories that offer explanations as to why one is or is not motivated for a certain activity. In this study, I am interested in motivation for the integration or resistance of technology innovations. In other words, I am interested in what encourages or discourages teachers to embrace or reject the use of digital technologies in their practice. EVT is the theoretical model that provides the best fit with the research question by offering explanatory power to the domain-specific, non-hierarchical, task-oriented research question.

## Constructs

In addition to the question about which theory of motivation is best suited for teacher motivations for integrating or resisting technology innovation, the four other constructs relevant to the study of integration or resistance to technology innovation in this proposal require clarification: technology, resistance, innovation, and integration.

### Technology

The first construct is that of technology. The term technology, like motivation, is somewhat problematic because the theoretical and operational work to define it has been the subject of much deliberation and debate across time. Kline (1985), for instance, unpacked several uses of the term technology: it could mean manufactured articles, sociotechnical system of manufacture, technique/methodology/know-how, and sociotechnical system of use. Given these uses of the term, technology could mean:  a computer, the factory process to make the computer, the knowledge to write code so that the computer will function, and the network to which a computer is connected once it is utilized in a school district. This broad definition allows for both concrete tools as well as abstract knowledge to be considered as technology.

Other scholars have defined technology as both concrete tool and abstract knowledge too; however, they do so in a more integrated and organic way that allows the definition to continue growing with the uses of various digital tools. Cole & Derry (2005), for example, described technology as the tool and the way that the tool is deployed as part of a social practice. Despite the fact that this definition was published two years before the release of the first iPhone, it fits the social use of smartphones for communication purposes and status symbols because it includes both the tool itself—the smartphone—and the social practices with which it is associated—verbal communication and nonverbal communication as a status symbol. Here the smartphone is more than the tool and those who know how to use it. The smartphone technology inherently allows for communication through calls, texts, and apps; however, it also incorporates signals a level of status to those who view smartphone users with the latest model, representing wealth.

More recently Persson (2012) extended the definition of technology to include "the design and manufacturing phases, the operationalization, and the predict[ion of]…consequences [for using] it" (p. 18). In light of this expanded definition, technology is not only the tool, but also the thinking and action that accompanies the tool and its production. In practice, this conception of technology means that the creation and publication of multimedia videos, the authenticity that publication brings to the project, and the student ownership of their own knowledge are all a technology too.

As the preceding paragraphs illustrate, the deliberation and debate about the construct of technology has been broad and inclusive. None of the definitions refer specifically to digital technologies. However, the current educational context uses the term technology to refer specifically to concrete digital technologies as objects that assist, accelerate, or extend the capabilities of human activity. To illustrate, the International Society for Technology in Education published standards for students and teachers to guide quality instruction and learning experiences with technology. All five of the main standards include the word "digital" in either the main standard or one of the subsections (ISTE, 2008), specifying the scope of what is meant by the term technology.

Professional standards are not the only documents that illustrate the digital emphasis for the meaning of technology in today's educational context. Federal legislation, specifically the No Child Left Behind Act (NCLB), identified the digital preparation of students as essential "in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade (ESEA, 2001, p. 248). When NCLB ended, the connection between digital and technology was continued in the language used by the Every Student Succeeds Act (ESSA, 2015). The ESSA subsection focusing on student enrichment grants includes a goal to "improve the use of technology in order to improve the academic achievement and digital literacy of all students" (ESSA, 2015, p. 215).

Thus, informed by the intellectual, professional, and legislative context that shapes the questions asked for this study, the operational definition of technology for my study refers simply to the concrete digital tools that assist, accelerate, or extend activity associated with classroom management, student learning, and teacher effectiveness. This definition is necessarily narrower than the broader conception of technology articulated by the philosophers of technology discussed earlier (e.g., Kline, 1985; Cole & Derry, 2005; Persson, 2012). There are two reasons for adopting this narrower conception. One is to be consistent with the current policy and practice usages of the term. Because I will be studying two classroom teachers who are innovating and integrating with technology within the larger context of the ESSA and the ISTE Standards, the alignment of practical and policy usage for the construct 'technology' makes the analytic work of this study more conciliant. The other reason is to keep the scope of the study manageable given the time and resource constraints available. To adopt a broader conception of technology would scale the data collection and analysis beyond what is feasible.

**Resistance**

Another construct is that of resistance. The everyday usage of resistance by teachers is likely to mean, “The action of resisting, opposing, or withstanding someone or something” (Resistance, 2016). This definition is consistent with the literature involving teacher technology use or lack thereof. Few studies operationally define the term. One such example states, “‘Resistance’ to technology may in fact be risk perception and uncertainty” (Howard, 2012, p. 368). This explanation, rather than more fully defining resistance actually offers an explanation for what causes the opposition. There is a large body of work that attempts to explain why teachers do resist or oppose using technology, which will be further explored in the literature review within the next chapter. For the operational purpose of this study, resistance is defined broadly as a refusal to use or the avoidance of digital tools within the specific context of a particular classroom teacher’s environment to meet the needs of students, parents, teachers, administrators, or other stakeholders.

**Innovation**

The third construct is that of innovation. The term innovation in everyday use by teachers is likely to mean, “the introduction of novelties; the alteration of what is established by the introduction of new elements or forms” (Innovation, 2016). Within this definition and throughout the colloquial use of the word, there is a focus on the novelty of something described as an innovation. This simplistic view, though, is not completely sufficient for understanding what it is that teachers are doing when they do actively innovate with technology.

The literature presents much more detailed explanations that occur in context and include other factors beyond the mere change. Soetaert & Bonamie (1999), for instance, state that “artists develop aspirations that in principle can only be realized by a change in the medium itself. This implies an innovation in the form of a technical leap that eventually produces a new art form" (p. 137). While this work focused on artistic creation, it is particularly applicable to teaching with technology. Synchronous learning across long distances was pure science fiction until the capabilities of personal laptops and high-speed internet connections made this type of communication possible for education. As a result, hybrid and synchronous online courses now appear regularly in campus course offerings, a medium that did not exist before the medium of synchronous telecommunication made them possible.

Similarly, the business world where the term innovation frequently appears also focuses on the output of a new product, method, or medium. However, the focus is not necessarily on the user, who in the classroom may be the teacher, but is the consumer, who may be the student. "A product is innovative when it satisfies new market needs or existing market needs in a new way" (Maranville, 1992, para. 19). In this case, innovations may not necessarily be new products, but the same tools used in a new way to meet the needs of the market, or in the classroom, of the student. Audio recordings or radio broadcasts have historically been a way to share information. Perhaps the most famous example in American history is that of Franklin D. Roosevelt's Fireside Chats. While this tool is hardly new, creating a podcast of a book talk that students can access in a classroom library uses an old tool or concept to meet the needs of modern students. Maranville further explains, "innovation. . . is the method of changing the values and satisfaction of consumers" (1992, para. 21). The inclusion of the auditory communication technology in a new place like the classroom library can change the value and satisfaction of the student customers who are searching for books they find interesting.

Other researchers also focus on the concept of change being central to that of the construct of innovation, but they add important information about the context beyond practice.

Dillon explains, “innovation theory typically deals with the operations, strategies, and infrastructure of organisations. It is a theory of change, usually in the interests of more effective or competitive practice” (2000, p. 5). While this supports the idea of novelty that the basic dictionary definition provides, it also includes the important focus on improving effectiveness or competitiveness of practice. In a classroom, showing an educational video that allows for multimedia interaction with a topic can be far more effective in engaging students with a lesson, regardless of content area, than reading from a textbook, even when that book includes illustrations and diagrams. Additionally, Dillon describes innovation as the first part of a process where innovation leads to adoption. Adoption of an innovation allows for reducing uncertainty, exploring possibilities, and assessing outcomes (Dillon, 2000). These things cannot occur without regular use and reflection. A teacher may innovate by having students respond to provided video annotations inserted via a Web 2.0 tool. On a later use of the same technology, she may have students actually provide the annotations themselves, rather than respond to those notes she provided. This shows the reduction of uncertainty in her abilities to use the tool, exploration of possibility for new applications of the tool, and assessment of student learning outcomes via the provided comments. The final step in the innovation process described here is that of integration, or incorporation into the existing way of doing things (Dillon, 2000). This final step is of great importance and is further explained in the next section with illustrative examples.

Based on the discussion above, innovation is not merely trying something new. It is a far more complex process, rather than a single endeavor, that includes contextual factors where the student and/or teacher take on the role of the consumer who receive a change in value and satisfaction to meet one or more needs, possibly through a new medium created by technological advances to allow for something that has never been done before due to the limits of past tools. For the operational purpose of this study, innovation is defined broadly as trying something new in the specific context of a particular classroom teacher's environment to meet the needs of students, parents, teachers, administrators, or other stakeholders.

**Integration**

The final construct is integration. Integration in the vernacular is defined as, "the making up or composition of a whole by adding together or combining the separate parts or elements; combination into an integral whole: a making whole or entire" (Integration, 2016). This definition from the Oxford English Dictionary indicates a very important point: technology integration is not only placing digital tools in the hands of students and teachers but also making the technology a part of the whole learning process. Research shows that more complete realizations of integration occur when the technology and the instruction are fused into one. "It is becoming increasingly clear that merely introducing technology to the educational process is not enough to ensure technology integration since technology alone does not lead to change" (Koehler & Mishra, 2005, p. 132)

The nature of technology—inherently fast-paced, constantly changing, and increasingly present in daily life—also impacts the construct of technology integration. Technology integration is a multifarious process where each tool has a plethora of potential applications. In a review of the state of digital technology, Schrum (1999) states, "Educators are making progress in learning about technology, but we have a long way to go." While this statement was made over a decade ago, its relevance to the status of technology today (i.e., hardware, software, online platforms, etc.) continues to fluctuate, making complete mastery of integration impossible. In the time that it takes to glean experience and expertise with a digital tool in a content area, that tool becomes obsolete, or the infrastructure to use it becomes unavailable; therefore, no specific action or way of using a particular device or platform can suffice as a definition for technology integration.

Given the purpose of this study, I choose to operationally define the construct of integration using the explanation outlined in the Technological Pedagogical Content Knowledge (TPACK) Framework: "True technology integration, we argue, is understanding and negotiating the relationships between these three components of knowledge [technological knowledge, pedagogical knowledge, and content knowledge] (Bruce & Levin, 1997; Dewey & Bentley, 1949; Rosenblatt, 1978)" (Koehler & Mishra, 2005, p. 134).

**Rationale**

In a practical sense, technology integration and innovation in classroom settings has the potential to offer significant positive outcomes for students. Technology in schools can prepare students for their adult, working lives, by practicing skills in a classroom, like maintaining a social media presence or using GIS software to map physical locations (Ito, et al. 2008) and by learning digital competencies, which are replacing traditional print-based skills (Greenhow, Robelia, & Hughes, 2009). Additionally, technology in the classroom has been found to increase student engagement and participation (Gao, et. al., 2012; Junco, Elavsky, & Heiberger, 2013; Manca & Ranieri, 2013). Finally, some studies show that digital technology improves learning outcomes for students (Roschelle, et al., 2010; Junco, et al, 2013; MacArthur, Feretti, Okolo, & Cavalier, 2001). Because of this promising potential, the field needs to better understand the integration of technology into classroom settings by classroom teachers.

Given that there are learning benefits for students, it is important to integrate technology into the classroom as a regular part of instruction. However, bringing in these new tools changes the classroom significantly, especially for the teacher. Standardization, such as state-mandated testing, a frequent measure of teacher aptitude and quality, “focuses on core principles of pre-digital education” (Lopez, 2008). Putting pressure on teachers to have classrooms with high average scores can make it difficult to try and incorporate new technology. The ever-changing nature of digital tools also means that there are new areas to learn and teach as the technology changes the content of courses. For example, geography classes can now include GIS components, biology contains new genetic discoveries of gene mapping, and mathematics requires students to learn graphing on advanced calculators. Additionally, technology can change the role of the teacher—students become the cultivators of knowledge in a social learning environment, rather than the vessels, and they may know more about the digital tools that the teacher does (Crook, 2012). This context prompts teachers to use technological pedagogical content knowledge to determine how best to use a particular technological tool in a particular context for a particular purpose (Mishra & Kohler, 2006). This is knowledge that teachers may not have, making them unprepared to effectively and efficiently integrate technology. These known difficulties hinder teachers in integrating technology innovation in their classrooms. Understanding the motivation behind teacher integration or resistance for technology integration is a key step in equipping classroom teachers. Presumably, when they are more motivated to integrate technology, teachers will also be more effective at preparing students for life outside of the classroom and in the workforce.

For students to reap the benefits of technology in the classroom, teachers must be willing to use it and to try new things as platforms, devices, and applications change. To understand why teachers do, or do not, use digital tools is of paramount importance to the benefit of students.

Extensive research on teacher technology use exists in the literature at large, but with a wide variety of contextual factors inherently present in classroom research, there is still more to learn.

While a number of studies have examined teacher motivation for integrating technology through the theoretical lenses of self-efficacy, self-concept, and control-value, none have done so through the lens of Expectancy Value Theory (EVT), which has the potential to provide new insights about teacher motivation for integrating or resisting technology innovation. More specifically, to date there is no literature that uses EVT to understand teacher technology use and its resistance. Further, the literature that used other motivational lenses focused on those teachers who are integrating technology, not those who resist its use. Pairing the lens of EVT with a detailed study of a teacher who embraces technology and one who resists it could shed light on an area of the field that to date has remained largely understudied. To carry out a study that examines technology innovation and resistance through an EVT lens, I will build upon my intimate knowledge of the two teachers, the general student population, the school context, and the digital technologies available to use with the curriculum. Such knowledge is possible because of my unique access to the participants and place. Most researchers do not have deep access to a setting's technological background before beginning field work. I will enter the scene with already established relationships to develop a methodologically sound analysis of teacher technology innovation. In sum, the purpose of this study is to harness the unique circumstances and explore the explanatory power of EVT.

## Question

The study that follows addresses the research question: What motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices?

## Overview

This dissertation is organized into five chapters with specific purposes. This first chapter briefly outlines the rationale for the study and identifies the purpose for the proposed research. In maintaining consistency with the research question, Chapter 2 reviews theoretical literature and empirical work from all of the theories introduced in Chapter 1 and then explores Expectancy Value Theory (EVT) further to illustrate its strength as a theoretical lens for addressing the research question. Additionally, Chapter 2 defines terminology including specific constructs that are included in the research question of this study.. Chapter 3 describes the methods for answering the research question by establishing the use of an interpretivist paradigm coupled with a case study methodology as appropriate for addressing the specific research questions previously established and including a description of data collection. Chapter 4 discusses the collected data as well as the results of the study. Chapter 5 discusses themes from the data, addresses limitations of the study, and concludes with exploring implications for future research.

# Chapter 2: Literature Review

## Introduction

This chapter reviews the existing literature on theories of motivation and the constructs related to technology integration and innovation. The motivation for integrating and integrating or resisting technology innovation draws on a range of theoretical and empirical work. Thus, to understand the relevance of this prior work to the proposed study, I begin by reviewing four motivational theories, then explain four constructs relevant to technology integration and innovation, and conclude by discussing the intersections of the constructs of motivation and technology. motivation.

## Motivation

To determine which theory of motivation provides a useful lens for understanding teacher technology integration and innovation for the current study, I further explain in this section: the four motivational theories that were briefly presented in Chapter 1, the distinct characteristics of each theory, the empirical work that grounds these theories, and the relevance of the theories to the question posed for this study.

### Self-efficacy

As stated in Chapter 1, self-efficacy is a widely-used theory. Its predictive strength has resulted in its use across a variety of settings outside of academia including motor skills, career choices, and health and wellness (Schunk, et al., 2014). Self-efficacy is a task-specific theory where efficacy beliefs and outcome beliefs predict future behavior. While these features were previously mentioned in Chapter 1, the relationship of the constructs to the nature of the theory is important and bears further explanation.

**A closer look.** Self-efficacy is a strong predictor of all types of achievement behaviors and is highly related to outcome expectations (Schunk, et al., 2014). Figure 3 illustrates the probable achievement behaviors that occur when various self-efficacy beliefs and outcome expectations combine in a given task.

Figure 3: Outcome Expectations for High and Low Self-efficacy

| **Self-Efficacy Beliefs** | **Outcome Expectations** | |
|---|---|---|
| | *Low-outcome expectation* | *High-outcome expectation* |
| *High self-efficacy* | • Social activism<br>• Protest<br>• Grievance<br>• Milieu change | • Assured, opportune action<br>• High cognitive engagement |
| *Low self-efficacy* | • Resignation<br>• Apathy<br>• Withdrawal | • Self-devaluation<br>• Depression |

(Bandura, 1982)

Self-efficacy builds from the success or failure of attempted tasks. These tasks do not have to occur in first person: students can learn from seeing models attempted and either succeed or fail at a task (Schunk, et al., 2014). A teacher who observes her colleague teach a lesson that attempts to use web browsing for research but results in students listening to song lyrics instead of finding reliable sources likely has decreased self-efficacy for using Internet research in a lesson because of her peer's failure.

The essence of self-efficacy creates a cyclical concern for students without strong beliefs. High self-efficacy leads to increased participation whereas low self-efficacy leads to avoidance (Schunk, et al., 2014). In academic or technological tasks where practice to become proficient is a key component of the learning process, those individuals with low-self efficacy quickly fall behind. Lack of self-efficacy leads to avoidance behaviors, which, in turn, leads to little or no skill development and practice. The opposite effect, high self-efficacy leading to practice, and in turn, leading to skill building, is also true. In any given situation, the skill gap between those with low and high self-efficacy is likely to grow and exacerbate the problem.

As stated in Chapter 1, self-efficacy is a task-specific, rather than a domain-specific theory. Because of its task specificity, "self-efficacy would not be merely a self-recognition of being good in school but rather explicit judgments of having the skills for finding main ideas in passages of varying levels of difficulty, correctly subtracting different types of fraction problems. . . and so forth" (Schunk, et al., 2014, p. 145). Among the theories reviewed in this study, specificity to task is a characteristic unique to self-efficacy.

Task-specificity is a key component of self-efficacy because it highlights the dynamic, fluctuating, and changeable nature of an individual's motivation as social conditions (e.g., classroom climate), physical conditions (e.g., illness or exhaustion), and task characteristics (e.g., length, difficulty) affect self-efficacy beliefs on a daily basis (Schunk & Pajares, 2005; Schunk, et al., 2014). For instance, a teacher's self-efficacy for embedding a video into a lesson can increase after successfully doing so, or, it can decrease after embedding a video causes a computer to crash; however, independent of the embedding task, her self-efficacy for creating an interactive GoogleDoc where students record collective notes in a shared document can remain unaffected.

**Distinct characteristics.** Given the closer look at this theory outlined in the previous section, three characteristics of self-efficacy are important to consider when reviewing motivational theory for this study: the theory is focused on a specific task (as mentioned above), it predicts the completion of a task in a particular future setting, and it links inherently to outcome-expectations. The theory does not, however, account for a lack of incentive (Bandura, 1977). For example, this theory would be ideal for predicting teacher motivation for composing a presentation with an embedded Voki avatar as this is a specific task with a future time setting, and it is inherently linked to an outcome expectation of either success or failure, depending on the teacher's beliefs. However, if the teacher has no incentive to use create the embedded Voki avatar, the predictive power of this theory is reduced as there is no reason to engage in the creation of the Voki avatar in the first place.

**Selected empirical works.** A sizeable body of empirical research informs self-efficacy theory; thus, a brief review of two relevant works is presented here to illustrate how task specificity, task prediction, and the link to outcome expectations work. Included empirical works from reputable journals illustrates the main theoretical components of the theory that were explained in the previous section as well as some important developments in the theory itself (e.g. major areas of focus in the literature, important creation of measurement tools, etc.). Articles were selected from the following databases: ERIC on ProQuest, SAGE Journals Online, and ProQuest Dissertations and Theses Global.

In one important work focusing on task prediction, Salomon (1984) compared mental efforts required by sixth graders with both traditional text and a silent movie (representing television). In general, the findings indicated that students have higher self-efficacy for the television/silent movie because it is "easy" and that students decrease their effort in response to the evaluation that this type of medium is "easy" (Salomon, 1984, p. 649). In other words, students put forth less effort when they evaluate a task as an easy one, predicting, therefore, that it will require less effort to find success. Additionally, high self-efficacy for reading was positively correlated with mental effort, but high self-efficacy for television was negatively correlated with mental effort, suggesting that when students perceive a medium as easier, they react by "behaving mindlessly" (Salomon, 1984, p. 654). The findings for the reading group are consistent with Bandura's (1977) theory that high self-efficacy results in more effort, rather than avoidance behavior in students; however, the results for television, which students perceived as "easy", were the opposite, indicating that the participants' view of the medium also plays a significant role in their behavior. Bandura's (1977) could account for this as a component of an outcome expectation, which identifies whether one task (watching television) will lead to a given outcome (learning without trying).

Other empirical work supports Bandura's theory and his claims that self-efficacy is highly task specific. For instance, Pajares and Miller (1995) completed a study to examine the accuracy of various measures of self-efficacy. Using 391 undergraduates enrolled in various upper division courses at three large public universities, researchers asked participants to rate self-efficacy for problem solving, course success, and completing math tasks. Using zero-order correlations and multiple regressions, Pajares and Miller (1995) found that there was a stronger relationship between problem solving self-efficacy and problem-solving performance that either of the other self-efficacy variables (course success and completing math tasks). This finding supports Bandura (1986) claim that self-efficacy tasks need to closely match the performance which researchers are attempting to predict to have the strongest relationship possible.

These two empirical works emphasize two important features of self-efficacy theory that are relevant for determining which theory of motivation provides a useful lens for understanding teacher technology integration and innovation in the current study. Salomon (1984) found that high self-efficacy was not necessarily an indication of high effort toward a task. In the context of teacher motivations for technology integration and innovation, this finding demonstrates an ill-suited characteristic of this theory for the proposed study: teacher incentives or lack thereof play a role in the decision to put effort toward a task, which is not something that self-efficacy theory addresses. Second, Pajares and Miller (1995) found that high-self efficacy only correlated with ability when predicting specific behaviors. The inability for a researcher to identify specific behaviors that would qualify for technology innovation (broadly defined as trying something new in the specific context of a particular classroom teacher's environment to meet the needs of students, parents, teachers, administrators, or other stakeholders) would limit the usefulness of self-efficacy as a theoretical lens for exploring teacher motivations for integrating or resisting technology innovation.

**Self-concept**

Self-concept, like self-efficacy, is a widely-used motivational theory with a rich and lengthy history. From early Greek philosophers like Socrates and Plato, to religious leaders like St. Augustine and Buddha, the self was the subject of much discussion and writing (Hattie, 1992). The roots of the theory, which begin with the essence of self, appeared in philosophy and religion around the world. Early 20th century research employed a formulation of self-concept, which lacked theoretical grounding and clarity of definitions (Schunk, et al., 2014). The research since then has worked to refine and solidify concepts and further examined the mechanisms of self-concept itself. As characterized in Chapter 1, self-concept is a stable, domain-specific, past-oriented theory that relies on peer comparisons to examine motivation, but the theory has additional features that bear further review.

**A closer look.** In brief, self-concept is the belief one has about one's self in various domains (Hattie, 1992). These self-schemas, "reflect individuals' beliefs and self-concepts about themselves" (Schunk, et al., 2014, p. 54). In other words, self-concept is a conglomeration of the values, beliefs, and feelings one has about him/herself. Research shows that self-concept is hierarchical, not only in peer comparisons, but also in the structure of a domain (Hattie, 1992; Schunk, et al., 2014). Table 1 on the following page illustrates how general self-concept is comprised of specific sub areas that are broken down even further into specific behaviors (Schunk, et al., 2014).

Self-concept is a domain-specific theory, meaning that it focuses on general areas rather than specific tasks; however, the question of domain specificity remains still contested and under study (Schunk, et al., 2014). For example, one could have a high self-concept for technology or even academics, but one would not have a self-concept for preparing video notes for students because it is a very specific task. Research does show that domain specificity increases with age (Schunk, et al., 2014). This means that individuals are better able to distinguish between strengths and weaknesses as they mature. For example, an elementary student who struggles to use a mouse accurately could have a low overall self-concept, but a young adult who is unable to format a paper in Microsoft Word accurately is likely to have only her academic-self-concept affected, not her overall self-concept.

Table 1:

*Hierarchical Structure of Self-Concept*

| | Overall Self-Concept | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Domain | Academic | | | | Social | | | | Athletic | | | | Personal | | | |
| Sub section | Math | | Language Arts | | Peer Relations | | Adult Relations | | Running | | Tennis | | Appearance | | Personality Traits | |
| Specific Behavior | Adding two-digit numbers | Regrouping in addition | Composing a topic sentence | Spelling words correctly | Talking to a friend at lunch | Comforting another student | Asking for help | Using manners at appropriate times | Pacing for a distance | Breathing regularly | Serving the ball | Returning the ball | Picking out matching clothes | Bathing regularly | Sending a sympathy card | Donating to charity (generous) |

Based on Shavelson, et al., 1979

Self-concept is multifaceted and includes two often referenced components of self-esteem and self-confidence, which are considered empirically and theoretically distinct (Schunk, et al., 2014). The dimension of self-esteem, which is "one's perceived sense of self-worth or whether one accepts and respects oneself," is the evaluative component, while self-confidence, which is, "the extent to which one believes one can produce results, accomplish goals, or perform tasks completely," is related (Schunk, et al., 2014, p. 185). More simply stated, self-esteem is how one feels about *herself*, and self-confidence is a measure of competence, or how one feels about his *ability*. Further, self-competence is a cognitive judgment, and self-esteem is affective (Schunk, et al., 2014).

Self-concept includes misconceptions of ourselves as well as accurate appraisals of abilities (Hattie, 1992). A teacher can be quite adept at organizing files in Google Drive, searching for digital resources, and troubleshooting network connectivity issues and still have a low self-concept for technology. Because self-concept is influenced by both personal and vicarious experiences (Schunk, et al., 2014), it is natural that changing the misconceptions that are a part of self-concept can also be influenced this way. "We can change an individual's misconceptions by self-examination, self-demonstration, explanation, and vicariation" (Hattie, 1992, p. 41)

Self-concept is related to achievement, but the nature of the relationship is still being investigated. To date, the evidence indicates a moderate correlation between self-concept and academic achievement (Schunk, et al., 2014), but the correlation does not indicate causality. Researchers are still trying to determine the direction of causality between self-concept and achievement. A number of these researchers hypothesize that there is a reciprocal relationship: "Self-concept influences future achievement and actual achievement shapes and constrains self-concept" (Schunk, et al., 2014, p. 60). This means that one can approach self-concept and achievement from either direction and still be successful in influencing them. For example, creating simple technology integration tasks like checking email or typing a document that a teacher can easily complete will improve self-concept, encouraging that teacher to continue trying new technology tools, and having a strong belief in abilities should raise motivation and, therefore, actual achievement.

Self-concept develops as individuals age, "proceed[ing] from a concrete view of oneself to a more abstract one" (Schunk, et al., 2014, p. 185). A concrete description of self may include physical appearance, possessions, and/or actions, but an abstract description is more likely to focus on abstract characteristics (i.e. greed, generosity, intelligence, etc.). It is influenced by both personal actions that an individual performs as well as actions that one observes in peers (Schunk, et al., 2014). The description that self-concept is both stable and past-oriented (Bong & Skaalvik, 2003) sounds somewhat contradictory. This duality does, in fact, create a "paradox" as "self-concept is both stable, enduring, and protects against change as well as varying" (Hattie, 1992, p. 115). For example, wearing a new suit for an interview can increase self-esteem, a component of self-concept. This is a temporary change in one's attitude about herself, but it is fleeting, just like the wearing of the outfit. Markus and Kunda (1986) conceptualize the stable and varying identify of self-concept by introducing the idea of a *working self-concept*: "The self-concept at a given moment—the working self-concept—is a subset of this universe of self-conceptions" (p. 859). This working self-concept responds to any number of variables affecting someone at a specific time while her overall self-concept remains stable and static.

**Distinct characteristics.** Given the closer look at this theory outlined in the previous section, three characteristics of self-concept are important to consider when reviewing motivational theory for this study. First, self-concept is a *stable*, past-oriented theory (Bong & Skaalvik, 2003; Schunk, et al., 2014). However, other research suggests that the stability masks a more malleable or flexible nature (Markus & Kunda, 1986). Second, the theory is *hierarchical* and requires individuals to compare themselves to peers (Hattie, 1992; Roche & Marsh, 2000; Schunk, et al., 2014). Third, like self-efficacy, self-concept is also *formed* by personal (1st person) actions as well as modeled or observed (3rd person) actions. (Schunk, et al., 2014). This means that teachers who observe failure by a peer may have a lower self-concept for that domain.

**Selected empirical works.** Many studies were used to build the theory of self-concept. Included empirical works from reputable journals illustrate the main theoretical components of the theory that were explained in the previous section as well as some important developments in the theory itself (e.g. major areas of focus in the literature, important creation of measurement tools, etc.). Articles were selected from the following databases: ERIC on ProQuest, SAGE Journals Online, and ProQuest Dissertations and Theses Global.

Reviews of the empirical work on self-concept can be found in synthesis syntheses by Marsh and Shavelson (1985) and Wigfield and Karpathian (1991). Three representative studies were selected to illustrate how the theory's complex stability, hierarchical nature, and susceptibility to vicarious experiences work.

In one study, Shavelson and Bolus (1982) sought to empirically support the hierarchical and multifaceted nature of self-concept with a sample of 99 seventh- and eighth-grade students from a predominately white, upper-middle-class suburb of Los Angeles. The researchers administered a variety of self-concept measures at various levels (general, academic, and subject-specific), and collected grades and standardized test scores from students. Measurements were repeated at the end of the second semester. Three models were tested to support the hierarchical, multifaceted structure. Model 1 had a single factor, Model 2 had two factors, and Model 3 was completely differentiated with many factors. Model 3 had the best fit, accounting for 80% of covariation, confirming that self-concept is a multifaceted construct. Additionally, zero-order correlations and analysis of covariance structure of the data were used to determine the stability of self-concept across the two instances of data collection. General self-concept was the most consistent facet across the two testing instances, supporting the idea that general self-concept is a stable construct; however, academic self-concept and subject-specific self-concept had approximately the same levels of stability as each other, contrary to the hypothesis of Shavelson and Bolus (1982). Full results confirmed that self-concept is a multi-faceted, hierarchical construct, but the complete nature of the hierarchy (specifically stability across hierarchical levels beyond that of general self-concept and changes from the base of the hierarchy upward) remained unconfirmed. Additionally, this study determined that general self-concept was distinguished from academic achievement.

A second study examined the multifaceted characteristic of self-concept, which had been proposed in a theoretical model of self-concept designed by Shavelson, Hubner, & Stanton (1976). Marsh and O'Neill (1984) who designed and tested the Self Description Questionnaire III (SDQ III) measure the multifaceted characteristic. The SDQ III includes 180 items with 10 or 12 items to address each of the 13 facets of self-concept and with one-half of statements worded negatively. Subjects responded on an 8-point Likert scale. The sample consisted of 296 girls, the majority of whom came from middle-class families, enrolled in 11th grade in Catholic Schools in Australia. Subjects were divided into groups of 50-60, and the SDQ III was administered. Additionally, there were 12 summary descriptions to represent the twelve facets of the SDQ III scales (the exception being the General-Self scale). Standardized test scores from a regularly-administered test at the end of 10th grade along with school performance (based on student rank within schools) formed an academic performance measure. Conventional factor analysis revealed 13 distinct factors with low correlations, indicating the 13 unique facets of self-concept, and confirmatory factor analysis supported the model. Additionally, self-summary descriptions had high correlation coefficients, indicating that they represent distinct and separate facets of self-concept. Measures of achievement in math and language correlated with the respective self-concepts, but not with each other. To replicate their findings from the first study, Marsh and O'Neill (1984) also completed a second study using a larger, more representative sample (students from two universities and a teachers' college). Students completed the SDQ III and provided a similar survey to the person who knew them best. A total of 151 pairs participated in the study. Similar statistical analysis supported the findings from Study 1, that there are 13 distinct facets of self-concept identified on the SDQ III. Additional tests comparing self-ratings to those of the paired person had high convergent coefficients (mean = 0.58) support the proposed multifaceted nature of self-concept. Low correlations between the General-Self factor demonstrated little relationship between the factors and failed to support Shavelson, et. al.'s (1976) hierarchical description of self-concept.

A third study examined the stability of self-concept. For instance, Markus and Kunda (1986) suggest that it is both stable and fluid. Forty female University of Michigan undergraduates participated in a multi-step study where they experienced a manipulation to identify them as either similar to or unique from other respondents. Then the experienced three dependent measures: judgments of similarity to reference groups (stability measure), self-categorization judgments (malleability measure), and word associations (malleability measure).

Results found that despite subjects' being aware of the unique/similar treatments, the stability measure, identifying a group on a Likert scale of 1 (not at all similar) to 6 (extremely similar), were unchanged across the treatment groups. However, the malleability measures (identifying adjectives as "me" or "not me" and listing words they associated with adjectives) were very distinct: a significant 2 x 2 x 2 interaction (Condition x Word x Response) $t(56) = 2.12, p < .05$. Control words (honest, polite) and uniqueness words (unusual, individualistic) did not have a significant Condition x Response interaction, indicating a difference from the similarity words (ordinary, conforming) that did (Condition x Response, $t(28) = 2.61, p < .01$). The results of this experiment support the idea that self-concept is both stable and malleable. Respondents did not change how they described themselves in the group association activity. However, the two treatment groups did have very different responses in the word association activity, demonstrating a change in self-concept based on the treatment group. In conclusion, Markus and Kunda (1986) determine that the stability of self-concept masks the malleable nature of self-concept based on the current situation.

These three empirical works illustrate the distinct characteristics of self-concept as well as the methodological issues within the history of the theory. The creation of a well-defined theory (Shavelson, et al., 1976) corrected one problem, but the data across works is inconsistent. Shavelson and Bolus (1982) and Marsh and O'Neill (1984) confirmed the multifaceted nature of self-concept, but the evidence in only one of these supported the hierarchical nature. The stability of general self-concept was clear from all three studies, but the stability of other facets within the model were unable to be clearly determined, especially when in the context of a hierarchical model: there was no clear rise in stability when moving up the hierarchy toward general self-concept. Additionally, the nature of these studies focuses solely on academic self-concept and subject-specific self-concept as the lower hierarchical levels, representing the skew in the literature toward this subsection of general self-concept. The hierarchical nature of self-concept along with the unknown nature of its stability make it ill-suited to studying teacher motivations for integration or resistance to technology innovation because it requires peer comparisons that may not allow for differences in content area, student population, available resources, etc., and the unknown nature of stability may conflict with the highly dynamic nature of technology.

## Control Value

Control value theory, a much newer theory than self-efficacy or self-concept, is based on the idea that subjective appraisals of controls and values determine emotions (Hall & Goetz, 2013). Stated in the simplest way: Control value theory uses value and control appraisals of past, current, and future events to determine the emotions one feels. This simple explanation is expanded, clarified, and explained in the following sections.

Control value theory borrows from these areas: expectancy-value approaches to emotion, attributional theories of achievement emotions, current theories of perceived control, and other models of effects of emotion affecting learning/performance (Pekrun, 2006). In the 1980s, research on achievement emotions grew significantly, especially test-anxiety and attributional studies. Test-anxiety and attributional studies still remain two areas with a large body of applied research on achievement emotions (Pekrun, 2000; Pekrun, 2006).

**A closer look.** A more expanded explanation of control-value theory indicates that *object focus*, the target of the evaluation, includes three distinct target categories toward which beliefs are directed. (Pekrun, 2006). Two categories include the outcome beliefs: either prospective toward the future (i.e. hope, hopelessness) or retrospective toward the past (i.e. shame, pride). The third category is the activity in which one engages.

Another appraisal category, *value appraisals*, are subjective evaluations that one has about the value of a certain activity (Pekrun, 2006). These appraisals can be intrinsic or extrinsic and are "of primary importance for achievement emotions" (Pekrun, 2000, p. 150). For example, a teacher may enjoy using social media to interact with students, an intrinsic value, or she may strive for a technology award from within her school district, an extrinsic value.

Influenced by the work of Skinner (1996), the *control appraisals* in control value theory describe the subjective evaluation of perceived control that one has over an actions and outcomes (Pekrun, 2006). These appraisals are borrowed from self-efficacy theory (Bandura, 1986) and include conditional self-evaluations. For example, a teacher believing that she has the ability to facilitate an online discussion for students and a teacher believing that the discussion will improve student learning is a positive control appraisal because she perceives her control and influence over the action of facilitating the discussion to be the driving factor in improving student learning.

Control appraisals are composed of different causal expectations: situation-outcomes, action-controls, or action-outcomes (Pekrun, 2000; Pekrun, 2006). The focus for these expectancies are: situation-outcome focuses on the outcome of a given situation; action-control focuses on the control one has to take an appropriate action; and action-outcome focuses on the outcome of the action that has been taken. These expectancies are explained with examples in Table 2.

Table 2:
*Causal Expectancies*

| Name | Explanation | Example |
|---|---|---|
| Situation-outcome | Expectations, positive or negative, without taking any action | Expectation that students will not learn when a teacher does not facilitate an online discussion |
| Action-control | Expectations of ability to initiate and perform an action | Expectation that a teacher has the ability to facilitate an online discussion for students |
| Action-outcome | Expectations of consequences for an action | Expectation that students will learn when the teacher facilitates an online discussion |

Based on Pekrun (2000) and Pekrun (2006)

Both value appraisals and control appraisals are considered important elements for the "instigation of achievement emotions" (Pekrun, 2006, p. 318), which means that both types of appraisals are essential in the arousal of achievement emotions, which are central to the theory. The emotions referred to in control value theory are understood to be systems of interrelated, multi-component psychological processes (Pekrun, 2000; Pekrun, 2006). More specifically, an achievement emotion "relates to an activity or outcome of an activity which is evaluated by the subject according to some external or internal standard of quality" (Pekrun, 2000, p. 145). For example, pride in a job well done is a cliché example of an emotion tied to accomplishment. Other everyday emotions such as anger or happiness can be considered achievement emotions when they are aroused by a task or activity. Table 3 below illustrates some sample emotions created from object focus, value appraisal, and control appraisal combinations.

Table 3:
*The Control Value Theory: Basic Assumptions on Control, Values, and Achievement Emotions*

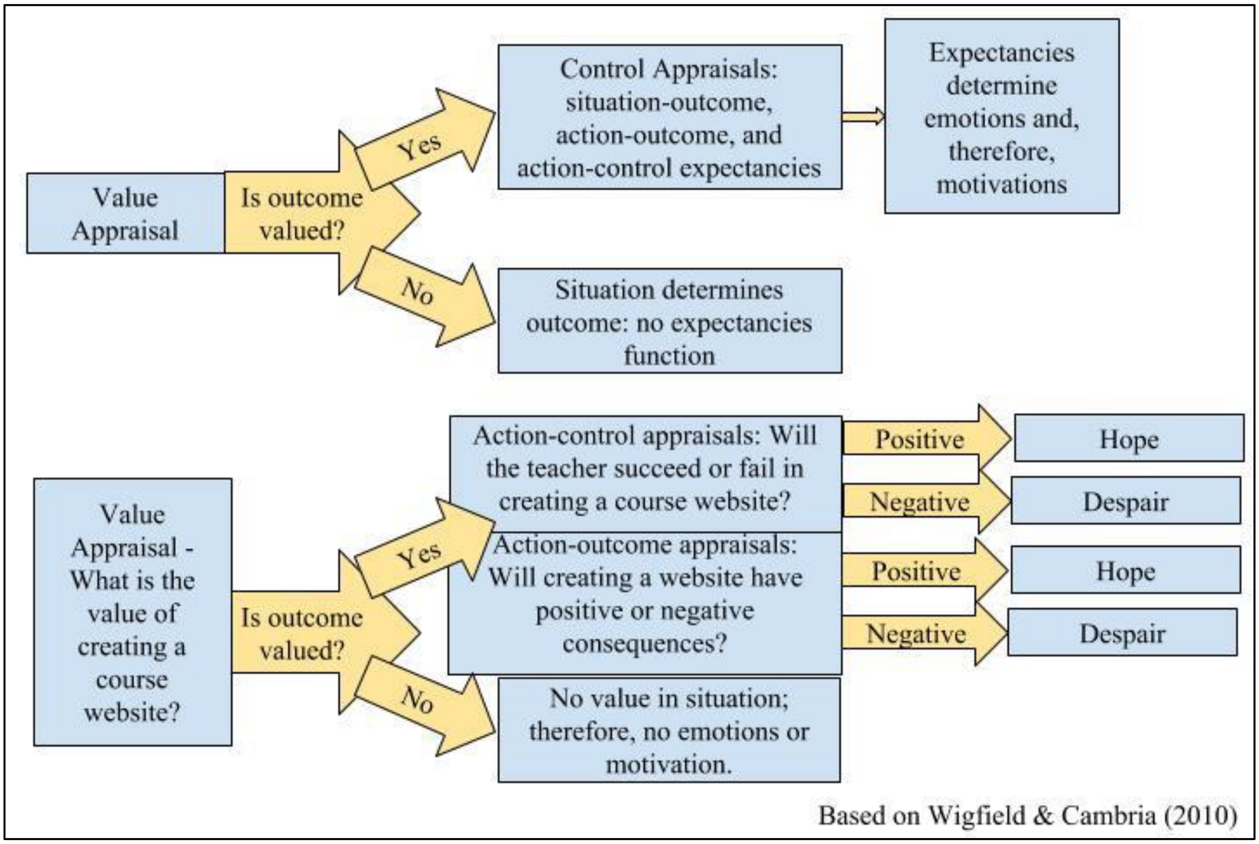
| Object Focus | Value Appraisals | Control Appraisals | Emotion |
|---|---|---|---|
| Outcome - prospective | Positive (success) | High | Anticipatory joy |
| | | Medium | Hope |
| | | Low | Hopelessness |
| | Negative (failure) | High | Anticipatory relief |
| | | Medium | Anxiety |
| | | Low | Hopelessness |
| Outcome - retrospective | Positive (success) | Irrelevant | Joy |
| | | Self | Pride |
| | | Other | Gratitude |
| | Negative (failure) | Irrelevant | Sadness |
| | | Self | Shame |
| | | Other | Anger |
| Activity | Positive | High | Enjoyment |
| | Negative | High | Anger |
| | Positive/Negative | Low | Frustration |
| | None | High/Low | Boredom |

From Pekrun, 2006, p. 320

The research literature identifies two types of achievement emotions. The first are those "momentary occurrences within a given situation at a specified point of time" (Pekrun, 2006, p. 317). These emotions, called *state achievement emotions*, are time and situation-specific. The second are those "habitual, recurring emotions typically experienced by an individual in relation to achievement activities and outcomes" (Pekrun, 2006, p. 317). These emotions, called *trait achievement emotions,* are not bound by a general time, but rather by a contextual situation where they occur. For example, one teacher may feel anxiety any time she attempts an advanced search using a web browser. Regardless of the specific point in time, she feels anxiety because of the situation and exhibits a *trait achievement emotion*: anxiety. Another teacher may be demonstrating an advanced search for colleagues and also have anxiety but only at this specific point in time and with this situation, which is an example of a *state achievement emotion*: anxiety. Note that trait emotions can be situation-specific as well, meaning that any time a situation occurs (first-time lessons, peer presentations, etc.), the teacher feels anxiety. Therefore, the distinction between state achievement emotions and trait achievement emotions is the presence or absence of habitualized occurrence. Trait achievement emotions are felt repeatedly, whereas state achievement emotions are limited to a single specific situation.

The process by which expectancies and values create motivation under control value theory is represented in Figure 4 below. One example of this process is a teacher's decision to create a course website. The value appraisal occurs when the teacher considers whether or not the creation of a course website is valuable. If it is, she participates in *action-control* appraisals (ability to successfully execute task) and *action-outcome* appraisals (consequences for taking action). The resulting expectancies will determine the emotions and, therefore, the motivations of the teacher.

Figure 4: Process of Motivation in Control Value Theory




**Select empirical works.** Because control value theory is a newer theory, it has a smaller body of empirical work that forms the basis for its validity.  Included empirical works from reputable journals illustrate the main theoretical components of the theory that were explained in the previous section as well as some important developments in the theory itself (e.g. major areas of focus in the literature, important creation of measurement tools, etc.). Articles were selected from the following databases: ERIC on ProQuest, SAGE Journals Online, and ProQuest Dissertations and Theses Global.

The studies below illustrate some of the early work done using the theory. These studies illustrate the characteristics of control value theory, an emphasis on achievement emotions and a thorough definition of expectancy values, that are essential in determining its value as a theoretical lens for exploring teacher motivations for integration or resistance to technology innovation.

Developing accurate and informative measurement tools that can be used in empirical work has been a primary focus of control value theory scholarship. For instance, Pekrun, Goetz, Frenzel, Barchfeld, and Perry (2011) addressed the need for a measurement instrument that addressed students' achievement emotions with the creation of the Achievement Emotions Questionnaire (AEQ). They designed scales for nine different emotions that were frequently present in exploratory field research to include in the AEQ with the goal of testing the validity of the AEQ as an instrument. Three hundred eighty-nine undergraduate students in a Midwestern Canadian university participated in the study for course credit. Participants completed the AEQ along with several other previously validated tools for comparison. Findings showed sufficient variation in scales (reliability above $\alpha > .75$), confirming the reliability and validity of the AEQ as an evaluation tool. Additionally, the results of the study confirmed Pekrun's control value theory (2000, 2006). Pekrun, et al., (2011) called for additional research to use the AEQ to further delve into achievement emotions in both research and practice, with a specific emphasis on causal relationships between antecedents and outcomes.

As evaluation tools became more available, questions like those proposed by Pekrun, et al., (2011) about achievement emotions became the focus of research. In one study, for example, Hall, Sampasivam, Muis, and Ranellucci (2016) evaluated three theoretical mediators between achievement goals and emotions from two theoretical models, including control value (Pekrun, 2000, 2006). Subjects included 273 undergraduate students who completed web-based questionnaires, including the Achievement Goal Questionnaire Revised (Elliott & Murayama, 2008). Using correlation tests and structural equation modeling, Hall, et al. (2016) found that mastery goals (goals where individuals measure their success against internal standards) and performance goals (goals where individuals are measure their success against external standards) predicted perceived control, resulting in positive emotions, and avoidance goals predicted negative control, resulting in negative emotions. Additionally, mastery goals were found to predict greater feelings of hope and higher perceived value, and higher values were associated with increased anxiety. The relationship of mastery goals to mediators and emotions were stronger than those associated with performance goals, something that was consistent in both statistical models and that provided support for elements of control value theory, with appraisal-related mediators specifically linking achievement goals to emotions (Hall, et. al., 2016).

One of the first longitudinal studies framed with Control value theory examined student emotions in synchronous hybrid courses. Butz, Stupinsky, Pekrun, Jensen, and Harsell (2016) compared student data at two points during the semester for a combined total of 218 out of 300 hybrid students. Various scales previously verified by research reviewed survey items relating to emotions, perceived control, value, and success. Using paired sample t-tests and mixed ANOVAs, Butz, et al. (2016) found that control value theory explained the emotions of hybrid students very well and identified differences in face-to-face and online students in the program. Emotions of students were not static and changed over time, especially with respect toward their enjoyment of technology, which decreased.

These selected empirical works represent the state of development for control value theory. There is a growing body of work surrounding the new theory itself. Measurement tools are still evolving, and the use of those tools to investigate achievement emotions is still an area of research that needs more attention, particularly in a variety of contexts. Control value theory is ill-suited to addressing the current research question for one reason: the theory has an intense focus on achievement emotions and lacks a strong, detailed view of the task itself. Given that research question emphasizes the task of integration or resistance to technology innovation, it requires a theory that does more to address the task itself.

**Distinct characteristics.** Given the closer look at this theory outlined in the previous section, there is one of the characteristic of control value theory to consider when reviewing motivational theories for this study: Control value theory includes a prominent focus on achievement-related emotions (Wigfield & Cambria, 2010). They are central to the predictions of those emotions' relation to achievement values. Additionally, the expectancy construct is well defined in control value theory (Wigfield & Cambria, 2010). Pekrun (2000, 2006) identifies situation-outcome, action-outcome, and action-control values as specific types of expectancy beliefs, unlike other theories that rely on expectancy beliefs in general.

## Expectancy Value Theory

Expectancy Value Theory (EVT) uses value beliefs and expectancy beliefs to explain an individual's motivation. Precursors to the current version of EVT are rooted in the work of Lewin (1935) and Atkinson (1957, 1964), which influenced and shared similarities with EVT today. In brief, EVT holds that expectancy beliefs, or one's expectations for success, are positively related to motivation (Eccles & Wigfield, 2002; Wigfield & Cambria, 2010; Schunk, et al., 2014). The higher the expectations for success are in a given context, then the higher the levels of motivation are in that context too. Task-value beliefs are views that one holds based on the perceived value of a specific activity (Eccles & Wigfield, 2002; Wigfield & Cambria, 2010; Schunk, et al., 2014). Task value beliefs are either positive or negative. Task-value beliefs are an amalgamation of four constructs: attainment value, intrinsic value, utility value, and cost (Eccles, et al., 1983).

**A closer look.** People who engage in a task will usually do so willingly when they believe that they can achieve a task. The belief that they can be successful at the task is known as an expectancy belief. These expectancy beliefs were mentioned in Chapter 1 but require a closer examination to explain what is involved in their makeup.

Expectancy beliefs are influenced by a variety of factors, including cultural milieu, goals, and general self-schemas (Eccles, 2005). Eccles (2005) offers examples of cultural milieu including stereotypes of gender, subject matter, or occupation, perceptions of those stereotypes, and family demographics. One such stereotype that could impact teachers is the idea that males have greater aptitude for math and science, and by extension, technology.

Another influential factor affecting expectancy beliefs is that of goals and self-schemas (Eccles, 2005). Goal theory as it relates to teachers includes two main types of goals: *mastery* and *performance*. Mastery goals are also called learning or task goals and center on developing specific skills or abilities (Ames, 1992; Midgley et al., 2001). Mastery goals, which are based on personal growth and development, are dependent on a relationship between effort and outcome (Ames, 1992). In other words, teachers with mastery goal orientations believe that increased effort produces increased performance or positive outcomes, while less effort may result in fewer improvements or negative outcomes. For example, a teacher with a mastery goal orientation learning computer programming code is seeking to improve her skill and will do so by spending time practicing the coding language. Mastery goals increase the time and persistence toward a task as well as the quality of the learning that occurs (Ames, 1992). In contrast performance goals, which are based on doing better than peers with limited efforts, can be divided into two categories: *approach* and *avoidance* (Ames, 1992). When individuals have strong belief in their ability to do well, they will seek opportunities to perform, but when their belief is weak, they will find ways to avoid performance opportunities. For example, teachers may volunteer to demonstrate a web search to appear skilled in a faculty meeting (performance approach), but they may refuse to attend technology-based activities if they fear they will embarrass themselves in front of peers (performance avoidance). A teacher with a performance goal orientation who is learning computer programming code will look for a way to appear proficient (or not appear deficient), rather than concentrating on mastering the skill. Self-concept is key in performance goal situations as it may determine the amount of effort an individual is willing to expend (Ames, 1992). Goals affect individuals either positively or negatively, depending on their orientation.

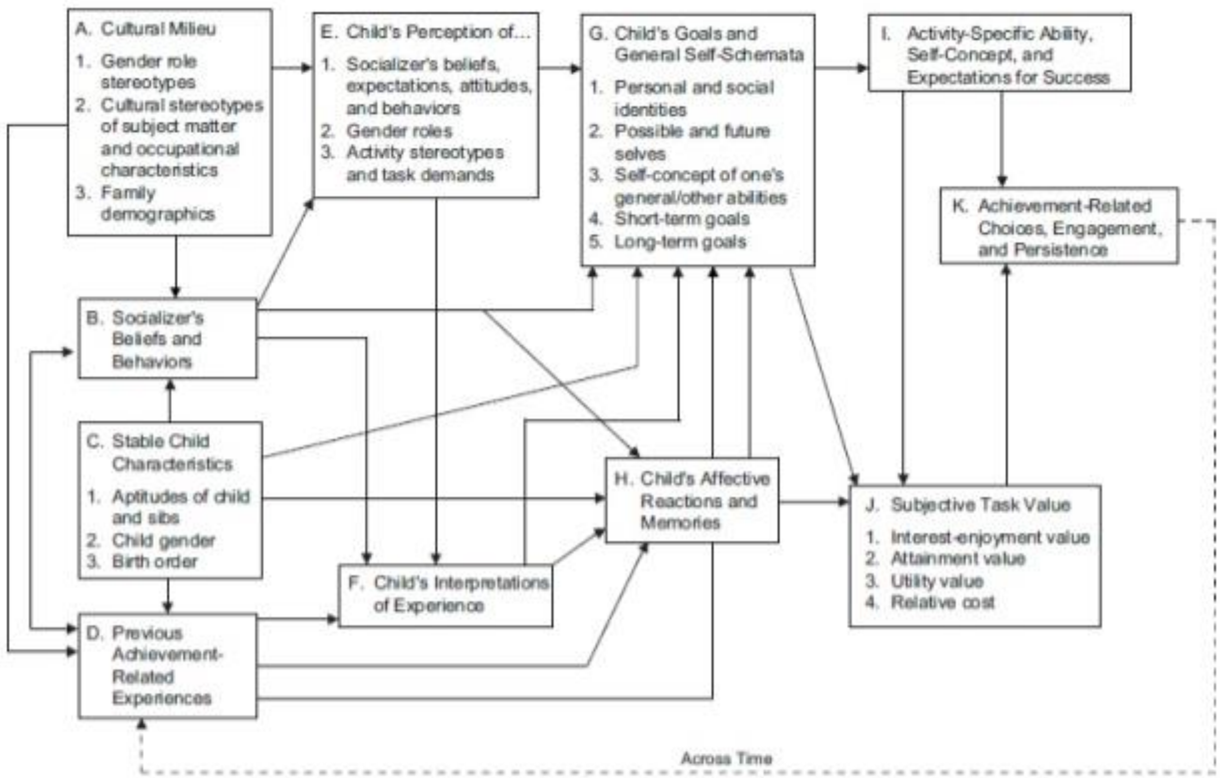
Self-concepts, which have been previously explored in the literature as evaluations of one's ability in self-concept theory, play a role in the setting of short- and long-term goals (Schunk, et al., 2014). Seeing one's self as an exceptional teacher, a self-concept, may affect beliefs about one's ability to convey material and encourage critical thinking in new mediums. Goals are "cognitive representations" of possible future achievements or milestones and are shaped by self-schemas (Schunk, et al., 2014, p. 54). Teachers who see themselves as tech-savvy and innovative may create goals around those areas of subjective strength. For example, a short-term goal for a teacher may be to create an interactive assessment using Google Forms for a current unit, while a long-term goal may be to revise and restructure curriculum and instruction to create a paperless classroom.

Similar to control value theory, affective, or emotional reactions, and memories play some role in the creation of self-schemas; although, these influences have a smaller presence in the literature than the goals and self-schemas they impact (Schunk, et al., 2014). A memory of using digital essay submission only to have higher rates of plagiarism may arise in future instances of planning essays, influencing attitudes toward digital essay submission in a negative way. This negativity could even generalize to computer use overall and affect goals for avoiding the digital tools in the future.

There are also outcomes that are positively related including cognitive engagement, or how mentally focused and involved one is, effort, persistence, and choice (Schunk, et al., 2014). For example, a teacher who has not put effort into planning a lesson on a coding language should have low expectations for success, while a teacher who chooses to attend professional development sessions to improve technology innovation skills should have higher expectancies for success.

Figure 5 provides a detailed model of EVT, indicating the influences as well as major components like task value and expectancy beliefs is below. This figure shows the complex influential relationship that various factors affecting task value have on each other as well as task value itself. As the arrows in the diagram show, there are numerous paths of influence that various factors have to affect each other and task value.

Figure 5: Expectancy Value Theory Model




From "Subjective Task Value and the Eccles et al. Model of Achievement-Related Choices" by J. S. Eccles in *Handbook of Competence and Motivation* (p. 106) edited by A. J. Elliot and C. S. Dweck, 2005, New York: Guilford Press. Copyright © 2005 by Guilford Press.

**Distinct characteristics.** Given the closer look at this theory in the previous section, the expanded perspective on expectancy value theory includes important characteristics to consider when reviewing motivational theories for this study. Expectancy value theory provides a broad and detailed view of task-value beliefs, including those with positive and negative values. The breadth furnishes a wide variety of beliefs, and the detail refines these beliefs into four categories: attainment value, intrinsic value, utility value, and costs. The theory predicts the initiation of a task (Eccles & Wigfield, 2002), rather than the completion or competence to perform it, is what matters most to the given research question. The synergistic model

(Trautwein, Marsh, Nagengast, and Lüdtke, 2012) foregrounds the total influence that comes from multiplying components, rather than adding them together.

**Selected empirical work.** Included empirical works from reputable journals illustrate the main theoretical components of the theory that were explained in the previous section as well as some important developments in the theory itself (e.g. major areas of focus in the literature, important creation of measurement tools, etc.). Articles were selected from the following databases: ERIC on ProQuest, SAGE Journals Online, and ProQuest Dissertations and Theses Global.

One of the seminal studies contributing to the formation of EVT was conducted by Eccles and Wigfield (1995), who reviewed empirical work that addressed expectancy beliefs and measures but found little work on value beliefs; therefore, they created a large-scale longitudinal study to explore empirical measurements as well as support for theoretical constructs relating to value beliefs. Building on the work of Parsons (1980), who used task value, expectancies for success, and perceptions of task difficulty, Eccles and Wigfield used confirmatory factor analysis to test the factors of self-concept of ability, perceived task difficulty, and task value. Two samples, 707 adolescents in year one and 545 adolescents in year two, participated by completing questionnaires in the spring of the year of the study. These questionnaires addressed beliefs, attitudes, and values about achievement domains, gender, and locus of control. Exploratory and then confirmatory factor analysis were used on each sample and then on all the results together. Results found that three-factor solutions demonstrated distinctions between perceptions of ability, task difficulty, and task value. Additionally, factor analysis confirmed the three theoretical components of task value: intrinsic, utility, and attainment values. These values were highly correlated (intrinsic and importance Year 1=.78, Year 2=.78, intrinsic and utility

Year 1=.55, Year 2=67, and utility and importance Year 1=.72, Year 2=.78), supporting the theoretical structure of task value. One factor emerged to address ability/expectancy/competence, all of which align with theoretical construct of expectancy value. This factor had a stronger relationship to attainment value (Year 1=.53, Year 2=.51) and intrinsic value (Year 1=.53, Year 2=.51) than utility value (Year 1=.37, Year 2=.40). Ability perceptions and task value factors had positive relationships, but both related negatively to task difficulty (Eccles & Wigfield, 1995). This study contributed important data to the formation of EVT because it examined the less-studied areas of task value and confirmed the theoretical structure of task value with sub constructs of attainment, interest, and utility value.

EVT has been used in non-academic domains to study a wide range of behaviors. In one selected example using 121 high school students, Borders, Earleywine, and Huey (2004) examined problem behaviors such as externalizing (throwing things, yelling, fighting, etc.) or hyperactivity (shouting out, fidgeting, getting out of seat, etc.). Students completed a Problem Behaviors subscale and Academic Competence subscale of the Social Skills Rating Scale (SSRS) as well as an adaptation from the Studying Expectancies Questionnaire (Levy & Earleywine, 2003) as well as a scale developed specifically for this study that studied problem behavior expectancies (consequences for misbehavior). Overall, students had higher than average behavior problems and lower than average academic competence. Results showed that problem behaviors had significant correlations with academic competence (.39), academic expectancies (.36), and consequences (.18). Additionally, academic competence and academic expectancies showed significant correlation (.26). This study expanded thinking of “traditional expectancy-value theory to examine the contribution of two competing expectancies,” the influence of academic and behavior expectancies, things that were not previously considered simultaneously (Borders, et al., 2004, p. 545). While this piece is highly focused on behavioral intervention and not theoretical development, it nonetheless added value to the current study as the teacher behavior of integrating or resisting technology innovation is a central focus of the research question.

Another characteristic EVT to be explored is the exact nature of the relationship between expectancy values, task values, and motivation. To explore a synergist nature (multiplicative rather than additive), Trautwein, et al. (2012) administered the Self Description Questionnaire (SDQ III - previously mentioned in the self-concept section) and another 12-item questionnaire developed for their study to 2,508 students in their final year of schooling in German secondary schools. Additionally, students completed a subset of the Third International Mathematics and Science Study test as well as the Test of English as a Foreign Language. Using structural equation modeling, Trautwein, et al. (2012) ran multiple models increasing the number of predictors. The first two models had only expectancy or value as predictors. In the third model, they were both included. The last model used the interaction between expectancy and value. Predicting mathematics and English achievement went in a similar fashion except that sex, prior achievement, cognitive ability, and school type were included in the first model and other components were added in subsequent model creation.

Trautwein, et al. (2012) found that academic domains were distinct, subcomponents of task value (specifically utility value) were distinct, and that the Expectancy x Value product term was significant. The contribution of the study was significant because it explained that expectancy beliefs and value beliefs are synergistic in nature rather than additive. Additive structure would indicate that total motivation is a combination of the two predictors, expectancy and value beliefs. If one is high and the other is low in an additive model, then there is still a level of motivation. However, in synergistic models, the predictors are multiplied together, and the result can be greater than the total of the two. However, this also means that if one is very low, then the high factor cannot overcome it and resulting motivation is also very low. Table 4 below illustrates the differences between additive and synergistic structures.

Table 4:
*Additive vs. Synergistic Models*

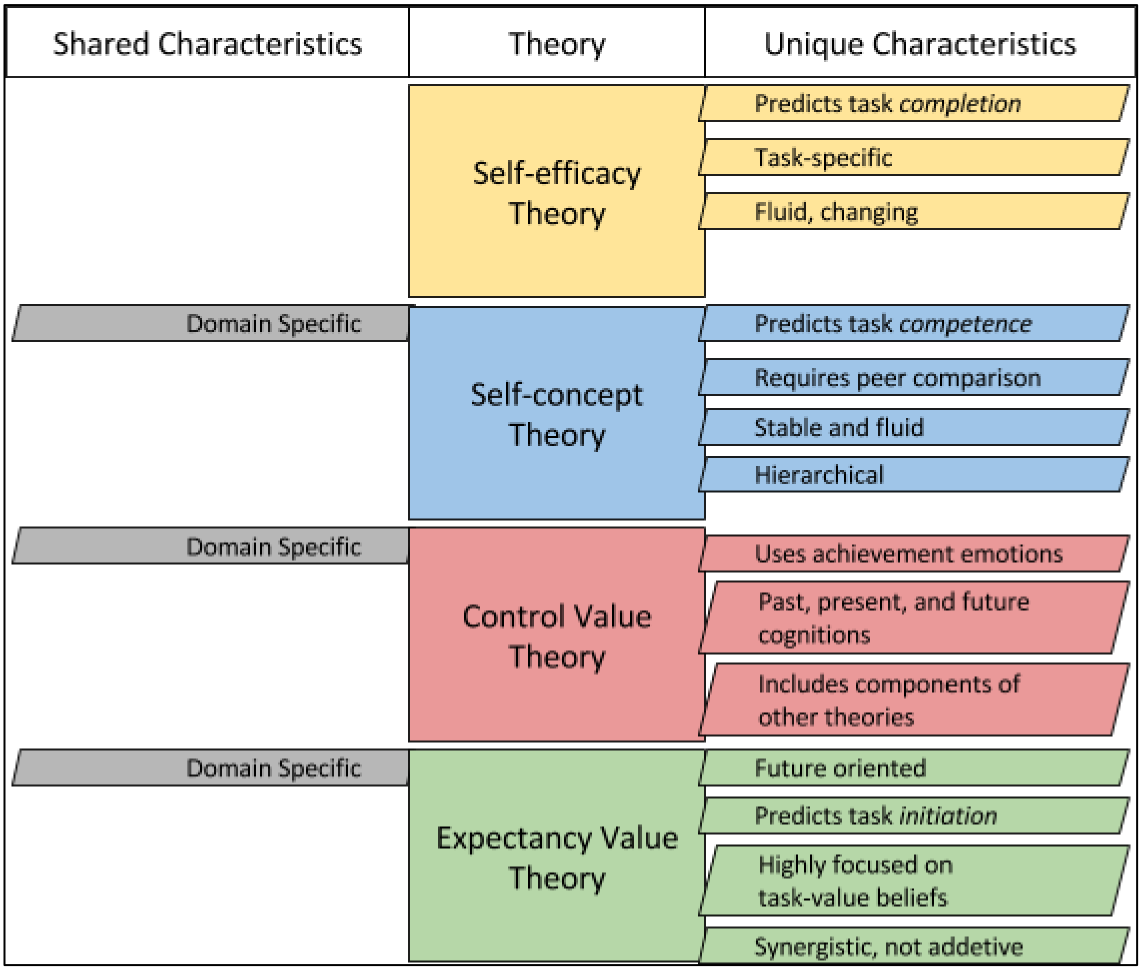
| **Additive** | | |
|---|---|---|
| Expectancy Value | Task Value | Total |
| 3 | 3 | 3+3=6 |
| 3 | 0 | 3+0=3 |
| **Synergistic** | | |
| Expectancy Value | Task Value | Total |
| 3 | 3 | 3x3=9 |
| 3 | 0 | 3x0=0 |

**Theoretical Best Fit**

The characteristics of Expectancy Value Theory that make it well-suited as a theoretical lens for examining teacher motivations integration or resistance to technology innovation, a broad and yet still detailed representation of task value, a predictive focus on task initiation rather than task completion, and a synergistic nature, are represented in the selected empirical work that follows.

Expectancy value theory is the best suited for a study examining teacher integration or resistance to technology innovation. While self-efficacy, self-concept, control value theory, and expectancy value theory include some of the same categorical components (e.g. prediction capability, specificity, presence in educational literature), the details of each component differ. It is these differences, depicted in Figure 6, that begin to suggest which theory provides the best explanatory power and predictive value for examining teacher motivations for integration or resistance to technology innovation. Self-efficacy, for example, lends itself to examining the future completion of specific tasks only (Bandura, 1997), but it is not sufficient for a study that will examine teachers' integrative or resistive work on a potentially broad technological landscape. Self-concept, for instance, is domain specific, but it is focused on past actions of task completion rather than future ones, which is the temporal orientation needed for a study examining teachers' current and forthcoming integration or resistance to technology innovation (Bong and Skaalvik, 2003). Control value theory is domain specific and focuses on expectancy beliefs but relies heavily on achievement emotions and does not have a sufficiently broad view of task value components, which are integral to understand integration or resistance to technology innovation. (Wigfield & Cambria, 2010). Control value theory, like self-efficacy and self-concept, also focuses on the completion of a task, rather than the initiation of one (Crandall, et al., 1965). Expectancy value theory is highly focused on task-value beliefs (Schunk, et al., 2014).

Figure 6: Comparison of Motivational Theories




**Primary characteristics.** Based on the full set of characteristics reviewed in the preceding pages of this chapter, which theory of motivation would best fit the purpose of this study? I think three characteristics are primary for determining which theory is a best fit:

- A theory that centers on domain specific beliefs because technology is a broad category and can represent thousands, if not millions, of individual tasks that cannot be evaluated across classroom, student, teacher, school, or district boundaries as specific tasks

- A theory that holds a future orientation because this is the temporal orientation needed for a study examining teachers' current and forthcoming integration or resistance of technology innovation
- A theory that focuses on task-value beliefs because it is the task of technology innovation that is at the core of the research question

**Best Fit.** Based on the characteristics of each theory, I see Expectancy Value Theory as the best fit for addressing the research question: what motivates teacher to integrate or resist technology innovation? There are three main reasons for this judgment.

First, EVT is *domain-specific.* Expectancy and task-value beliefs examine broad categories like technology, rather than specific tasks, like reviewing for a quiz with Kahoot. Unlike Bandura's (1997) self-efficacy construct, which is task-specific, expectancy beliefs are for a given domain. This distinction is important for the study because the definition of technology is unique for each context in which it is examined.

Second, EVT holds a *future orientation* on expectations. In modern EVT, belief statements are focused on individuals' performance on upcoming tasks (Eccles, et. al, 2002). Other theories do not offer this advantage. Self-concept is based on activities from the past that have shaped an individual's view (Bong and Skaalvik, 2003). Control value is based on a current view of completed actions (Crandall, et al., 1965). An orientation toward future task initiation is essential for examining teachers' innovations as new tasks are those that will be initiated in the future.

Third, EVT *highlights task value*. In order to understand integration or resistance to technology innovation, one must have a detailed way to analyze the task in which teachers are or are not engaging. The emphasis on the task value structure, unlike control-value theory, which focuses on achievement emotions rather than the task itself (Wigfield & Cambria, 2010), along with the synergistic model structure (Trautwein, et al., 2012), which suggests that high expectancies for success cannot overcome low task value, allow for the analysis of not only the teacher but the technology innovation task. This is unique to EVT.

## Constructs

In addition to the four theories of motivation reviewed in the preceding section, I survey four other constructs relevant to the study of integration or resistance to technology innovation previously introduced in Chapter 1:  technology, resistance, innovation, and integration.

### Technology

As stated in Chapter 1, there are several conceptions of technology articulated in scholarly literature. For contextual and practical reasons, the operational definition of technology used in this study refers to the concrete digital tools that assist, accelerate, and extend activity associated with *classroom management, student learning*, and *teacher effectiveness*. The literature related to each of these areas is surveyed below.

**Classroom management.** Classroom management, broadly conceived, "encompasses the behaviors and strategies that teachers use to guide student behavior in the classroom. Its goals include fostering student engagement and securing cooperation so that teaching and learning can occur" (Evertson & Emmer, 2016, p. 1). Simply put, teachers use their own behaviors to organize and regulate student behaviors. A number of studies indicate that technology can assist, accelerate, and extend a teacher's capacity to manage the classroom better (e.g., Gao, et. al., 2012; Junco, Elavsky, & Heiberger, 2013; Manca & Ranieri, 2013). These studies indicate that using technology for classroom management increases student engagement. Two representative studies are described in detail below.

Schaffer (2016) examined an 11th-grade American literature teacher using a flipped classroom approach—where background information and traditional informative activities take place at home and practice/group/discussion activities occur in the classroom—to engage his 36 students in a unit featuring *The Great Gatsby.* Through semi-structured interviews, classroom observations/field notes, and document analysis, Schaffer found that the technology used to flip the classroom increased student motivation and engaged students in more in-depth discussion. Schaffer also found that the teacher managed his classroom differently: “He discussed modeling technology with students and his plans for teaching them how to use the technology …. He felt the need to establish a [technology-based] system to make sure students completed activities” (p. 571). Taken together, these findings illustrate how the concrete digital tools used for flipping the class assisted, accelerated, and extended the classroom management capabilities of one teacher.

In another study, Schanez, Young, and Jouneau-Sion (2016) used the concept of *ludicization*—which means to encourage spontaneous and playful activities in a space where creativity and reflexivity have traditionally been undervalued—to study a role-playing game called Classcraft, which was developed specifically facilitate classroom management. Teachers used the game to reward students for positive behaviors and discourage negative behaviors. Students were assigned teammates so they could help each other in the game. Sanchez, et al. (2016) examined the effects of Classcraft on four classrooms and surveyed 227 teachers about the general effects of the game on their classrooms. Results indicated that the concrete digital tools used for playing the game assisted, accelerated, and extended, the classroom management capabilities of the teachers.

**Student learning.** Student learning is an important goal for teaching. Technology can have a direct effect on student learning outcomes, increasing or improving student learning

(Junco, et al., 2013; MacArthur, Ferretti, Okolo, & Cavalier, 2001). Test scores and GPA comparisons are among the measures included in the literature. Two samples of this type of work are explored in more detail below.

One study, part of The MITTEN Program, explored effects of planned technology integration on instruction and student learning. A sub-group from the program, who focused on social studies, included 25 full-time public-school teachers, 25 pre-service teachers, five faculty members, and three field supervisors, completed pre-and post-surveys, journal entries, reflections, electronic portfolios, and technology projects (Taylor & Duran, 2006). Using the National Assessment of Educational Progress (NAEP) to measure student achievement, researchers found that the more 8th and 12th grade students used CD-ROMs and Internet research, the higher their NAEP scores were in U.S. History (Taylor & Duran, 2006). High correlations were found between students who used computers to write reports and those same NAEP scores, especially when compared to those students who did not use computers to write reports, and also increased the quality of research that students were conducting (Taylor & Duran, 2006). These high scores came from a wide variety of technological activities, dependent on the resources available to participating teachers, suggesting that many technologies have learning benefits for students.

Another example in the literature examined three studies, one quasi-experimental and two controlled experiments, that evaluated the impact of the SimCalc approach where interactive technology are added to paper curriculum and teacher professional development (Roschelle, et al., 2010). Seventh- and eighth-grade students and volunteer teachers in Texas participated in the experiment where two replacement units took the place of traditional school curriculum, and teachers attended three-day summer workshops to gain familiarity with the software and the new curriculum (Roschelle, et al., 2010). Researchers focused on time spent in the computer lab as a measure of technology use, time spent on the unit as a measure of teaching time, and topic coverage, as a measure of other math skills that students had. Results indicate that the technology-rich SimCalc replacement unit, which used representational technologies, had a causal effect on students learning advanced mathematics, despite the wide variety in teachers and schools using the software (Roschelle, et al., 2010). While this study is limited by the short duration, the positive results for advanced mathematics understanding showed promise for the use of technology in the mathematics classroom as a way to increase student learning.

**Teacher effectiveness.** Teacher effectiveness is a term used here without any ties to student learning. Rather, it is a focus on the efficiency with which teachers are able to complete regular tasks that are required as a part of their regular teaching. Examples include, but are not limited to, providing feedback for student work, preparing lesson materials, communicating with parents, and managing grades. These have no direct ties to actual instruction or to student learning outcomes, but it is recognized that providing feedback and preparing lesson materials can affect student learning when they are implemented. Therefore, this section of literature focuses not on the actual implementation of feedback or lesson materials, but rather on the preparation side that must occur before materials have contact with students: the actual process of grading papers, the research and aggregation of class materials, etc.

Researchers examined how Google Docs, an online, cloud-based writing platform, allowed 257 sixth-grade students taught by two teachers in Colorado to compose writing and exchange feedback (Zheng, Lawrence, Warschauer, & Lin, 2015). Longitudinal growth models were used to examine 3,537 writing samples that were composed over 18,146 writing sessions with student surveys, content analysis of writing and standardized test scores providing additional data. Descriptive statistics and content analysis for a random sample of 40 students' Google Docs addressed one research question that focused on the feedback that students received. Results found that students received a total of 344 feedback items from teachers and peers, where almost as much feedback game from students as from the teachers (Zheng, et al., 2015). Feedback was provided for a wide variety of things, mostly grammar and mechanical errors but also issues of content and clarity, overall evaluative statements, and general communication, and students provided almost as much feedback as the teachers provided (Zheng, et al., 2015). The sheer volume of student-student feedback indicates that this platform offered support for student writing that is simply not possible for teachers to provide independently. The collaborative nature of Google Docs allowed teachers to provide feedback more efficiently by engaging students through peer-to-peer feedback.

In the university setting, technology has also contributed to the efficiency and effectiveness of teaching. One study examined the benefits of a learning management system (LMS) as a supplement to face-to-face classroom instruction (Lonn & Teasley, 2009). Two years of survey data were examined to determine the effects of LMS on teacher efficiency and interaction. Several statistical methods were used to examine the data, including T-tests, chi-square tests, and multinomial logistic regressions were employed. Results found that students and teachers felt that the LMS inclusion added value to the course with students finding efficiency to be the most valuable feature and instructors finding communication to be the most important feature, with one instruction explaining that she "would 'spend a lot less time on administrative details (and does not) have to make announcements about such stuff and students know they can find stuff (online)'" (Lonn & Teasley, 2009, p. 693). The digital platform of the

LMS in this study allows instructors to be more efficient in making course announcements and communicating with students so that more class time can be devoted to instruction.

It is important to note that the guiding factor in these studies is not the inclusion of technology itself. Rather, "technology is a means, not an end; it is a tool for achieving instructional goals, not a goal in itself" (Ringstaff & Kelley, 2002, p. 1). Those instructional goals are represented in the definition of technology where teachers use digital tools for specific purposes: *classroom management, student learning*, and/or *teacher effectiveness*.

**Resistance**

As stated in Chapter 1, the literature has few, if any operationalized definitions of resistance. For contextual and practical reasons, the operational definition of technology used in this study refers to a refusal to use or the avoidance of digital tools within the specific context of a particular classroom teacher's environment to meet the needs of students, parents, teachers, administrators, or other stakeholders. This definition does fit well with many attempts to study how and why teachers actively avoid or ignore technology in the classroom. This body of literature where resistance fits this definition generally conceptualizes resistance of technology in two main ways: resistance to *change* and resistance to *risk*.

**Resistance to change.** Resistance to *change* is one of these conceptions. Adding technology into a lesson, unit, or classroom where it previously has not existed brings about change for teachers that are frequently uncomfortable. To avoid that discomfort, teachers avoid the *change* that creates it.

Through a five-year grounded theory case study of four veteran teachers taken from two larger studies, Orlando (2014) found that change fatigue, exhaustion coming from trying to keep up with a large number of curricular, technology, and policy changes, prevented teachers from implementing technology into their instruction. “The teachers (both primary and secondary teachers) referred to a constant need to keep up with changes to: the knowledge and needs of students, organisation of school staff, new teaching practices, new leadership priorities in the school, new teaching spaces, and new resources. . . Technology practices are just one of an inter-related mesh of contextual variables veteran teachers have encountered, problematised and dealt with for many years” (Orlando, 2014, p. 436). In this study teachers were resistant not to technology itself but to the frequent changes they experienced. Each change required new knowledge and resources. Because changes were so frequent, teachers became burnt out and resistant to change, and technology, rather than embracing them for what they could offer students.

In another study using a random sample of 76 Commerce Teaching College lecturers from 20 colleges belonging to Udupi District of Turkey, Mayaa (2007) used open-ended questionnaires to examine what impedes a commerce teacher’s computer use. The surveys asked about available technology, motivating factors, impeding factors, and specific applications that may be used. Findings show that some teachers were resistant to changing their teaching practices, but age was not a clear dividing line between those who embraced instructional computer use and those who resisted it (Mayaa, 2007). Further, one explanation offered for resistance to change was the view that best practices are already in place. “Some teachers teaching language felt that the chalk and talk method is the best method of teaching” (Mayaa, 2007, p. 10) If teachers believe that their methods are the best, they will not change their curriculum and pedagogy to something that they consider less effective. While these findings are limited to a single content area and to higher education, they do represent a phenomenon that is visible in many other settings: a resistance to change (Bovey & Hede, 2001; Stanley, Meyer, &

Topolnytsky, 2005). Teachers who established a teaching practice that they felt was working were resistant to change anything beyond that.

**Resistance to risk.** Resistance to *risk* is a second conception. These teachers conceptualize the use of technology as an uncertain practice that creates significant risk in their teaching practice. Resistance to technology is a risk management strategy for teachers where they avoid using the technology that has uncertain outcomes for themselves and their students.

In a mixed-methods study with one school from Australia and another from the United States where eight participant teachers completed three individual hour-long interviews each and a combined total of 12 classroom observations, Howard (2013) triangulated data from interviews, observations, and policy documents to then explore the nature of teachers' risk perception. Through careful coding of data, Howard (2013) created a risk-profile of a teacher, Judith, who taught mathematics for secondary students, both advanced and remedial. She was uncomfortable and anxious with computers. partly because of a belief that they did not improve student learning, but also because she lacked computer knowledge to handle technical glitches (Howard, 2013). This was the opposite of her views on scientific calculators, which she had been teaching with them since the 1970s. Unlike computers, the technology of calculator was not a risk for Judith as she was comfortable troubleshooting, and she saw them as contributing to student learning. It is important to note, however, that the risk here is personal to Judith. Howard explains, "ultimately, her decision not to use technology was not necessarily based in a *rational* evaluation of the risk related to technology integration in teaching. [It was] primarily based on anxiety, fear and dread of technology use" (Howard, 2013, 9. 369). While there was no huge risk in including technology into a lesson, to Judith, the integration of these tools caused additional anxiety and did not provide learning benefits for her students. They were an unnecessary risk.

In another study based on the English as a Foreign Language program at Sakarya University, researchers used a collective case study design to explore the feelings of 14 English teachers who were informed that an intensive one-year language prep program was moving into a computer-assisted language learning/teaching approach (Timucin, 2009). In-depth interviews with open-ended protocols were conducted, and teachers expressed discomfort about the transition with common themes surrounding risk: inadequate technical skills, uncertainty about their roles, and concern over the fit of their teaching skills in the new environment (Timucin, 2009). These teachers having no power or role in the inclusion of the technology into the course plan and were uncomfortable with the uncertainties they faced because these unknown factors were *risks* for these teachers.

The theoretical definition, “the action of resisting, opposing, or withstanding someone or something,” does fit well with many attempts to study how and why teachers actively avoid or ignore technology in the classroom (Resistance, 2016). However, the operationalized examples of resistance are not to the technology itself, but rather, to the consequences of its presence. It is not technology itself that teachers resist. It is the change to teaching practices and curriculum and the risk of new teaching roles and uncertain learning outcomes that is the actual source of teachers’ resistance.

**Innovation**

As stated in Chapter 1, the definition for innovation is much more complex than the colloquial usage implies. For the operational purpose of this study, innovation is defined broadly as trying something new in the specific context of a particular classroom teacher’s environment to meet the needs of students, parents, teachers, administrators, or other stakeholders. The breadth of this definition is intentional as, “Knowledge does not and cannot reside in any one individual, text, object, or tool (Schrum & Levin, 2009, p. 11). The act of defining innovation with any specificity would eliminate a viewpoint that is essential to this study, that of a teacher who is resistant to trying technologies. While there may be many individuals around the world, and even in her school building who are actively practicing with a specific technology, her adoption of the practice is still valued and important, despite being behind the curve of adoption. Additionally, the rapidly changing nature of technology and the slow by comparison speed of academic research would make a specific definition of innovation obsolete before the publication of this article.

One sample study that explored technological innovation did so at the college level by providing incentive grants to college instructors for the purposes of innovating with a specific platform in which the school had previously invested. Researchers issued surveys to participants at the beginning and the end of the project, approximately one calendar year apart, and conducted interviews at the end of the project (Lei & Morrow, 2010). Researchers found that $2,000 mini-grants were motivating incentives for 20 instructors to experiment with the CCC Confer platform, develop new materials, try new instructional strategies, and develop a sense of community. Effects were even farther reaching than the 20 participants who received grants, with non-participating faculty also increasing their use and integration of CCC Confer into classes (Lei & Morrow, 2010). However, this study was limited to the platform specific to the California Community College. It was also found that financial incentives were, in isolation, not effective to produce motivation: they were only effective in the presence of knowledge and skills as well as the removal of environmental barriers (Lei & Morrow, 2010).

Another longitudinal study examined teacher learning and innovation, attempting to understand how teachers learned when they were working with something new. Within Dutch secondary schools, 94 teachers over 30 schools participated in the experiment with one-third not involved in formal/organized learning activities such as peer-coaching or collaborative project groups (Bakkenes, Vermunt, & Wubbels, 2010). Participants completed six logs each that included seven elements: what they learned, how they learned, what their thoughts were, what their feelings were, what their concerns were, what their goals were, what their reasons for learning were, how other people were involved, and how the learning connected to student active and self-regulated learning (Bakkenes, et al., 2010). Through content analysis, researchers found six different categories of activities in which teachers partook: experimenting, considering own practice, experiencing friction, struggling not to revert to old ways, getting ideas from others, and avoiding learning (Bakkenes, et al., 2010). Additionally, the same content analysis identified changes in four categories: knowledge and beliefs, emotions, intentions for practice, and actual teaching practices (Bakkenes, et al., 2010). The results of this study indicate that teachers who are learning, either formally or informally, are thinking about innovation in the form of new beliefs, changing teaching practices, experimenting, and gathering of ideas. All of these represent changes to the status quo of their teaching with the addition or modification of something new: an innovation in their practices.

One important note from these studies is the social nature of innovation in education. Both studies included important findings about the sharing of ideas with other colleagues, even those who were not involved in the same innovation grants or professional collaborative groups. Another similarity that is important to note is the time that innovation took to infiltrate the teacher’s practices. These studies took place over an academic semester and an academic year, large portions of time where changes were made to instruction and novel ideas were put into practice. Neither of these happened quickly.

**Integration**

There is no limit to the consideration that student motivation has in the creation of technologies that appear within educational settings: behaviorism, cognitive science, social learning, and constructivism (Moreno, 2012). Drill-and-practice applications that require students to enter answers for math problems that develop rote memorization (e.g. *Rooftop Ride*, a multiplication facts game) show the underlying influence of behaviorism principles where student responses are shaped through rewards for correct answers and penalties for incorrect ones. Every animation that displays a complex biological process is there to help manage cognitive overload (e.g. Khan Academy's animation of the cellular organelles).

Figure 7: Screenshot of Khan Academy's 'Parts of a cell' Video


(KhanAcademy, 2010)

Public television broadcasts of shows like *Between the Lions* and *Sesame Street* use modeling to teach small children literacy basics and social skills, an example of social learning at work (Moreno, 2012). Digital frog dissections like the *Froguts* software modules allow students to construct their own understanding of frog anatomy by making their own choices as to how the various organs and organ systems fit together.

Figure 8: Screenshot of Froguts Software in Use


However, despite the clear connection between the technologies themselves and learning theories, there is a disconnect between the technology and how it is deployed in the classroom.

As stated in Chapter 1, the definition of integration varies within the literature, but the definition offered within the TPACK framework provides a strong foundation for the study of teacher innovation with technology: "understanding and negotiating the relationships between these three components of knowledge (Bruce & Levin, 1997; Dewey & Bentley, 1949; Rosenblatt, 1978)" (Koehler & Mishra, 2005, p. 134). In other words, for true integration to occur, a teacher must select a technology that has affordances to strengthen the pedagogical style that is best suited to the specific content.

One study that examined the decisions of technology integration did so with the participation of four instructors and 13 students at the university level where faculty members and graduate students worked together to develop online courses (Koehler & Mishra, 2005). Researchers monitored students' and teachers' knowledge four times throughout the semester through self-reporting surveys, which were coded for evidence of specific types of knowledge, finding changes during a semester course. In the beginning of the semester participants demonstrated thinking about technology, content, and pedagogy as separate, but at the conclusion of the semester, analysis of survey data showed an increase in the interactions between various types of knowledge (Pedagogical Content Knowledge, Technological Content Knowledge, Technological Pedagogical Knowledge, Technological Pedagogical Content Knowledge), suggesting a change in how teachers conceptualize the content, technological, and pedagogical knowledge as well as the relationships between them.

Another study using this definition of integration used a one-day seminar on digital tools and a follow-up Summer Institute to provide professional development to 13 volunteer teachers in TreeTop Elementary, which has three computer labs, a small library lab, and classrooms equipped with an LCD projector, and ELMO document camera, and at least one computer. Teachers were paired with university partners to plan curriculum and met throughout the summer to discuss plans. Over the course of a year, researchers collected three online surveys, two interviews, and email/Skype correspondence from each participant. Repeated measures ANOVA compared results across survey distributions, with results indicating that knowledge of technology and knowledge of technology integration improved while prioritization of technology integration increased and then decreased to beginning levels (Morsink, et al. 2010). Analysis of other data sources developed profiles of learning that occurred to describe how participants were learning. Results indicate that overall teachers improved their knowledge and expertise for technology integration; although, not all of the participants gained knowledge in the same way or at the same pace, nor did they all perceive their knowledge growth (Morsink, et al., 2010).

Both of these studies indicate an important characteristic of technology integration: it is a time-consuming, hands-on process. Developing the knowledge required for effective integration occurred in both of these settings, but they were both long term with the first representing one-half of an academic year and the other representing almost a complete calendar year. Additionally, they both required participants to conceptualize integration of a specific technology for a specific content area in a specific learning environment.

## Intersections of Motivation and Constructs

### Theoretical Intersections

There are several theoretical works that examine one aspect of motivation (or more) and another construct that has been highlighted in this study (technology, resistance, innovation, or integration). Below are several examples from the literature that demonstrate such an intersection.

In a review of the literature relating teachers' educational beliefs to their technology integration, Galvis (2012) argues that beliefs "play a decisive role when integrating technology into the curriculum" (p. 104). In other words, beliefs are strong influencers of teacher behavior. Beliefs were a component of each motivational theory explored earlier in this chapter. In a theoretical analysis of beliefs and technology integration, Ertmer (2005) argues that examining teacher beliefs is an issue at the heart of technology integration and identifies three ways to change teachers' beliefs: personal experiences, vicarious experiences, and social-cultural influences. This is well-aligned with motivational theories that rely on beliefs to shape motivation. Ertmer (2005) also argues that pressure to change teachers' beliefs may have an opposite result and instead create resistance, another construct at the center of this study.

These beliefs also overlap with the value of a technological tool. To have value of a tool, one must believe that it contributes to efforts to reach previously established goals: Building on her previous work (Ertmer, 2001), Ertmer (2005) argues, "Instructional technologists might consider introducing technology as a tool to accomplish that which is already valued (e.g., communicating with parents, locating relevant instructional resources). Then, once the tool is valued, the emphasis can switch to its potential for accomplishing additional or new tasks, including those that are supported by broader, or different, beliefs" (p. 31). Once this value is established, beliefs that are beyond the scope of the tool itself can become influential. If the tool conflicts with the previous belief, there is an opportunity to use the personal or vicarious experiences to influence that belief.

A third intersection occurs where those beliefs and values, components of motivation, cross with knowledgeable integration of technology. The Technological Pedagogical Content Knowledge (TPACK) Framework states that, "developing good content requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy, and content" (Mishra & Koehler, 2006, p. 1029). In other words, one must have a defined belief for success in technology, pedagogy, and content as well as a value for the technology used, pedagogical methods employed, and content delivered. The TPACK Framework also states that, "viewing any of these components in isolation from the others represents a real disservice to good teaching" (Mishra & Koehler, 2006, p. 1030). The beliefs toward and values of one component cannot be separated from the other two without changing the dynamics of the relationship and hindering successful integration.

There is clear overlap between studies exploring teacher technology integration and motivational constructs. These articles demonstrate three main components that are central to theoretical arguments: the importance of beliefs, the value of technology, and the creation of meaningful of integration.

**Empirical Intersections**

There are many empirical studies that examine one aspect of motivation (or more) and another construct that has been highlighted in this study (technology, resistance, innovation, or integration). Below are several examples from the literature that demonstrate such an intersection.

In one study, researchers conducted a multiple-case study with eight teachers who received awards for excellence in teaching with technology. Through interviews, observations, and electronic portfolios, Ottenbreit-Leftwich, et al., (2010) found that teachers used technology because of the value it held for them as both professionals and for student engagement. However, this study included only a small sample of teachers, all of whom were actively using technology, and some of whom had been using it throughout the entire course of their career.

Cullen and Green (2011) examined teacher motivation and action through the lens of Theory of Planned Behavior, which identifies attitudes, beliefs, and self-efficacy (similar to expectancy beliefs) as the greatest predictors of behavior, and Self-Determination Theory of Motivation, which has several sub-components, one of which is the distinction between intrinsic and extrinsic motivation. Through the development of a survey of Likert-scale items, Cullen & Green (2011) found that the variables identified in these theories are sufficient for predicting behavior. However, there was no measure for actual behavior in participants, so the results measure the intentions for participants to execute activities in the future.

Kim, et al. (2013) in another two-year study examining technology use in K-8 classrooms of 22 teachers showed that teacher beliefs are strongly correlated with technology integration. Further having the same technologies, professional development, and technological/pedagogical support did not equate to equal integration of technologies. However, this study focused on teachers in rural settings where this study specifically focused on improving the use of technology by providing tools and support to these teachers. Unlike many settings, teachers in this study had two years of strong support to support integration of technology innovation provided by this study.

Rehmat and Baily (2014) conducted phenomenological research with a group of preservice teachers during a science methods course where participants experienced a technology and non-technology based lesson once a week during the course. Based on the pre- and post-survey, participants completed the course with a more positive belief about their ability to use technology as well as more evidence of technology inclusion in lesson plans (Rehmat & Baily, 2014). In this case, there is an interaction between knowledge, beliefs, and practices. The addition of knowledge from the course was able to make preservice teachers' beliefs more positive. However, these participants being "from a technology era" and having taken courses in web searching and Microsoft Office, were more technologically savvy than many in-service teachers who entered the classroom before computers were there or even widely available for personal use. Further, there was no measure of behavior to determine whether or not teachers' practices aligned with the more positive beliefs generated through the coursework.

These four articles are a brief sample of the work that does exist in the current body of literature. They also support several of the arguments that theoretical work presents: the presence of devices is not sufficient to create meaningful integration, beliefs about ability are highly influential when predicting teacher technology use, and technology must provide value-added before teachers are willing to deploy it in the classroom.

## Teachers and Technology

There is a large body of work surrounding teacher technology adoption. Much of the work surrounding integration of technology innovation in the classroom focuses on the benefits it holds for students. As any teacher can explain, student learning is more than just memorizing and repeating information. There is no singular definition of academic achievement or success, even within legislation that guides educational practices in this country. Neither the Elementary and Secondary Education Act of 2001 nor the Every Student Succeeds Act of 2015 have a clearly stated definition; although, it is frequently associated with the terms "standards" and "assessments" in both documents (ESEA, 2001; ESSA, 2015). Research shows that the use of technology in schools can positively affect students in a variety of ways, with engagement and academic achievement being two appearing frequently in the literature.

Technology can increase student engagement in the classroom. Numerous studies have proven that the use of technology in the classroom results in increased student engagement and participation (Gao, et. al., 2012; Junco, Elavsky, & Heiberger, 2013; Manca & Ranieri, 2013). These studies include a wide variety of educational settings and age groups, suggesting that the effects are not limited to highly specific contexts.

Other studies show that the use of technology results in some learning benefits for students (MacArthur, et al., 2001; Zhao & Cziko, 2001; Roschelle, et al., 2010; Junco, et al., 2013). In a review of data collected on teacher technology use, Zhao & Cziko (2001) concluded that in order for teachers to use technology, they must believe that the technology must be able to assist in achieving important, high-priority goals more effectively than other, more traditional methods. Junco, et. al. (2013) found that students who used Twitter in a class had higher GPAs than the class that did not use Twitter. Roschelle, et. al. (2010) found that students using SimCalc software went beyond the basic skills and learn more advanced mathematics. The results of a literature review of articles examining technology use by special education students found that there were some learning benefits for those students (MacArthur, Ferretti, Okolo, & Cavalier, 2001). Technology can improve learning outcomes for students in some settings.

Reviews of the literature are already in place and approach teachers and technology from a plethora of perspectives (e.g. age, cultures, and beliefs. Rather than completing another review, I summarize the findings of several reviews below.

Buabeng-Andoha (2012) reviewed the factors that influence teachers' adoption and innovation with information and communication technology into teaching, finding that barriers to technology innovation exist at a teacher-, school-, and district-level and suggest that, "knowing the extent to which these barriers affect individuals and institutions may help" (p. 148).

Harper and Milman (2016) reviewed the literature on 1:1 programs, finding that technology improved both differentiation and personalized instruction but called for a "move away from investigating the impact(s) of 1:1 programs on student achievement and instead focus on contextual factors regarding planning, design, development, implementation, and evaluation of 1:1 programs" (p. 140).

Additionally, there are many literature reviews surrounding teachers' uses of specific technology platforms. For example, Manca and Ranieri (2013) studied Facebook as a tool for learning finding that many studies were, "aimed at exploring the attitudes of teachers and students regarding Facebook as a learning tool" (p. 496). In another study, Kay (2012) examined studies from 2002 through 2012 where video podcasts were used a learning tools, finding that student attitudes were very positive but suggested that the instructor perspective is one area that future research should address.

This is by no means an exhaustive list of literature reviews on the topic of teacher technology use; however, these studies were selected to illustrate some commonalities seen across studies: a focus on student outcomes like engagement and learning. Many studies have addressed the student learning that occurs when considering technology integration (Harper & Milman, 2016), but they have left a gap in the understanding of the teacher perspective on these issues (Manca & Ranieri, 2013).

## Summary

The literature review above served several purposes. First, it furthered the explanation of four major motivational theories in the field, providing empirical evidence to illustrate the major components of each. Next, it reviewed the fit of the theories with the research question, what motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices, presenting Expectancy Value Theory as the best-suited theory for three reasons: First, EVT identifies domain-specific expectancy related beliefs and task-value beliefs as the major components of motivation for an individual. Second, EVT is focused on expectations for the future. Third, EVT has an emphasis on the value of the task and the structure of that subjective value, rather than a focus on achievement emotions.

Next, the literature review further explored four important constructs that are essential to the understand in order to address the research question: technology, resistance, innovation, and integration. Technology the use digital tools for specific purposes: *classroom management, student learning,* and/or *teacher effectiveness*. Resistance was established not toward technology itself, but toward the change to teaching practices and curriculum and the risk of new teaching roles and uncertain learning outcomes that is the actual source of teachers' resistance. Innovation was explored and identified as a social practice where peer influences were important through sharing ideas with colleagues in one format or another, even when there were no formal groups established. Finally, innovation was explored as a time-consuming, hands-on process where the specific technology and content area played a role in the pedagogical decisions. This review also included empirical evidence to support the operationalized definition of each construct.

Finally, the review explored theoretical and empirical intersections of motivational theories and the four essential constructs. There was clear overlap between studies exploring teacher technology innovation and motivational constructs. These articles demonstrated three main components that are central to theoretical arguments: the importance of beliefs, the value of technology, and the creation of meaningful of integration. Empirical work, although a very brief sample of the available literature, did support the three arguments that theoretical work presents: the presence of devices is not sufficient to create meaningful integration, beliefs about ability are highly influential when predicting teacher technology use, and technology must provide value-added before teachers are willing to deploy it in the classroom.

Finally, the literature review addressed the large body of literature surrounding teacher technology use by pointing to several existing literature reviews on the topic that take both broad spectrum and tool-specific views. These literature reviews call for more research to address the underrepresented teacher perspective, rather than the student learning perspective, including the planning and preparation components as well as barriers to technology use.

In conclusion, there is still much to learn about the successful integration of technology into classroom instruction. In particular, there is still a gap in the literature surrounding why teachers are integrative or resistant to technology innovation, particularly when considered through a well-suited lens, Expectancy Value Theory.

# Chapter 3: Methods

## Introduction

This chapter describes the study's methodology, design, setting, participants, data collection, data analysis, and researcher positionality. The reasoning that informed each element of the study's methods is provided, along with the details for answering the question: What motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices?

## Methodology

This study is informed by an interpretivist paradigm, which provides the rationale for why certain data was collected and why it was analysis in a particular way. The key features of this methodological tradition are that it: aims to *understand* the world; emphasizes the *exchange* between researcher and participant; and focuses on *discourse* that is "dialogic and creates reality" (Lather, 2006, p. 38). Simply put, an interpretivist methodology uses the information exchanged during research-participant discourse to collaboratively construct an understanding of a phenomenon. These features of an interpretivist approach, along with a deep and enduring relationship to the participants and setting, align well with this study's research question on teacher motivations for integration or resistance to technology innovation. The features of this alignment were manifested in three ways.

First, an interpretivist approach invites, and depends on, the unfettered exchange of information between the participants and the researcher (Lather, 2006). In this study, the candid exchange of information was central to understanding teacher motivations for integration or resistance to technology innovation. To witness teachers' thoughts, emotions, beliefs, and feelings as they happened, and as they reflected up them, required a methodology where ideas could be openly, regularly, and jointly in the presence of a trusted researcher. My prior relationship with the setting and participants allowed these exchanges to take place more freely and naturally than if I had been an outside researcher, enter the setting as a newcomer, who had to first do the work of establishing trust and rapport (Hine, 2008).

An interpretivist approach also asks the question, “What is heuristic?” (Lather, 2006, p. 38). Put another way, an interpretivist approach enables participants to discover or learn things by reflecting on thoughts, emotions, beliefs, and feelings for themselves. This type of contemplative discovery—by both the participants and the researcher—requires two types of heuristic thinking: ‘reflection on practice’ and ‘reflection on self.’ As previous research has found, there is interpretive value in reflection that invites everyone involved in a study to jointly discover meanings beyond the obvious (Brookfield, 1987; Ambrose, et al., 2013). The nature of the dialogue between me and the participants in this study prompted us all to reflect heuristically, which, in turn, enabled deeper understandings to develop.

Finally, an interpretivist approach recognizes that “truth is many” (Lather, 2006, p. 38). In other words, there is no singular truth to be constructed about a phenomenon, such as teacher motivation for integration or resistance to technology innovation. Rather, there are plural possibilities for understanding it. The broad explanations of technology, innovation, and integration described in the previous chapters are consistent with the potential for multiple understandings of technology, innovation, and integration, which in turn recognizes the individual teacher’s ideas and interpretation are their own personal truth. In this way, the interpretivist approach values the potential for multiple truths, making it an open lens through which for seeking to understand teacher motivations.

Thus, the primary data source for this study was the conversational discourse between participants and myself about integration or resistance to technology innovation. Teachers were invited to speak openly and freely about their current practices, their instructional context, the available resources, and their goals for instruction. They were also invited to reflect on their spoken words by making sense of them, just as I was doing. The artifacts that were central to the conversational discourse and observations also served as a data source. In all, the conversational discourse and archiving of artifacts provided a rich data base from which participants and I could interpret teacher motivation for integration or resistance to technology innovation.

**Design**

Given the interpretivist paradigm outlined above, the methods for this study were operationalized as a multiple-case design. Based on the work of Creswell (2013) and others, specific methods are best used to understand, explain, and contrast views and experiences of case participants. As Creswell (2013) indicates, multiple-case design is especially appropriate "when the inquirer has clearly identifiable cases with boundaries and seeks to provide an in-depth understanding of the cases" (p. 74) In this study, the individual teachers serve as clearly identifiable cases within a single school setting. Their accessibility also provided opportunities for in-depth understanding of their motivations integrating or resisting technology innovation. For these reasons, methods used for a multiple-case design were well suited for examining this study's research question (Creswell, 2013).

Creswell (2013) also explains that a multiple-case design "explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information (e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case-based themes" (p. 73). Information from multiple sources make possible the interpretive work that yields a deep understanding of each case by itself, as well as the cases collectively. Because multiple sources of data and multiple participants were part of this study, single and cross-case comparisons made possible more compelling interpretations of teacher motivation for integration or resistance to technology innovation (Yin, 2009).

To be sure, methods associated with other interpretive approaches were partially woven into the design of this study. For instance, traces of *phenomenological* methods, which are well suited to understanding 'shared experiences' of several participants, are visible in this study (Creswell, 2013). As a teacher in the same school building as the participants in this study, I shared a number of experiences with the participants. Similarly, vestiges of *narrative* methods, which are well suited to understanding 'individual experiences,' are discernable too (Creswell, 2013). Because teacher beliefs are shaped by experiences (Eccles, 2005), incorporating the stories of individual teachers was also important. In sum, multiple-case design aligns well with the depth and detail necessary to answer this study's proposed research question, but the remnants of other methods were also taken because of their shared history with related interpretive approaches to research.  The specific design elements for this study are outlined in the sections below.

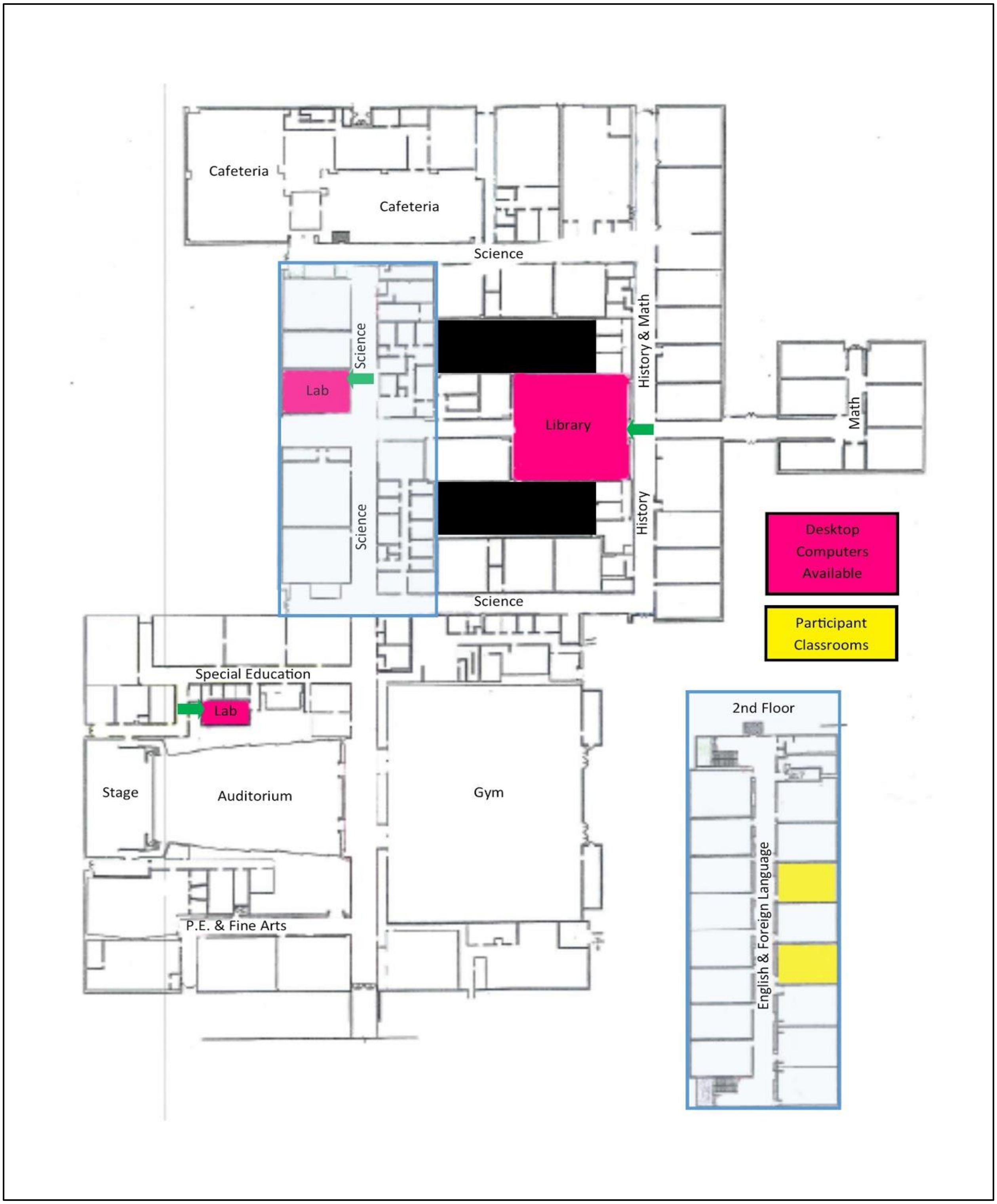
**Setting**

Two teachers from a high school in a small suburban district in a mid-Atlantic state served as participants in this study. The school district included three elementary schools (K-5), one middle school (6-8), and one high school (9-12). All schools in the district were classified by the U.S. Department of Education as "having a high concentration of low-income families" in the 2014-2015 Teacher Cancellation Low Income Directory (U.S. Department of Education, 2015).

The high school had two computer labs that are on the main floor of the building and were shared among all the teachers in the school. Five laptop carts were available for checkout. The high school purchased 100 Chromebooks for the 2015-2016 school year, which supplied all students taking English 12, AP English, and College Composition with a device. (This included all of the senior class, approximately 225 students, and less than ten junior students.) The school district also planned to furnish Chromebooks to all middle and high school students over the next three to five years. In preparation for the one-to-one tablet initiative, teachers were encouraged to prepare for eventually teaching in a paperless classroom.

The footprint of the school appears on the map below in Figure 9. The classrooms and computer labs where the two participants in this study taught are highlighted in black, pink, and yellow. Both participants' classrooms were located on the second floor of the building. Two stair wells, one at each end of the hallway, connect the upstairs hallway with the downstairs main building. Classrooms were organized by content area, so teachers in the same content department were located close to each other. The vast majority of students did not have multiple courses in the same content area at the same time, so they traveled throughout the building for classes. Lockers where students can store books and personal belongings were located throughout the building, but most students did not use their lockers because they are allowed to carry their book bags during the day.

Figure 9: Map of school with highlighted computer locations



**Teachers**

Teachers were sought and selected for this study based on their willingness to express and reflect upon their motivations for integration or resistance to technology innovation. To understand why teachers either integrated or resisted technology innovations, it was preferable to seek and select participants with differing motivation and usage experiences. Ideally, one participant would be a teacher who self-identified as a frequent and comfortable user of technology (with a widely receptive mindset for technology use) and the other would be an infrequent and uncomfortable user (with a resistant mindset toward technology use). This contrast is one that the literature identifies as an important distinction that needs to be better understand (e.g., Mumtaz, 2000; Wright & Custer, 1998).

In order to compare and contrast participants who differed in motivation and use of technology, however, it was also essential to find participants who taught the same content area (i.e., science or history) and who taught students similar in age (e.g., freshmen or seniors). Having the same content area was needed because technology use is integrally related to the content of a curricular area. As Mishra and Koehler (2006) define the technology-content relationship, “technological content knowledge (TCK) is knowledge about the manner in which technology and content are reciprocally related” (p. 1028). In other words, the affordances and constraints of technology use vary according to the content area in which it is deployed. For example, Diigo is a social annotation tool that allows groups to annotate and highlight alphabetic print in digital documents and websites. This tool lends itself to use in a history class where students socially annotate the text of the Constitution of the United States, but not to a math class where students learn to solve numeric equations. Thus, to better understand participant motivations for technology use, two teachers were needed from the same content area. For similar reasons, it was desirable to seek and select teachers teaching at the same grade level so that student maturity, content goals, and background knowledge would be as equivalent as possible.

To recruit two such participants, an email was sent to all teachers at the high school (See Appendix A) inviting them to complete a survey via the Qualtrics platform provided by Michigan State University (See Appendix B). The survey asked for demographic and experiential information. Additional questions asked about technology use in the classroom (e.g., do teachers use technology, are they comfortable using it). The open-ended question format invited potential participants to respond freely about their frequency and comfort when using digital technology. These open-ended questions also helped to gauge which respondents would be willing to provide thorough responses, an essential quality for an interpretive study whose purpose was to understand in-depth the motivations of multiple cases for integrating or resisting technology innovation. This survey was piloted on two individuals who were not participants to ensure that the questions effectively elicited relevant information. As a result of the pilot, no revisions were necessary to the survey.

Eight teachers responded to the survey. A summary of multiple choice responses appears in Table 5.

Table 5:
*Initial Survey Responses*

| Teacher | Content Area | Tech Frequency | Tech-Savvy? | Tech Innovator? | Interview Participation? |
|---|---|---|---|---|---|
| JW | Foreign Language | Rarely | No | Yes | Yes |
| AC | English | Sometimes | No | Yes | Yes |
| DF | Math | Sometimes | Yes | Yes | Yes |
| AU | Art | Frequently | Yes | Yes | Yes |
| AC | Math | Rarely | No | Yes | Yes |
| CG | Science | Frequently | No | Yes | Yes |
| EF | English | Often | Yes | Yes | Yes |
| BC | Career & Technical Ed. | Frequently | Yes | Yes | Yes |

Given the criteria described in the previous paragraphs, two pairs of teachers were selected using the data in Table 5? because they both taught (a) in the same content areas (math and language arts) and (b) at the same grade level (high school). Deciding which pair to select for this study involved the application of two additional criteria: (c) the willingness to provide thorough open-ended responses on the survey, and (d) the likelihood of greater trust and rapport from the start of data collection. Regarding criteria (c), one of the math teachers did not respond to the open-ended questions, which suggested the possibility that generating responses to interview questions once the study was underway may not yield sufficient for data analysis. Regarding criteria (d), I had experience working directly with the two English teachers for several years (and no experience working directly with the math teachers). Thus, the likelihood of eliciting open and extensive thoughts, emotions, beliefs, and feelings from the start of the study seemed more possible. Thus, to ensure comparability, increase the prospect of sufficient data, and to take full advantage of my insider access, the two English teachers were selected for participation in this study.

**Data Collection**

To produce a thick description of the setting and participants that would address the research question, I gathered and generated seven types of data: contextual observations, teacher interviews, instructional observations, lesson plans, work samples, classroom photographs, and policy documents. A summary of these sources and their purpose is provided below in Table 6. Data collection took place when the participants' schedules permitted. The rationale for each data sources as well as the procedures and tools for collecting it appear in the paragraphs that follow.

Table 6:
*Data Types*

| **Data Type** | **Purpose in Selection—To Identify and Understand…** |
|---|---|
| Contextual Observations | • Physical layout of the building<br>• Available technological resources<br>• School culture<br>• Available professional development |
| Teacher Interviews | • Teacher beliefs about technology<br>• Specific phenomena observed in classrooms |
| Instructional Observations | • Teacher use of technology<br>• Confirmation or conflict with teacher beliefs |
| Lesson Plans | • Differences between teacher intentions and teacher actions |
| Work Samples | • Student engagement and learning |
| Classroom Photographs | • Available technological resources<br>• Classroom culture |
| Policy Documents | • School culture |

**Contextual observations.** To understand and describe the role of context on the integration or resistance to technology innovations of the participants, I observed and documented four elements of the setting: the *physical* footprint of the building, the *professional* development offered, the *technological* tools available, and the *cultural* milieu for technology use. Based on the work of Zhao & Cziko (2001), these contextual elements were viewed as the prominent shapers of integration or resistance to technology innovation. My summaries of the building are part of my bracket statements in Appendix I.

**Teacher interviews.** Interviews occurred in three phases. Phase 1 commenced with an individual interview with each teacher. The teachers were interviewed separately to prevent social desirability effects. The interviews elicited information about teachers' beliefs and their school environment (Pajares, 1996; Bandura, 1997). Questions focused on two areas: *environment* (e.g., What resources are available to you? Are there other teachers who use technology like you? Does your school have a technology policy in place?) and *beliefs* (e.g., What do you enjoy teaching? When I say technology, what comes to mind?). All interview questions were piloted on two individuals who were not participants to ensure that they effectively prompted relevant information. Based on evidence from the pilot, adjustments were made to clarify the wording of three questions, one question was removed, and one question was added. The revised versions are presented in Appendix C, which contains a complete interview protocol. To conclude the Phase 1 interview, I asked each teacher to select an English unit they would soon be teaching for discussion and review during Phase 2. The was no requirement for technology to be included in the unit that teachers selected. This was a deliberate decision so that teachers would pick a unit they were comfortable teaching, rather than one where they were artificially inserting technology as a form of bias, including it only because it was a target in the study. Phase 1 interviews were transcribed within three days.

Phase 2 consisted of one individual meeting with each teacher. These occurred within one week of the Phase 1 interview. The one-week window gave teachers time to identify a soon-to-be-taught unit so it could be brought to the interview. Phase 2 questions focused on *the unit* (e.g., What are the learning goals for this unit? Is the pedagogy the same or different in other units that you teach?). These interviews were also semi-structured. All interview questions aligned with components of Expectancy Value Theory (EVT) and were piloted on two individuals who were not participants to ensure that they effectively elicited information relevant to the research question. Adjustments were made to three of the questions, and the revised versions are presented in Appendix D, which contains a complete interview protocol. The concepts 'technology' and 'innovation' were not defined in the interview protocol so that each teacher's usage of technological innovation would not be prompted or guided by me (Halpin, et al., 2004). This unprompted approach also maintained domain-, rather than task-specificity. Interviews were transcribed as soon as possible after the interview.

Phase 3 involved periodic individual interviews with each teacher that occurred throughout the instruction of their unit of study. These semi-structured interviews used lesson plans, student work samples, student assignments, and field notes from observations to prompt teachers to elaborate about decisions made during planning and instruction. A broadly framed protocol guided the Phase 3 interviews (See Appendix E). In principle, the interview questions targeted practices that were specific to the intentions, observations, and artifacts for their English unit. Interviews were transcribed as soon as possible after the interview. Before each of these interviews, I would review notes from observations, where I frequently wrote questions that I developed during using the comment feature of Microsoft Word. I would also ask teachers to explain specific activities that occurred during observations. These interviews generally occurred every day or two, whenever the teacher's schedule allowed us to meet. All interviews were conducted in the teacher's classroom with a closed door to ensure privacy.

All three phases of the teacher interviews were recorded in their entirety on a LG V10 smartphone using the "Voice Recorder" app. An iPad 4 was used as a secondary recording device. As I transcribed interviews, I recorded instantaneous reflections using the comment feature of Microsoft Word to make those reflections available when analyzing data at a later date.

**Instructional observations.** For each teacher, observations occurred when the teacher's schedule permitted. Observations occurred for a minimum of two weeks or one English unit, whichever was longer. One class block was selected for continuous observation. Each teacher and I worked together to determine the class block that would be the focus of this study, with the teachers having a leading voice in the selection. Previous scholarship indicates that a relationship with the participants where choice is sanctioned makes the participant-observer role a more comfortable and less anxious one (Glesne, 2006). In addition, because I had an established relationship with both teachers, the participant-observer role in this study was likely to be a more comfortable one.

Two general criteria guided my conversations with the teachers about which unit and block to select for this study. One was the length of the unit. Pilot work had indicated that a one-week to two-week unit would provide sufficient time for data to be gathered on the research question. The other criterion was the teacher's comfort level with a specific class block. My experience indicated that teachers in this school had preferences (a) for a certain time of day, or

(b) for working with a particular group of students. Given both criteria, the goal was to choose a class block where the teacher was most comfortable so that the most robust data set could be gathered.

For each observation, I sat in the classroom where the teacher designated and used a laptop with Microsoft Word to take notes. My approach to field-note taking was informed by methods developed by qualitative case study researchers (e.g., Connelly & Clandinin, 1990; Cullen & Green, 2011). While observing, I looked for and recorded:  how content was delivered, what students said and did, what teachers said and did, what kinds of technology was present and how it was used, and adjustments made to the original lesson plan.

Overall, I observed each teacher teaching for ten ninety-minute periods of instruction (15 total instructional hours per teacher). In each class session, I observed both teacher and student behaviors and interactions. At times when I reflected on a practice immediately, I recorded that reflection using the comment feature of Microsoft Word so it would be available for future coding and reflection on the data.

**Lesson plans.** To understand how integration or resistance to technology innovation figured into the English units of study, participating teachers provided me with a copy of their lesson plans before my observations began. The school required that lesson plans be posted to a secure online space, so I collected plans via email from each teacher. During observations, I had the lesson plans open on my laptop to annotate any changes observed between the plan and the actual teaching that occurred. The content of the teacher lesson plans was also analyzed based on the work of Rehmat & Baily (2014).

**Work samples.** Six types of student assignments, including the blank assignment and completed student work, were collected and copied:  article annotations, writing assignments, pretests, posttests, assignment rubrics, and reading questions. Each type was used as evidence to understand teacher motivations integration or resistance to technology innovation (Gao, et al., 2012; Junco, et al., 2013; Manca & Ranieri, 2013). The three assignments types were also used during Phase 3 of the teacher interviews to prompt teachers to elaborate about decisions made during planning and instruction. In all, about 30 work samples were copied as data for this study. Assignments that were completed digitally via Google Docs were shared with me by the participating teacher along with her comments. Hand-written assignments were examined in classrooms and captured via photo on an LG V10 cell phone.

**Classroom photographs**. I collected photographic data of the physical environments and material resources in the school where each teacher taught their English unit. The first set of photographs were taken prior to my initial observation of the opening lesson in a unit. In particular, I captured aspects of the environment that included and shaped the possible uses of technology, such as types of devices, location of devices, location of power outlets, and the physical setup of the room. Teachers were present when I took photographs and were able to alert me to devices and features of the environment that are not readily visible, so I could photograph them as well (e.g., devices in locked charging carts, other rooms in the school, etc.). These photographs provided an understanding of the material resources that are available to teachers and their arrangement, which is a significant consideration when examining the EVT-like costs of technology (Chen, 2008).

**Policy documents.** The school technology plan was posted online and available for public download. This policy provided an understanding of the general context in which teachers were working with technology, and how policy was intended to contribute to teachers' use of technology (Orlando, 2014). Additionally, there was a policy from the school board, "Acceptable

Computer System Use" that is also available online for public download. All students received this document with a letter from the superintendent of schools at the beginning of the year. Parents must have signed an attached form and returned it to the schools before students were allowed to use any digital technology devices in the school district. Employees were given the same agreement to sign as well.

**Data Analysis**

It is my goal to maintain as much transparency about my analytical methods as possible in the following section. This aligns with the research on qualitative methodology and is suggested in the literature as a strategy for maintaining rigor (Anfara, Brown, & Mangione, 2002). In general, data analysis was informed by an interpretive approach. Analysis started as soon as the data collection process began. Conversational discourse and artifacts were analyzed and reanalyzed for patterns and themes related to teacher motivation for integration or resistance to technology innovation. Teacher interviews were transcribed and coded by means of iterative cycles of analysis, which progressively developed and refined patterns and themes from the discourse and artifactual data. Notes from instructional observations were analyzed for *in situ* (i.e. natural context) patterns and themes regarding the enactment of integration or resistance to technology innovation. The work samples, classroom photographs, and policy documents were organized and analyzed for patterns and themes as well.

More specifically, data analysis used case study techniques outlined by Yin (2009). For example, I started by roughing out a data-analysis strategy, yet remained open to strategic and adaptive shifts that were needed once the data analysis was underway. I also used Expectancy Value Theory (EVT) to inform the construction of initial patterns and themes from the data, but remained open and alert to alternative explanations that extended, refined, enriched, and clarified elements of motivation for integration or resistance to technology innovation. Relatedly, the analysis was conducted by "making a matrix of categories and placing the evidence within such categories" (Yin, 2009, p. 111). EVT provided the rough outlines of five starter categories for such a matrix: costs, attainment value, intrinsic value, utility value, and expectancy beliefs (Eccles, et al., 1983). Additionally, to remain open to new patterns and themes that could suggest an alternate explanation than those proposed in the theory as suggested by Yin (2009), I included a category of 'other' for data that did not fit into the starter EVT categories of the matrix. And finally, I color coded each data source (e.g. interview evidence in orange, observations in red, etc.) so it was clear which sources were providing data for a single category or when only one data source was representing a category. As a result, the sources from each category provided points of triangulation for interpretations, a practice recommended by Creswell (2013). No coding software was used for the coding process. Throughout the analysis of data, I adjusted the protocol as necessary, creating a coding protocol book to first define and then refine my decisions (See Appendix G). This protocol book began with the five starter categories from EVT literature (beliefs, utility value, attainment value, intrinsic value, and costs). Updates to the original coding scheme—the inclusion of more specificity in categories and examples to illustrate my thinking are also included in Appendix G.

Throughout the data collection and analysis process, I wrote memos to myself about possible connections, questions, explanations, or thoughts that occurred, as recommended in the literature (Yin, 2014). These memos were not intended to be codes, nor were they used as such. Rather, they captured my thinking at the moment and were a part of my cyclical review of the data, allowing me to see the changes in my thinking that occurred. Changes in my thinking were also captured within my bracketing statements (See Appendix I).

To begin the analysis process, I read all the interviews for both teachers. After this initial reading, I reread and noted quotes that evidenced teacher motivations for integration or resistance to technology innovation. These quotes were marked in the interviews and then transferred to the coding matrix where they were color coded in orange as interviews. I repeated that process with the observations, coded in red. Interestingly, student work samples did not code into this matrix through the EVT categories and were, therefore, discounted as a data source. This is not surprising given the research question—What motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices—is teacher-centric, not student-centric. To ensure that coding reflected unbiased analysis, a second coder was given clean copies of all data sources, a codebook (See Appendix G), and a matrix to duplicate the coding process. Any differences in codes were discussed in detail and resolved. Inter-rater reliability was calculated with 87% agreement.

Once the initial round of coding was complete, I stepped back from the data to allow myself time to process and synthesize the data on my own. I was concerned that jumping directly back into the second round of analysis would result in rushed coding or insufficient data. When I returned to the data with fresh eyes, I initially examined my codes in a quantitative manner, exploring the number of codes in each category and identifying the types of data sources from which they came.  I then examined my original codes and looked deeper to expand them beyond the original categories based on EVT. For example, I looked for teacher beliefs related specifically to students, to administration, to personal abilities, and to pedagogy. This second round of coding allowed for a more detailed and nuanced understanding of what was happening. This also allowed me to reexamine the category of "other" that I had developed as a way to be open to other possibilities (Yin, 2009) In reexamining the first identified codes, I was able to refine my conception of beliefs and acknowledge that some of the data originally identified as "Other" belonged in a more refined category.

Finally, upon review of the data and the beginning stages of writing, I added an additional analysis to the study. I reviewed each coded statement from participants and coded with a revised scheme of positive, negative, or neutral (see Appendix H for coding protocol). To ensure that coding reflected unbiased analysis, a second coder was given clean copies of the coded statements and a codebook (See Appendix H) in order to duplicate the coding process. Any differences in codes were discussed in detail and resolved. This analysis allowed for a closer examination of the nature of categories as I saw that while numerically the number of codes in teachers' EVT categories looked very similar, the connotation behind the data was not the same and was not apparent in my first level of analysis.

To ensure that my interpretation of the raw data was an accurate depiction, I employed a member check at the end of the process. Upon completion of coding and write up, I invited the participating teachers to review the data and ensure that I was representing them in a way that captured their feelings and actions honestly and accurately. Additionally, I provided selected evidence and conclusions to a colleague for secondary judgment. This colleague either verified my conclusions or argued that the evidence provided did not support the conclusions. This process continued until all disagreements were resolved.

**Researcher Positionality**

The setting and participants provided a unique research opportunity. They afforded an insider perspective on teacher motivations for integration or resistance to technology innovation. For three years, I worked as a faculty member of the English department in this high school. Later, I worked with a grant program that sought to reach at-risk seniors who needed one or two credits or state standardized tests to graduate at the end of the year. Through this position, I forged relationships with the teachers in all departments at the school, the administration, and the technology support professionals. Additionally, I had a teacher's view of the school technology and resources, which allowed me in-depth knowledge of the school, the teachers, and the resources that an outsider would simply be unable to acquire. Most research has occurred without access to the background and without peer relationships with participants (Yin, 2009), making my access a unique opportunity. These circumstances, my insider knowledge of the environment and the increased presence of devices in the district, created an uncommon research environment.

There were advantages and costs to having an insider perspective when conducting qualitative research (Blythe, Wükes, Jackson, & Halcomb, 2013). Advantages of insider research may have included: easier access to a population (Griffith, 1998; Hayman, Wilkes, Jackson, & Halcomb, 2012b; Yakushko, Baidee, Mallory, & Wang, 2011) or equal feelings of power between the researcher and the participants (O'Connor, 2004), which could have led to a richer, fuller conversation with between the two parties, achieving detail and depth not possible in another way (Dwyer and Buckle, 2009). Insider knowledge informed research and allowed for understanding that would be highly unlikely without the background knowledge insiders have (Rooney, 2005).

However, the literature also stated that the same knowledge that provided depth could also have been a disadvantage to research. Those preexisting relationships may not have drawn in participants and could have made some participants uncomfortable. Objectivity of the researcher was also a concern when using an insider perspective, and the researcher must have taken certain steps to ensure objectivity and validity of the study (Rooney, 2005).

As a researcher who was personally familiar with the teachers and the school district involved in this study, my position and history pose potential biases for the collection and analysis of data. My general approach to addressing this bias was through the systematic "bracketing" (Hoskins and White, 2013), or identifying and acknowledging, of my personal beliefs about teacher technology innovation. To that end, I wrote bracketing statements while collecting and analyzing data for the study, including them in Appendix I.

My position and history also posed potential affordances, which countermand the bias concerns that bracketing addressed. In particular, my familiarity with the teachers and school district created the opportunity for understanding the motivation of technology innovation more deeply than other scholars have been able to do. Based on my initial forays with district personnel, this existing bond encouraged teachers to speak more freely and prolifically than they would with someone who is unfamiliar to them. And my familiarity with current technological innovations in the school permits me to bring a heightened awareness to their teaching when observations are made. All said, measures were put in place to ensure that the tradeoff between confirmation bias and familiarity were managed. In this study specifically, there were several steps taken to ensure the quality and validity of the study itself, which were described in the previous sections. They include: triangulation of data, thick, rich description, member checking, secondary coding, and bracketing.

# Chapter 4: Results

## School Context and Teacher Backgrounds

To answer the question, "What motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices?" a theory-informed analysis was conducted to understand the role that teacher beliefs play in the decisions, intentions, and actions of teachers (Eccles, et al, 1983). To understand teachers' beliefs, particularly when it came to technology innovation, a domain-specific belief, as well as their value beliefs of technology innovation, I individually interviewed two teachers twice prior to an observation period and then repeatedly throughout a two-week observation period. In addition, I frequently had casual, collegial conversations about their beliefs on technology, students, and school context. Throughout the coding process and while building sketches, I sought to understand how the data could shed light on the research question.

## Privacy

While describing the setting in the following section, it is essential to provide as much detail as possible; however, it is also my responsibility as a researcher to protect participants' identities. Therefore, pseudonyms are used in place of teacher, school, and student names.

## Organization of Chapter

This chapter is organized into several sections. First, I describe the setting of the school in which the teachers are working, paying particular attention to the physical assets and policy documents that are in place. Second, I give a detailed description of each teacher. Third, I analyze the motivations of each teacher as an individual case through the lens of Expectancy Value Theory. Fourth, I compare the teachers in a cross-case manner to understand their differences and similarities, and fifth, I offer a summary of the data in response to the research question in the concluding section.

## Setting

Both participants in the study shared the same department and the same school, so many of the larger contextual pieces were similar. As previously described, Nantucket High School was the only high school in a small suburban district in a mid-Atlantic state, identified by the U.S. Department of Education as “having a high concentration of low-income families” in the 2014-2015 Teacher Cancellation Low Income Directory (U.S. Department of Education, 2015). Two buildings, a main campus building and a career and technical education building across the street, hosted its population of approximately 900 students. Both participants were in the main building and had their own classrooms on the second floor. In the front of the building were two computer labs hosting 26 desktop computers with high-speed wireless Internet access and basic software including Microsoft Office Suite. (See Figure 9 in Chapter 2 for a map of the main school building that identifies teacher classrooms and computer locations.) All students had individual Google accounts with access to Google Apps products (e.g. Docs, Slides, Drive, etc.), which were new to all students in grades 6-12 during the 2014-2015 school year. Five laptop carts were available for checkout, one of which was permanently housed upstairs in a classroom while the other four were housed in the library.

A Technology Specialist in the building was available to assist teachers with technical difficulties, but he did not aid in lesson planning. The specialists’ assistance was requested via an online help-ticket system. Most teachers used this system for broken equipment or student password retrieval. The school district employed two Information Technology Resource Teachers (ITRT) who offered lesson plans and technology resources to teachers, but because they were shared throughout the district, they were not always available to the teachers. One ITRT had an elementary background, and the other was a former secondary biology teacher.

Professional development opportunities were available during summer months where classroom teachers, in addition to technology resource teachers, provided workshops with specific digital technology foci, but these sessions were not mandatory for teachers.

The school district collected information from administrators and lead teachers to develop a Technology Plan every five years, which outlined goals, objectives, and implementation strategies for the district. Areas of focus included in the most recent plan were: "Technology Integration, Professional Development, Connectivity, Educational Applications, and Accountability" (Webster, 2010, p. 28). This Technology Plan also addressed the financial costs of integrating technology into the classroom, which had been a "significant constraint" during the installation (Webster, 2010, p. 10). Specific steps to improve technology integration were identified in the 2010-2015 Technology Plan too, such as installing overhead projectors in all classroom. At the time of data collection, however, this benchmark had not been achieved.

The only other document officially associated with technology in the school district was the "Acceptable Computer System Use" agreement, which all students in grades K-12, student guardians, and staff were required to sign before using any digital technology devices. As stated in the agreement, student use was very limited. This agreement outlined "acceptable computer use" by defining what students were not allowed to do (e.g. search for song lyrics, view graphic websites, communicate in chat rooms, share passwords, etc.). There were no policies in place that required student use of technology as a curriculum requirement, graduation criteria, or instructional focus. All state assessments, however, were given via computer. Students were not permitted to use their personal devices, including computers, tablets, and phones, during school hours for any purpose.

With the creation of student Google accounts during the year of this study, administrative staff members had strongly encouraged teachers and students to use of Google Apps for Education. This encouragement came in the form of professional development during the teacher work week as well as verbal statements from administrators. The Technology Plan specifically stated an objective to, "deliver appropriate and challenging curricula through face-to-face, blended, and virtual learning environments" (Webster, 2010, p. 15). There was no formal requirement for teachers to use Google Apps, but the school district had eliminated the need for and availability of local server storage by allowing Google to provide storage through Google Drive. There were, however, formal policy requirements for teachers to use computers for attendance, gradebooks, and email communications.

## Teachers

### Cassie

Cassie, who had spent all ten years of her teaching career at Nantucket High School, came across as a highly-organized, efficient, and motivated individual. Her desk was neatly organized with papers contained in orderly piles or files, pens corralled in containers, and a ready workspace available. She made the most of all of her time at school, constantly using every spare moment she could to provide the most for her students. She was rarely seen without her planner, where she kept a running to-do list, checking off tasks as she completed them. She projected a very strong sense of right and wrong and described herself as "a moral person" who did what she was supposed to do while at work.

Cassie's classroom included 24 desks arranged in six groups of four around the room. Near the door, there was a supply cart with extra paper and a three-hole punch. A projector was mounted in the ceiling that projected to the dry-erase white board at the front of the room. An overhead projector that used transparencies sat in the middle of the room beside Cassie's desk/workspace arrangement, which was in the center of the back wall. A book cart with a class set of textbooks sat in the back of the room as well. Computer cables hung in the front of the room so that a laptop could be connected to project using the ceiling-mounted projector. The dry-erase board across the front of the room had one section marked off with the daily agenda and homework for each class written clearly. There was also a television mounted in the front corner of the room with a VHS-DVD combination player mounted below it. Figure 10 includes a photo collection depicting Cassie's room.

For this study, Cassie chose to focus on a professional writing unit in her College Composition course. She described it as "the easiest unit" her students studied. The unit occurred during the final testing for AP courses, which affected the vast majority of her eight students. College Composition was an elective course for dual enrollment credit through a local community college, which set the content requirements for the course. Students had to complete English 11 Honors with a B or better as a prerequisite for taking the course. By its very nature as an elective course, College Composition included students who were interested in the content of the course and motivated to do well in the class.

Students had just finishing a challenging unit on literary analysis. The students and Cassie welcomed the break, both commenting on how much easier the assignments were for the professional writing unit. Because the unit was only a week long, I continued my observations into the next unit on research presentations where students choose controversial topics, then researched the contributing factors, stakeholders, and potential solutions to the issues, and finally shared their findings with the class. Cassie had only taught College Composition once prior to the semester I observed. The version of the course in this study used a new textbook, which Cassie said made it feel like "teaching an entirely new course."

Figure 10: Photo Collection of Cassie's Classroom

Figure 10 (cont'd)




1. View of classroom from doorway
2. View of wall to left of doorway
3. Bulletin board on wall to left of doorway
4. View of classroom from corner opposite of doorway (back left of classroom)
5. Student desk arrangement.
6. Teacher's desk and overhead projector
7. Television and DVD/VCR Combination and projector cables

**Laura**

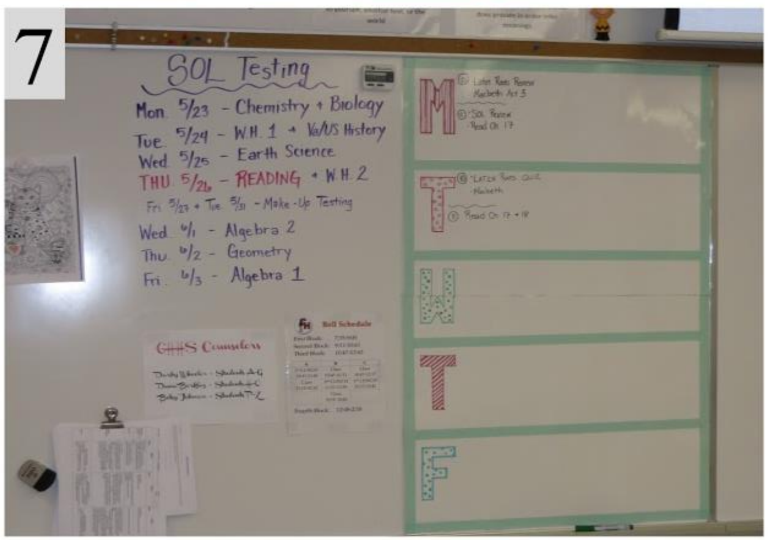
Laura, who had spent all twelve years of her teaching career in Nantucket High School, came across as a neat, practical, and easygoing teacher. Her workspace in the corner of the classroom kept things within easy reach. She often expressed the idea that, “form makes function,” which was evidenced by the materials organized in aesthetically pleasing binders that she had decorated. Her crafty nature appeared throughout her classroom as well in the form of bathroom passes, bulletin boards, and posters with decorative lettering. From her workspace, she could see both her students and the door of the classroom. She was the technology-go-to person in the department and had a reputation as an innovator among her peers and colleagues.

In Laura’s classroom, desks were arranged in rows facing the front of the room where a dry-erase white board ran across the entire length of the room. Sections were blocked off on the board for two courses, and important upcoming dates were written for the students on the board. A ceiling mounted projector faced the front of the room, and Laura’s workspace was in the front corner opposite of the door. Computer drop cables lined up so that she could work from behind her desk or from the front of the classroom with the keyboard of her laptop facing her either way. A television was mounted in the corner behind her desk with a combination VHS and DVD player mounted directly below it. A table sat with several chairs on the far side of the room near Laura’s desk. Storage cabinets were in the far back corner holding supplies. Photo arrangements of Laura’s classroom appear in Figure 11.

Figure 11: Photo Collection of Laura's Classroom

Figure 11 (cont'd)






1. View of classroom from doorway
2. View of white board directly behind open door (front wall of classroom)
3. Bulletin board on wall to left of doorway
4. Remainder of wall to left of doorway
5. View of classroom from back left corner of classroom (opposite of doorway)
6. Teacher's desk/work area, mounted television, and projector cables
7. Weekly schedule posted on white board at the front of the room

For this study, Laura chose a literature unit where students read Zora Neal Hurston's novel, *Their Eyes Were Watching God*. Literature units in the department were generally focused on plot and analysis; they almost all included study questions that were plot based and followed along with the book. Students completed study guides as they read the chapters and answered test questions drawn directly from those guides. This class was a required course for students in their junior year of high school. This section was an "academic" level course (meaning that it was for students of average ability, rather than a "collaborative" level course for students who needed extra support or an "honors" level course for students who needed more challenges). It was also the course which included the state standardized test for both reading and writing. That testing requirement set many of the learning goals for the course and influenced both content and teaching. Students had just finished a research unit exploring important components that appeared in the background of the novel (time period, local culture, historical events, etc.)

## Motivations

To understand Cassie's and Laura's motivations to integrate or resist technology innovation in their respective units of study, I began by creating a coding protocol (See Appendix G) that was informed by the components and categories expressed in the scholarly literature for Expectancy Value Theory (EVT). These categories together built a picture of teacher motivation to integrate or resist technology innovation.

### Cassie

**Expectancy beliefs.** Based on Cassie's description of herself, she did not see herself as very confident in her ability to integrate technology in the classroom beyond certain platforms with which she had extensive experience (e.g. GoogleDocs). However, beliefs about her abilities were not the only beliefs that influenced her decisions.

***Beliefs about technology.*** Cassie's beliefs about integrating or resisting technology innovation were based on an ecumenical view of what constitutes a technology:

> I guess I define technology as anything the students are using, anything from something as simple to pencil and paper to something as complicated as a Prezi or multimedia presentation. Anything they are using as tools to learn or communicate, I would view as technology. It's just that some is more sophisticated, and some is more rudimentary.

While such a statement indicated that Cassie's beliefs about technology were broad, that breadth was not symmetrical. Her definition of technology, for instance, included analog technologies such as pen and paper, but she excluded them when she talked about using technology in the classroom, providing strictly digital examples such as Prezi, Google, or Kahoot. This disjuncture suggests an asymmetry between her beliefs (the broad digital and analog conceptualization of technology) and her actions (the digital technologies she used).

The evidence also indicated that Cassie's beliefs about technology were *context-specific*. For instance, all of her examples of technology were strictly professional and classroom based. None were situated outside the classroom context. She distinguished between her work life and home life:

> We're not supposed to use um  or are discouraged from using Facebook or things like that during the school day. . .I know that we're not supposed to use our computers for personal gain, like financial personal gain, or things like that.

Cassie sees a clear divide between activities that are acceptable at home versus those that are acceptable at school, and she does not see crossover between the two. Thus, her focus on the setting of teaching suggested a context-specific view of the innovation or resistance to technology integration.

In addition, Cassie's beliefs about technology implied *fixed purposes* and uses for tools. For example, she described her own technology use as, "using the same technology in the same ways." To her, a technology had a specific purpose and use that was not to be changed or adapted. This belief extended to her description of students' technology use too:

> When they give their persuasive speech, they're required to have a visual aid, which can be anything, but most of them choose to do a Prezi, a PowerPoint, or Google Slides now that they have access to Google. We use technology when they do their presentations, their research presentations on *Their Eyes Were Watching God* same thing: PowerPoint, Prezi, or GoogleSlides. We use GoogleDocs when they do, basically when they do any paper.

Note that in her description of several presentation platforms, Cassie only one way to use each of them. To her way of thinking, certain platforms were for presentations, certain platforms were for writing, and certain platforms were for other particular purposes. While introducing the unit assignments to students, she did mention that they had any option for a visual, but the only suggestions she provided were what she considered to be presentation platforms, and none of the students asked about alternatives.

Finally, Cassie's beliefs about technology were *student-centric*. She believed that students were the users of the technology themselves, not the recipients of a technology she used. For example, in the professional writing unit, she described the tools her students would use:

> Well this unit it's particularly relevant because one of the main focuses is email, which obviously deals with technology. Um, it's also relevant in the sense that they'll be using Google Docs, which I imagine they'll be using in college or some form of some platform like that. And then of course they would need to use technology to write and print a cover

letter, write and print a resume, and knowing know to format it. Knowing how to get the bullet points here. Knowing how to tell AutoCorrect not to do X, Y, and Z that it's doing. That type of thing.

Cassie taught not only the content of professional writing (i.e. what information goes into a resume, what diction is relevant, how to find relevant diction), but also the digital aspects of writing (i.e. formatting a document with a word processing software, manipulation of AutoCorrect tools) as well as the necessary computer-based research skills.

In sum, Cassie held an ecumenical, yet asymmetrical belief about technology. Her belief focused exclusively on the context of schooling and fixed the purpose on student-centric use of technology.

***Beliefs about herself.*** Cassie's beliefs about herself as a technology user did not consistently match her skill as an actual user. These variable beliefs were voiced in Cassie's initial survey response when she described herself as a non-tech-savvy teacher, but then admitted that she sometimes believed herself to be very effective in using technology. That effectiveness, she said, depended upon the specific technology being used, her proficiency with that technology, and her belief in herself with that technology. At times she believed herself to be lacking when her actions demonstrated otherwise, and at other times, she believed herself to be skilled when her actions demonstrated a high level of skill.

Cassie's beliefs about herself varied from one zone to another; from her *comfort* to her *learning* to her *panic* zone (Senninger, 2000). affected how Cassie saw herself. If she was in her *comfort zone*—with a technology (like Google Docs), participating in an *au courant* workshop, or solving a device or app problem—then Cassie believed she was quite competent at integrating the particular technology. This belief meant that she saw herself as clearly having the knowledge, skill, or experience needed to integrate that technology.

For example, one illustration of Cassie's belief about herself as a competent technology user occurred when she used Google Drive as a learning management system for her class. Through Drive, she shared her lecture slides with students, allowing them to take notes while she presented, pointing out specifics on the slides that would be relevant to student work. She shared assignments with students in the form of a Doc, and she received assignments from students in the same way. Students were able to work asynchronously and peer-edit as a regular part of the course by sharing the Docs with each other.

When suggestions were about her use of this platform, she was open to integrating them. For example, she marked that students were "finished" with an assignment by having them hand in a paper rubric. When I suggested that she could have students change the name of the document to include the word "FINAL," she immediately accepted the idea with the comment that it would allow for assignment submission when students were not physically present in the room and avoid issues of students' loss of the paper rubric, a struggle that was noted often during observations. Her belief in herself to use the Drive platform, including Docs and Slides, allowed Cassie to readily integrate this innovation into her regular teaching practices.

But if Cassie was in her *learning zone*—grappling with a less familiar technology (like Blogger), participating in a challenging workshop, or only partially solving a device or app problem after repeated attempts—then she believed she was plaso-competent at integrating the particular technology. This belief meant that Cassie believed herself to be still developing the knowledge, skill, or experience needed to integrate that technology.

For instance, a demonstration of Cassie's belief about her plaso-competence occurred when she repeatedly came to me with questions about how to use a technology after she'd spent hours trying to figure it out. With her laptop in hand, Cassie would explain the long list of things she had done to try and solve a problem. By these actions and queries she demonstrated a belief that her understanding of a particular technology was still developing, and she needed support to keep developing it.

The effect of these learning-zone-like experiences was for her to search for alternative platforms that allowed her the same affordances and utility features, but that avoided the costs of frustration and difficulty. Cassie sought out information from other teachers who had used different platforms, and then decided to use a platform that had fewer compatibility issues with the school server and web filter. Because Cassie was in her learning zone, she was comfortable enough to struggle with the problem and find a solution, but not so comfortable that she felt compelled to continue problem-solving on her own.

Finally, if Cassie was in her *panic zone*—overwhelmed with an unfamiliar technology (like Classroom), participating in an overwhelming workshop, or befuddled on how to solve a device or app problem—then she believed she was incompetent at integrating the particular technology. This belief meant that Cassie saw herself as generally lacking the knowledge, skill, or experience needed to integrate that technology.

For example, one expression of Cassie's belief about her incompetence occurred after a beginning-of-the-year workshop:

> We had the new Gmail and Google Docs and Google Slides and Google Classroom and Google File, and it was like 500 things. That was extremely overwhelming to me. And

> then on top of it … halfway through it my computer battery died … So that was frustrating.

The effect of this panic-zone-like experience was for her to avoid, or resist, technology-focused workshops:

> I avoid [technology-focused workshops] in part because I feel like I won't be able to keep up, or I won't be able to get anything out if it because I won't be able to keep up, and also, I think I do have a little bit of fear of making big, sweeping changes, and for some reasons I have in my head that incorporating technology will be this big, overwhelming, sweeping change that I'm not prepared emotionally to handle.

In sum, Cassie's beliefs about herself as a technology user were variable and highly *zone-dependent*. Having struggled with the learning process for Drive, she was in her comfort-zone, venturing out on her own when making changes. With platforms with which she was less familiar, she was in her learning-zone and willing to struggle and seek input from peers and colleagues to find support and solutions. However, in situations where there were an overwhelming number of platforms to learn, when she was unable to take her time and work at her own pace, or when she felt powerless to work toward a solution because of technical difficulties, she became frustrated and entered her panic-zone. She felt the need to avoid these situations and only attended technology-focused professional development activities when they were mandated by the administration, and even then, she went into the sessions believing that she would fail.

***Beliefs about students.*** Cassie's beliefs about her students were based on deliberate efforts to observe and get to know them. She explained that really knowing her students shaped her decisions and actions about technology use as a teacher. One belief she formed from getting to know her students was that they were effortful:

> I typically see them typing their notes [on Chromebooks], like when I saw Mary yesterday, so it's hard for me to believe they would put that effort in just to cheat [on quizzes], but it's possible. Um, I think you also have to know your students, and I really just don't think that they would [use their notes on a quiz or test].

In short, Cassie believed her students put forth honest efforts with technology to prepare for quizzes, assignments, and other schoolwork.

Cassie also believed that students in her College Composition class were very *intelligent* learners with technology. She thought the quality of student work and future interests was evidence of this belief. One student, for instance, searched online for a future job in medicine at Johns Hopkins University Medical Center while another student asked if putting the technology patent he had registered with the U.S. Patent Office on his resume would be acceptable even though it came from work done during high school. Overall, Cassie believed her students were intelligent because they were high-achieving students with lofty goals and meaningful accomplishments.

Additionally, Cassie believed her students to be *independent* learners. For example, her instructional style was to frequently check with students as they worked on assignments because they were often in various places, given their independent, self-paced working schedules. Cassie also demonstrated this belief about her students' independence when she identified a flaw in GoogleDocs (the app's artificial intelligence auto-check sometimes suggested changes for writing errors that were not actually errors). Cassie showed little concern over the flaw because she believed her students were capable of independently analyzing what was accurate and what was not, even if their analysis disagreed with Google's auto suggestions.

> **Interviewer:** You mentioned that the Google Docs has flaws with its proofreading. How does this impact your instruction?
>
> **Cassie:** It doesn't impact my instruction too much in College Composition because those students are so high-level they know to ignore it. It's sad to say, but I don't think in my English 11 academic classes the students even notice that it's wrong or that it's happening at all, and honors hasn't mentioned it either, but I haven't noticed issues in their papers, and they probably are doing the same thing as the College Comp students and going, "Oh, I know it's wrong."

In brief, Cassie believed that students were capable of independently understanding GoogleDocs' glitches and how to handle them without her influence or direct instruction.

Cassie believed that her students were *intrinsically-motivated*. She described them: "They generally don't need a whole lot of support or redirecting other than one who tends to wander the class and pace and needs some redirection. Um, so they're typically AP and honors students." Their work ethic and focus was intense when I observed them, and Cassie confirmed that this behavior was typical for the group: "They were REALLY focused." In short, Cassie believed that her students motivated themselves intrinsically, rather than needing external motivation or guidance from her.

In sum, Cassie believed that her students were *effortful*, *intelligent*, and *independent* learners who were *intrinsically motivated*. They worked for themselves, rather than for external sources of pride, happiness, or recognition. As she acknowledged, this belief, in turn, affected her decisions and actions as a teacher when it came to technology use.

***Beliefs about context.*** Cassie's beliefs about her context were resource-influenced. For example, she listed a plethora of supplies in her description of school resources and stated, "We have all the basics covered," to describe her working context. Cassie belonged to a group of teachers who had all students in class equipped with individual Chromebooks. The use of Chromebooks for each student allowed Cassie to use digital assessments as well as offer her students open-note daily grades that she had not offered in the past. Without the devices available to students, these types of activities would not have been possible. Cassie had also added new components to the course this year, specifically the use of Google Docs and Google Drive, to which she did not have access the first time she taught the course. Even though students had laptops in the past, they did not have Google accounts and could not utilize the group sharing features for peer editing or submitting assignments. In brief, her beliefs about her context and the technology resources in that settings influenced her pedagogical decisions.

Cassie also believed that her context was *policy-restricted*. Recent removal of Hulu and Netflix from the school network was announced in the middle of the year with no warning to teachers or students. While this may have seemed like a logical choice—eliminating services that provide distracting or inappropriate content—it had repercussions for teachers like Cassie.

> "I was a little disappointed that we can't access YouTube and Hulu because I had a lot of content that I accessed on that, and that's going to make me have to change a lot of what I was doing or seek it from new routes."

This policy change decreased the available resources that Cassie had for her course, making it more difficult to teach the content of her classes. In turn, having to recreate assignments with new resources, search for replacements, or forego entire lessons because of the changes cost

Cassie time and effort. In brief, Cassie believed the context in which she was teaching had been restricted by administrative policy.

Cassie believed her context was *peer-shaped*. There were times when Cassie found peer suggestions, like the previously mentioned reading specialist, or professional development sessions, like the conference where she learned about Kahoot, as influential. Throughout the time we worked together for this project, she identified instances where she took the ideas of peers and adopted them into her own teaching. For instance, she held tests and quizzes completed by students and returned them at the end of the semester because her first-year mentor suggested she do that to provide students with exam study material. More directly, the PowerPoint slides she used for this course came from an instructor at the partner community college; she described them as a "security blanket" because they came directly from a colleague at the sponsoring institution. In brief, Cassie's teaching context was shaped by her peers, both in the building and in her larger professional network.

Additionally, Cassie believed that her teaching context was *student-dependent*. Because Cassie knew her students and had strong beliefs about their abilities, morals, and behavior, she used those to establish what would or would not happen in her classroom. While the advanced students in the observed class were allowed large chunks of uninterrupted time to work (sometimes 80 minutes of unstructured work time), Cassie noted that she could not do that in all of her classes:

> If I were doing this in a collaborative English 11 Class or an academic English 11 class, then the personality of the class itself would greatly dictate whether I could [work at my desk] or not. And also, the role that I would play—in this class, it's so small and they're so self-disciplined that I feel comfortable grading their resumes while they work on their

> cover letters. If it were a larger class with less disciplined students, then I would probably be needing to do a lot more circulating and a lot more refocusing and a lot less of the things on my checklist.

Knowing her students allowed Cassie to evaluate the context in which she was teaching. That context included the resources and colleagues, but also the students in the course that played an enormous role in dictating what could be done. In brief, Cassie believed her teaching context was student-dependent.

In sum, Cassie believed that the context in which she was teaching was a ridged one that was *resource-influenced*, *policy-restricted*, *peer-influenced*, and *student-dependent*. Her beliefs about her students and about the context in which she was teaching were impossible to separate because the students were an integral part of the context.

***Beliefs about content.*** Cassie's beliefs about content covered considerable terrain and were inherently linked with her context. To begin, her belief—and experience—was that content was something determined by others. For instance, when the community college that co-sponsored her College Composition course let it be known that the core means of delivering content—which was via the textbook—would be changed, Cassie fell right into line. Even though the new textbook changed much of the content she previously taught, she yielded to what others decided should be taught. Those making the decisions about her content were a part of the context in which she taught.

Relatedly, Cassie's beliefs about content were *book-centric*. The textbook was the centerpiece for content delivery. It served as the authoritative and core source of matter to be taught.

> A lot of the material—while I've taught the concept before, I've not necessarily with this terminology or in this context because I was using a different textbook before. I taught [the class] one time before with the other textbook, and I finally felt like I had it under control, and then we switched textbooks, so it's almost like I'm teaching it for the first time all over again.

The textbook was the primary force shaping the course itself, including the assignments and materials that Cassie provided to students.

Technology was *perimetric* to the book, serving a secondary or auxiliary role in delivering content. For example, content provided by an app or website was used in service of the book's content. PowerPoint slides that Cassie received from a colleague mimicked exactly with the content of the textbook, supporting the information, rather than supplementing it. Internet searches for job opportunities were completed online only because the book did not have that information. All writing assignments, like cover letters and resumes, that were completed in online platforms were based on examples from the book. No additional platforms to support writing, like the digital proofreading/instructional platforms Grammarly or NoRedInk provided additional content.

Cassie's beliefs about the delivery of content were *traditional* in that the teacher was the holder of the knowledge, and the students were the vessels. Her actions and words conveyed the view that content was to be transmitted from the book, by her, into students. As such, content was a commodity to be transported with efficiency and precision. For instance, Cassie focused on adapting the temporal aspects of the courses—pace of content distribution, timing of content activities, and time available for students to master content—when organizing content from the new textbook. She explained, "I don't always feel 100% comfortable with the material even though I've read through it because I've only read through it maybe once before I'm trying to communicate it to the students." By reading through the textbook, she became the owner of knowledge. Her role as a teacher was to transmit that knowledge from the book to the student vessels.

Finally, Cassie believed that to manage the new textbook, she had to *control* it. For example, Cassie adapted directions, references, questions, activities, and assignments so they were subdued to the textbook content and her beliefs about how it ought to be managed. It was as if the unknown wilds of the new content needed to be tamed for domesticated delivery to students. She felt a need to get the content "under control" before she could deliver it to her students. While it may seem that this was in conflict with the other-determined aspect of her beliefs, it is, in fact, because of the outside determining force that she feels the need to gain control.

In sum, Cassie's beliefs about content were that it was other-determined. It was book-centric and technology-perimetric, with the teacher delivering content with efficiency and precision once she controlled it.

**Utility value.** Based on the evidence in Cassie's lesson plans, observations, interviews, and assignments, she highly valued the utility, or usefulness, of the technological tools that she and students utilized when working in her classroom. Cassie primarily used technology for *increasing efficiency*. Four types of increasing efficiency uses were identified: allowing flexibility, saving resources, accessing information, and providing feedback.

The technology's value for *allowing flexibility* occurred when Cassie accommodated the schedules of her high-achieving students who missed class for club activities and AP testing by allowing students to submit assignments asynchronously using Google Docs as a platform for sharing work. Students informed her that they would submit documents from home after they had more time to revise, and her lesson plans identified asynchronous due dates as "before class tomorrow," which was when students in the class were not together. Students were also able to share work with each other when they were not in class together, which was something they discussed in their peer edits throughout the two-week unit. Neither of these would have been possible for students if they had worked solely on hard copy assignments, and for this group, the asynchronous capabilities were essential to their success because they were not always physically in class, especially during the end of the semester: more days had absent students than had all eight students present.

Technology's value for *saving resources* was visible when Cassie responded to students through online platforms. She used Kahoot, an interactive game where students respond individually to posted multiple-choice questions. She explained:

> [Kahoot] also cuts back on the paper I need because I used to give a lot of those reviews in hard copy format, and now I don't have to make those copies or print those off because it's up on the screen, which saves time.

In this instance, technology saved two resources: time and paper. Cassie saved her time that would be spent waiting in line to use the copier as well as physically making the copies. Furthermore, Cassie did not have to waste paper copying review activities. Because, "[she] can type so much more quickly than [she] can hand write," Cassie saved time, a very valuable resource.

Technology's value for *accessing information* appeared throughout the class. Cassie projected shared documents using the ceiling-mounted projector in her room so that she could point to specific places in the document and discuss features of the assignment with her students.

Students had the same shared document on the screen of their Chromebooks, but they looked back and forth between their individual machines and the projected screen, where they could see Cassie's verbal annotations and gestures. By having the information on their Chromebooks and in person, students could see Cassie's specific instructions and keep a record of the information she shared for their own reference. Another example of accessing information was Cassie's use of real-time job search websites like Indeed.com and Monster.com during the professional writing unit. Here students accessed job information that was otherwise unavailable. A third example of this occurred when Cassie shared the rubric with students in a digital format. She explained:

> What I like about sharing the rubric that went well was that nobody lost it because I kept the hard copy, and we'd had a problem in there with me giving out rubrics so they could use them as they worked and then three people losing it and me having to print it and run and get it. It was a fiasco, so I liked that they all had a copy they could refer to but that was not losable because all they had to do was open the file again, so that was good.

Technology provided another avenue through which students could access information. In this case, it was an avenue that they could not misplace, eliminating a stressful situation for Cassie. In brief, Cassie used technology to access information by providing a place for students to record notes they could access later, offering information that was unavailable in other locations, and ensuring that previously provided information was always available.

Technology's value for *providing feedback* appeared when Cassie was using the GoogleDocs platform to collect and evaluate her students' writing. The commenting feature had been especially useful for Cassie. She described it:

> I love using GoogleDocs. That's probably one of my favorite things. . . because I can make much more in-depth comments. My comments on [student] papers are of much higher quality on GoogleDocs than they were when I was hand writing them on hard copies because I can type so much more quickly than I can hand write, so I'm more apt to provide more detailed feedback when I can type it into a comment instead of having to hand write it.

Cassie's feedback was more detailed and delivered more quickly when she used GoogleDocs to provide it to students.

In sum, *increasing efficiency* amplified the utility value of Cassie's technology use. To her, the increasing efficiency uses included a broad range of topics including allowing flexibility, saving resources, accessing information, and providing feedback.

**Attainment value.** Attainment in terms of personal gain was not something that appeared to be a motivator for Cassie. She was very prolific in her responses, but they never crossed into the personal realm, which was consistent with her beliefs and her interpretation of the school technology policy: "We're not supposed to use our computers for personal gain, like financial personal gain, or things like that." Given her clear separation of personal and professional in the context of technology, there was little surprise that attainment value as not a motivating factor that appeared frequently for Cassie. As noted in Appendix G, attainment value was defined as something that was not required in the job position (completing lesson plans, posting grades, etc.). Cassie made no mention of anything above and beyond those requirements in her interviews, nor was there anything present in any other data sources. Attainment value was not a driving factor for Cassie.

**Intrinsic value.** There as very little that intrinsically attracted Cassie to the use of technology. Her interjection of tools like Kahoot were inspired by the "fun" she and her students had, but that was the sole instance of her placing intrinsic value on technology.

**Costs.** Based on the evidence in Cassie's lesson plans, observations, interviews, and assignments, costs, which included all of the negative aspects that demotivated her to integrate technology and promote resistance to technology innovation (Eccles, et al., 1983), were present in her decision making. Three types of costs were identified: instructional time, competing content, and personal frustration.

The cost of *instructional time* surfaced in many ways. Instructional time was one thing that technology integration cost Cassie. Multiple students asked Cassie, "Did you get my paper?" because they were concerned about the sharing capabilities of Google Docs. These frequent questions from students about sharing of documents interrupted precious class time and took away from instruction. During class when the high school wireless signal was unavailable, which occurred for one class period during my two weeks of observation, students were not able to use their work time, and Cassie was unable to provide feedback to students via the comments feature of Google Docs. This hurt students and Cassie in two ways. First, students were not able to use the work time for actual writing. Writing in class was beneficial because Cassie was there as a resource to clarify content questions, point out writing mistakes, and offer general guidance on assignments. Second, Cassie was not able to post feedback to students, which they would have taken and applied to future writing assignments, especially when revising final drafts. Time, mentioned throughout interviews and in class by both students and Cassie herself, was a valuable resource that integrating new technology innovations consumed.

The cost of *competing content* appeared during the course. Battery life was a concern for these devices as students had to sometimes plug in computers during class, moving away from their groups to be close to an outlet and reducing the interaction they had during partner and group activities. The integration of technology requiring students to have powered devices competed with the existing content of group work. Some quirks of software platforms, like false identification of grammatical errors, added to the content of the class. When Cassie was already forced to cut parts of assignments, like the proposal for the final research project, because they ran out of time at the end of the semester, the addition of even lesser amounts of content like quick grammar lessons to prove software inaccurate added a burden. Innovative technologies available to students also required specific instruction. For example, in the same research presentation following the main professional writing unit, students included images as a visual aid in their presentation. Citations for these images were a separate issue and required additional, specific instruction that took away from work time in class. While students were still receiving instruction during these points, it competed with the main content of the course.

The cost of *personal frustration* was a contributing factor for Cassie. For example, at the suggestion of the district reading specialist, Cassie tried to move a project to a digital format.

> Well, I tried, I mean hours. I spent hours on Google Sites trying to figure out how to use it, and I couldn't. So, I feel, I just feel like I put forth a decent effort, not the best effort I could, but I feel like I would need to put in so much effort for it to be my best effort that everything else would have to suffer.

This innovation attempt cost Cassie hours of time and was unsuccessful, and in her view adding more effort would have cost her even more in the "suffering" of everything else. The costs of time and effort associated with these innovations were enough to outweigh the suggestion of the reading specialist.

In sum, three types of costs (instructional time, competing content, and personal frustration) existed for Cassie, but they were not enough to create immediate resistance to technology innovation. Repeated failures, however, were enough to stop her from innovating once she had given a solid effort to follow the suggestion. The costs were not primary reasons for resisting, but rather were the result of attempts to innovate with technology that did not produce any value for her or her students.

**Summary**

Cassie's beliefs and values were the driving forces behind her teaching and decision making. They are summarized below in Table 7 and Table 8.

Table 7:
*Cassie's Expectancy Beliefs*

| | Category | Cassie's Beliefs |
|---|---|---|
| **Expectancy Beliefs** | Beliefs about Technology | Ecumenical |
| | | Context-specific |
| | | Asymmetrical |
| | | Fixed-purpose |
| | | Student-centric |
| | Beliefs about Self | Developing skill |
| | | Zone-dependent |
| | Beliefs about Students | Effortful |
| | | Intelligent |
| | | Independent |
| | | Intrinsically motivated |
| | Beliefs about Context | Resource-influenced |
| | | Policy-restricted |
| | | Student-dependent |
| | | Peer-shaped |
| | Beliefs about Content | Other-determined |
| | | Book-centric |
| | | Technology perimetric |
| | | Teacher-delivered |
| | | Need to control |

Table 8:
*Cassie's Value Beliefs*

| | Category | Cassie's Beliefs |
|---|---|---|
| **Value Beliefs** | Utility Value | Allowing flexibility |
| | | Providing feedback |
| | | Accessing information |
| | | Saving resources |
| | Attainment Value | Not important |
| | Intrinsic Value | Not important |
| | Costs | Instructional time |
| | | Competing content |
| | | Personal frustration |

Cassie's beliefs about technology were extensive and deeply situated. Her consistent practice of identifying digital tools as technologies in context-specific situations showed a lack of flexibility one would expect to find in someone who considered themselves a novice as an expert would feel more comfortable in bending the rules of where technology belonged and how it could be used. Her asymmetrical representation of technology as tools that students used for fixed and unchanging purposes for individual tools also demonstrated a novice perspective. However, these beliefs did not affect her student-centric pedagogical views or decisions. She valued utility in the tools that she used, and she saw costs as secondary, rather than primary influences in her decision making.

**Laura**

**Expectancy Beliefs.** Based on Laura's description of herself, she saw herself as confident in her ability to integrate technology innovations in the classroom. Her reputation among her peers supported this. However, beliefs about her abilities were not the only beliefs that influenced her decisions.

***Beliefs about technology.*** Laura's beliefs about integrating or resisting technology were based on a more parochial view of what constitutes a technology. She viewed technology cell phones, computers, and tablets, as well as the software and programs to operate them. Analog technologies such as pen and paper were excluded from her conception of technology, whether in or out of the classroom.

While the evidence indicates that Laura's beliefs about technology were limited, that narrowness was symmetrical. Her conception of technology, for example, included digital technologies, whether talking or using technology in the classroom. This juncture suggests a symmetry between her actions (the digital technologies she used) and her beliefs (the narrower digital conceptualization of technology).

The evidence also indicated that Laura's beliefs about technology were context general. For example, her examples of technology were both professional and personal as well as classroom-, community-, and home-based. She discussed many of the affordances of certain apps or platforms that she applied to both contexts. She identified some that she began using personally, like a Google account and all the associated apps, that had now become present in her classroom. The affordances were something that she considered when deciding whether or not to place technology in the hands of her students and herself, particularly in cases where devices were unavailable or where they did not function well in the environment. She considered laptops, tablets, and phones, but noted that not all of these were useful in the classroom setting:

> I have a school-issued iPad that I cannot make a lot of use of…. If it's going to be to replace a laptop, that's not really convenient because a keyboard is usually more

> necessary. And then if it's to deliver content, I'm basically mirroring what's on my laptop. And the kids, having one doesn't really help a classroom full of kids, so I honestly haven't figured out how to use that effectively…. I am allowed to use my cell phone in class, and if I ever use that during class, it's for remote mouse, but I haven't found a way that English would be better because I have my cell phone right now.

Her examples were situated across the contextual spectrum. Thus, her focus on many different settings suggested a context-general view of the integration or resistance to technology innovation. The use of these tools was very deliberate and planned, rather than spontaneous. She logically considered why she did not use some of the resources that were available to her as she listed them in our interview, gesturing as she described why she did or did not use the tools. Laura lived and worked in the context where she was seeking new opportunities but had not found the right combination of available devices and technological affordances to reach her students. She wanted to find "a way that English would be better" before bringing this tool into her classroom, and she chose to limit the tools that she did use according to the ideal of improving instruction.

In addition, Laura's beliefs about technology implied functional purposes and uses for tools. For instance, she described her own technology use as contingent and fluid in relation to purpose. A case in point was her description of why she uses Google Docs for providing feedback:

> Convenience, um, you know if you're sharing a written document that I have to edit, it is more convenient for me to edit it via, you know, Google Docs, than it is handwriting comments and getting it back to them. And like, for instance with editing documents like

> I have more space to do it. Like I can write out a whole lot more in a comment, not that they read it, but than just like a quick ‘doesn’t make sense’. I can explain why it doesn’t.

Laura selected the technology for the functionality that it adds in the form of convenience and added space. She found that receiving student writing and responding to it in this way was more functional than traditional pen-and-paper methods.

Her selection and use of technology was efficiency-centric. She sought to use tools or provide them to her students in order to be the most efficient way possible. A case in point is her description of tool selection:

> Um I think it’s because it if it’s going to be to replace a laptop, that’s not really convenient because a keyboard is usually more necessary. And then if it’s to deliver content, I’m basically mirroring what’s on my laptop. You know, so, and the kids, having one doesn’t really help a classroom full of kids, so I honestly haven’t figured out how to use that effectively.

Laura’s decision is grounded in effectiveness and efficiency. She views a single device as something that is not efficient for use with a classroom of students and, therefore, resists its integration in the classroom.

Laura maintained this definition of technology as a tool that helped both her and her students to do something. That goal or product may change frequently, but she was purposeful in her articulation that technology as not replacing the students or the teachers but was instead a new addition to the learning environment.

In sum, Laura held a parochial, yet symmetrical belief about technology. Her belief focused generally across many contexts and functionally aligned the purpose on efficiency-centric use of technology.

***Beliefs about herself.*** Laura's beliefs about herself as a technology user were that she was masterfully skilled with it and that she had a reputation for being the go-to person in the department. Her beliefs about herself, however, went beyond her skill with technology. She believed that her skill licensed her to take certain liberties. For instance, despite school policy that prohibited student cell phone use, Laura did not enforce this policy. She responded to student passion for cell phone use by explaining "It's just in my personality to only fight with them so much. I'm just not that kind of a person to just, you know, yell and make everyone…I'm not that kind of person." She believed there were limits to her fighting students on this policy, so she consistently and comfortably enforced her own policy, which was to permit cell phone use. Her beliefs about how she though others perceived her technology use resulted in her ignoring the student phone use policy.

Her own beliefs about herself also had a similar effect when mandates from administration required her to change the content of her English 11 course. She was "told" to add *Their Eyes Were Watching God* to her curriculum. Rather than debating this change with the department head or principal, she chose to follow the mandate, but on her own terms. Her beliefs about her own authority positioned her responses to technology use—whether with digital or analog technologies—or whether mandated or self-selected.

In sum, Laura believed that she was capable but *acquiescent* in her teaching—she avoided conflict rather than embraced it.

***Beliefs about students.*** Laura's beliefs about students were based on observations, interviews, and artifacts. One belief about her students is that they are intelligent. Before the bell rang, the class of thirteen students was talking socially. Approximately one third of the class carried bags of candy to sell as a fundraiser for National Honor Society (NHS) and the National

BETA Club, both of which require high GPAs and academic standing. Included in those with candy bags were a group of four female students who sat together in the back of the room and discussed a wide variety of things important to them: jobs, summer vacation, prom dresses, and how badly the humidity is affecting their hair. Despite the high-achieving, intelligent status of some students in the class, demonstrated through their NHS and BETA membership, they displayed a significant disregard for the expectations of class. Laura described them as "wanting answers for answers' sake and to get their 100s on tests and to stay in BETA club,"—very externally motivated individuals.

Another belief about her students is that they were *disengaged*. When the bell rang, Laura passed out a reading check to students as they grumbled and complained about the difficulty they had in reading the book. As Laura circulated around the room and paused to help individual students, that same group of girls discussed their answers, whispering quietly and trying not to call attention to themselves. When the reading check was finished, Laura transitioned into the next part of the lesson by turning on the overhead projector. As she did this, the majority of students were engaged with smartphones. Laura began to discuss symbolism, calling on students for answers and trying to engage them by connecting the fruit tree, which appeared on the front of the novel and as an object in the novel, to other stories that they knew. A few students provided examples such as the story of Adam and Even from the Bible, but most stared at the projected study guide with at least one earphone plugged into their ear. Laura directly addressed the fact that students had not done the homework and verbalized her knowledge to them. Competing for their attention was a battle when they were *disengaged* with the content, and that was a battle in which Laura did not see herself as a combatant.

Another belief about her students is that they are *capable* but *extrinsically motivated*. Later Laura assigned a quick-write, a brief writing assignment for student to practice their composition skills and access prior knowledge. The crumbled piece of paper that sailed into the trash can when one student learned it was not a graded assignment demonstrated average writing ability as well as a disregard for learning the skills of writing that Laura was addressing with the assignment. There was no desire to learn from the assignment or to receive feedback when the assignment itself was not graded. Laura noted differences between this group of students and other students that she taught at the same time, elaborating on what she believed were their motivations.

> Second block has less of an academically inclined population. They, um, they don't seem to want, not all of them, want to learn for learning's sake. Like in third block, you know, they'll have me stop in the middle. They'll say, 'Stop the tape, [Ms. L]. What is going…Why did she say that to him? What is he doing?' Not because of misunderstanding but because this is, they want to talk about it, and you know, and second block does some of that too now that I'm thinking and talking about it, but they I don't know. It's just different. They want answers for answers' sake and to get their 100s on tests and to stay in BETA club.

In sum, Laura believed that her students were *extrinsically motivated*. She saw them as *capable, intelligent* individuals, but she also felt that they were *disengaged* because their motivation came from external factors, rather than internal ones. This belief, in turn, affected her decisions about instruction and her actions as a teacher.

***Beliefs about context.*** Laura's beliefs about context were resource-limited. She was influenced by the technology resources that she had available. A shared school calendar for reservations of the available laptop carts and computer labs in the building was not sufficient to acquire devices if they were already in use by another teacher or department. Further, the laptop carts were cumbersome and frustrating as they often arrived with tangled wires and uncharged machines, requiring lots of time after use to reorganize for the next user. Device availability became more of an issue during periods of testing in the school when laptops and computers were in use by the guidance department, which was an issue in other classes where students did not have one-to-one device availability. This belief about the availability of machines in her teaching context limited the activities she could plan: "I know I might not have the laptop cart during this particular week, so I'm not going to try to create something where they have to use it. So yeah because I know what limitations I have."  Her inclination to use the devices was limited by her beliefs about the context in which she was teaching.

Laura's beliefs about context were *policy-restricted*. The context in which Laura was teaching was shaped heavily by policy all levels. First, the selection of the book itself was not her choice as an instructor. Instead it occurred as a decision from the English department, and she was "told to do it." The decisions made allowed enough time for her to read the book only once before having to teach it to her students. This policy change did not provide ample opportunities for her to prepare a brand-new curriculum. As a result, she borrowed curriculum from another teacher because it was completed, and she needed it to begin teaching. She also had to account for the amount of time it would take from her personal life to build a new unit after her contract hours were over, and that interfered with her life outside of school.

School level policy also limited what Laura was able to do with cell phones, a clearly readily available tool in her class.

**Interviewer**: “Several students when they were coming in from classes had their cell phones. Is that something that you don’t use because of the policy that you mentioned? Is that something that you’d like to use?”

**Laura**: “Yes on both accounts. I don’t use it because I’m not allowed to, so I don’t incorporate them meaningfully, and then I would like to use them more…I would rather have them partner read or listen to it on their own.”

In this instance, there was motivation for Laura to try new things with the technological tool that was so readily available with her students, but the current school policy prevented her from acting on that motivation.

Policy existed at the state level that gave standardized test scores great value as a tool for measuring teacher effectiveness, and school accreditation increased the emphasis that administrators placed on achieving high marks. As a result, teachers must have demonstrated specific test preparation strategies they used to prepare students, like moving away from multiple choice and true/false assessments. Laura explained that multiple choice and true/false assessments, “aren’t very rigorous ways to assess, so I’ve avoided doing that.” Laura spent an entire class period working with students on a state-practice-test packet based off of the book. The goal of this assignment was not to enhance student understanding of the novel or foster connections through discussion but to prepare students to take a test that they must pass to graduate, and that was a major component of Laura’s yearly teacher evaluation. This policy also restricted what Laura was able to do with her students as her beliefs about the state-wide context restricted her instructional choices. In brief, Laura’s beliefs about context policy-restricted at the department, school, and state level.

Laura's beliefs about her context were *peer-isolated*. As the go-to person in her department, she did not have regular interaction or feedback from peers. She described one resource that is a part of her context, the technology resource personnel: "An Informational Technology Resource Teacher. . . so that's a resource teacher that helps implement technology via teachers. Specifically works with teachers." However, this Instructional Technology Resource Teacher (ITRT) never interacted with the teachers at the high school for instructional purposes as described in the description she provided. Rather, he was present to help with the online gradebook that teachers had to use. In brief, Laura believed her context to be isolated from peers as she holds the mentor role in the department and the ITRT is not actually present for instructional purposes.

Laura believed that her teaching context was *student-dependent*. Her students were part of the environment surrounding her teaching and, therefore, made up part of the context. She made instructional decisions based on her beliefs about the students at that specific moment in time, reacting to her present teaching context.

> **Interviewer**: When you changed your plan and you decided not to do the writing assignment today, why did that change?
>
> **Laura**: Um because they'd already checked out and because after listening to half of them being at AfterProm and not caring about what was happening I thought, okay, well, we'll get chapter X, chapter 7 read, and then tomorrow, like after that, we'll do the writing assignment instead and maybe they'll be a little bit more invested.
>
> **Interviewer**: Do you think that the checking out that you mentioned when they were having side conversations and that kind of thing, do you think that is from the class activities or is that from just that you mentioned After Prom and things that are going on?

> **Laura**: Um, that's kind of been like a typical pattern because starting in when we started the class in February they were already counting down to spring break, and after they came back from spring break they were counting the Fridays to summer, so um it's kind of been a struggle for the whole semester.

Her students' behavior had become an embedded part of the context of her teaching that she anticipated during the entire semester. Although, these beliefs were tied directly to those beliefs about her students, they were inherently a part of her teaching context that could not be separated out.

In sum, Laura believed the context of her school was *resource-limited*, *policy-restricted*, *peer-isolated,* and *student-dependent*. She also saw a direct connection between students and context, which was expected given the nature of student component of a classroom environment.

***Beliefs about content.*** Laura's beliefs about content were broad and inherently linked to context. Laura believed that her content was determined by others. She stated that she was teaching the unit, "because [she] was told to." She did not offer protest about the change, even though she identified teaching something new as difficult and time-consuming. In fact, she spent part of her summer vacation reading the novel so that she would be prepared to teach it. She also discussed the technology tools she had used and explained that there had been a district push to move from traditional file storage on a hard drive or school severs to GoogleDrive, so she stored files for this unit there. She accepted the change in content without protest, believing that the content she was teaching came from administrative decisions, rather than teacher choice. Therefore, her content was shaped by her context.

Laura's content was *book-centric*. She specifically stated that one learning goal of the unit was, "to read the book." This is consistent with her department: "traditionally at our school, [we teach] longer works with a study guide. That's how you get content learned or understood." These study guides were plot-based questions with occasional quotes interspersed throughout. Students answered the plot questions and identified the speaker of the quote. The study guides were then the basis for the tests. Laura did delve deeper into the content of the book, addressing it through specific assignments geared toward students, like freewriting about their wedding, a topic that appeared in the book that she identified as one to which students could relate. All of the assignments, however, were based specifically on the content of the book itself.

Being so focused on the book shaped Laura's beliefs that technology was *perimetric*, serving a secondary or auxiliary role in delivering content. She used GoogleDocs for storage and presentation of the book-based study guide, and she used audio readings of the book to make the language more accessible to students. There was no use of technology to expand beyond the content of the book, such as social media communication with other classes reading the same book in another geographic location to compare interpretations beyond basic plot.

Laura believed that content was *student-constructed*. Reflecting on her lesson, she identified a gap in student learning:

> Laura: Okay, well, what went well was that they wrote down the answers. . . .I know they didn't read, so there wasn't much point in discussing the answers, so I guess that's the part that didn't go well. You know the actual thinking about the book.

Because students did not actually read the book itself, her content focus shifted in response to their needs, demonstrating a link between content and context. This was problematic as there were content learning goals besides simply reading the book. She also wanted students, "To have an understanding of gender roles. . . roles of African Americans, . . .and roles of African American women in the 1930s and to get just have an understanding of a different part of America in that time." These were still book-centric learning goals dictated by the setting and characters of the story, but they required students to construct their own understanding. She expressed a greater desire to have student-constructed content in her reflections at the completion of the unit where she addressed changes she wanted to make:

> **Interviewer**: "Is there anything that you want to change for them next time you teach?"
>
> **Laura**: "Yeah, but I don't know how yet. You know I tried literature circles for the first time this year with *To Kill a Mockingbird*, and that went okay. The length of the book is an issue and the amount that they have to read. So, I was thinking, okay, this is a shorter book. Maybe the literature circles with this book, but then the language is a barrier for some of them, like the dialect. So, my answer is yes, but I haven't fully figured out how to."

In literature circles, students are grouped together where they have to form their own understanding of the text. Laura, as the only teacher in the room, cannot deliver content to each group, forcing them to construct their own meaning from the work.

Finally, Laura believed that to manage the new book, she had to be *become familiar* with it. Familiarity with the content in a teaching context, not just as a consumer of the book, came from actually teaching a lesson or unit, evaluating, revising, and repeating the teaching process. She mentioned several times throughout observations that she was, "kind of nervous because [she'd] never taught the book before. [She] read it this summer, but [she'd] never taught it." Throughout the reading of the novel, Laura paused frequently to add notes to her copy of the text with literary devices, plot points, and notes about places to pause for student discussion. In comparison, her teaching copies of other novels are filled with annotations, Post-It notes, and other reminders, demonstrating that she built an expertise as she repeatedly taught units. As she built familiarity with the content, she was better able to address the problems like the language barrier that students faced when attempting to read the complex southern dialect. Until she saw how students responded to the text itself, she was unable to prepare for this challenge. Reviewing and revising also required a significant time investment that she could not provide while teaching the unit.

In sum, Laura's beliefs about content were that it was other-determined. It was book-centric and technology-perimetric, with aim that students would construct content once she was familiar with the novel and could adapt her lessons accordingly.

**Utility value.** Based on the evidence in Laura's lesson plans, observations, interviews, and assignments, she highly valued the utility, or usefulness, of the technological tools that she and students utilized when working in her classroom. She primarily used technology for *solving problems* as they arose in the classroom. Four types of problem solving uses were identified: clarifying language, saving time, supplementing resources, and providing feedback.

The technology's value for *clarifying language* was visible when students struggled with understanding a novel that was written in a thick, southern dialect. For instance, students struggled to make sense of the following paragraph:

> 'Lemme speak to mah wife a minute and Ah'm goin' see de man. You cannot have no town without some land to build it on. Y'all ain't got enough here to cuss a cat on without gittin' yo' mouf full of hair.' (Hurston, 1937/2013, p. 37).

The phonetic spelling of dialect to produce authentic sounding language proved too challenging for students at times. They made frequent comments about the difficulty of decoding words. As a solution, Laura used a digital audio recording found on another teacher's website to play for students so they could concentrate on understanding the story rather than decoding the words.

> It's a modern novel that uses dialect of southern black people, not quite, I mean one woman was a former slave, and then a couple generations later, so they have a very distinct way of talking, and in the book, their speech is written out as though they were talking, so sometimes just looking at the words it's hard to understand what they're saying if you just look at the letters instead of pronouncing them out, so that's why I went with the audio to listen to somebody read it better than I could or [the students] could.

Laura also shared the link with students so that they could use the digital recording at home as well, recognizing that the problem of decoding the novel's dialect extended beyond the classroom. In sum, the utility value of digital technology was that it solved a language-decoding problem for Laura's students. The authentic digital provided a way for students to access the novel's language through their personal devices so that they could complete reading assignments in and out of class.

Technology's value for *saving time* materialized when Laura projected a Google Doc on the front screen that contained answers to the study guide questions. This projection also allowed her to make the answers visible to all of the students thereby eliminating the time-consuming need for her to hand write answers on the board. It also saved time by eliminating the possibility that rushed handwriting would produce poor, illegible penmanship, wasting even more time by dictating answers to students. Her lesson plans indicated that saving time was something she designed into her teaching, anticipating possible technological difficulties, schedule changes, and other unexpected circumstances beyond her control. She noted assignments that students would need to complete for homework because there would not be enough time to do so during the 90-minute class period.

Technology’s value for *supplementing resources* surfaced that when the resources were unavailable (because they were being used by another teacher) or ill-suited to the task at hand. For example, when students had worked on vocabulary assignments, she allowed the use of cell phones, rather than dictionaries or laptops, because they were a better supplemental resource for students than the mismatched class set of dictionaries shared among all the school’s English teachers, which were old enough not to have all the vocabulary words that appeared in the core text being read. Laptops were another tool that could have been used to complete vocabulary assignments, but they were frequently used by the school journalism class that met at the same time Laura taught this class. Thus, cell phones provided the best value for locating updated definitions to all the students who needed them, and students were happy to collaborate when one student did not have a phone.

Finally, technology’s value for *providing feedback* became evident when students were permitted to type papers rather than hand write them as they prepared for the state standardized test. Laura provided typed, digital feedback (rather than handwritten comments on printouts) that was more thorough because the digital comment boxes expanded, allowing her to explain not only what students needed to change but also why they needed to change it. The typing of digital comment boxes also allowed her to deliver feedback more quickly, so students could access the it instantaneously, rather than wait for the entire class set of papers to be returned.

In sum, the solving of problems increased the utility value of Laura’s technology use. To her, the problem-solving uses included a broad range of topics including clarifying language, saving time, supplementing resources, and providing feedback.

**Attainment value.** No evidence to support attainment value as a motivation for Laura appeared as a part of this case study. As noted in Appendix G, attainment value was defined as something that is not required in the job position (completing lesson plans, posting grades, etc.) Laura made no mention of anything above and beyond those requirements in her interviews, nor was there anything present in any other data sources. While she did have a reputation with her peers as being a technology go-to person, she did not appear to learn the technology for this purpose. Rather, the status as a go-to person was a side effect of her tech proficiency. In the same way that Tweeting as a course requirement improved your reputation as a prolific social media user, the primary motivation was the course requirement to do so, not the desire to build one's reputation. Attainment value was not a factor in Laura's motivation to integrate technology innovations.

**Intrinsic value.** Laura's pedagogical decisions to integrate technology innovations were rarely driven by intrinsic value for this unit. While I knew her to be a tech enthusiast, during this project, she did not extend this personal belief to her professional life. She described Quizlet Live, a game she used with students to learn vocabulary. "I like it. It's really fun. And the kids have a lot of fun." This was the only instance in which she directly indicated that technology integration held intrinsic value for her. While I did have insider knowledge that she intrinsically enjoyed technology, the data sources provided for this study did not allow for triangulation, so it was not considered a strong category but was noted to show that the data did not capture something I knew to have been present.

Laura sees intrinsic value in technology at the personal level; however, this was not a primary motivation in her professional actions.

**Costs.** Based on the evidence in Laura's lesson plans, observations, interviews, and assignments, costs, which included all of the negative aspects that demotivated her to integrate technology and promote resistance to technology innovation, were present in her decision making (Eccles, et al., 1983). Three types of costs were identified: professional time, personal time, and limited affordances.

The cost of *professional time* surfaced in many ways. As stated in the description of the school context in earlier in Chapter 4, laptop computers and computer labs were available for student use, but they came at a cost. Acquiring devices required effort for teachers—securing devices through digital sign ups, planning lessons that use technology to coordinate with the available time slots, and managing work for students who were absent and then have to make up the technology-rich assignment—were all components that cost teachers time. Laura acknowledged the difficulties and chose to complete a creative writing assignment she adapted for use with her literature unit in the traditional pen-and-paper format rather than in a digital format.

> **Interviewer**: "You mentioned that laptop carts are available. Why were they handwriting the assignment and not doing it on the laptops, especially since you mentioned that you can edit and do a lot of commenting with Google Docs and that's something you prefer?"
>
> **Laura**: "[The laptops] were in use, and it's too big of a hassle to go down to the lab for that segmented amount of time."
>
> **Interviewer**: "What makes it a hassle?"
>
> **Laura**: "Everybody get your stuff. Go to the lab. Or don't get your stuff. Okay. Turn on the computer. Load. Go. Shut down. Let's walk upstairs. That."

The cost for Laura to introduce technology into this assignment was too great because of all the difficulties that arose with it, particularly the cost of acquiring the devices. Accessing computers would have cost Laura both planning and instructional time. Additionally, the creative writing assignment did not require the in-depth comments and feedback that more formal writing assignments demand, so the ease of providing digital feedback to students was not necessary. Attempting to alleviate the cost of instructional time by eliminating travel and allowing students to use personal devices would have created more problems than it solved. Because there was no control over the content on the phones, the influx of texts and social media would have been frequent distractions to students in the classroom.

The cost of *personal time* appeared in the data in several places. For Laura, who was also a club sponsor in school as well as a wife and parent, preparation time was also greater when technological innovations were involved. While discussing a graphic organizer she created for student responses, she explained, “That probably took fifteen minutes of my night, which doesn’t seem like a lot, but I have 5,000 other things I had to do, so yeah, time.” This planning saved her time in class, but it cost her fifteen minutes of her personal time at home. This was a simple innovation that eliminated preparation for an activity, and it did not require a large investment in time. However larger innovations like changing entire lessons or units, incorporating new software packages, or adding one-to-one devices for students required a much larger investment of planning time, dedicating hours or days of personal time to creating new projects.

The cost of *limited affordances* was present in the data. The constraints of specific technologies also contributed to the decisions that Laura made. Digital technologies allowed communication around the world but required a device, and the available devices were not very mobile. Trying to carry a laptop around the room while using it for communicating with others through a Google Doc was not a safe option for either the students or the machines. Laura chose to have students walk to the board in the front of the room as “an excuse for movement” that the antsy group of children appreciated. In this case, the technology would have constrained students literally by limiting the movement that they could make. Laura attempted to use digital technologies for assessments but found that the advantages of faster feedback through automatic grading and the speed with which she collected student responses were not sufficient.

> “I used a Google Form to do a quiz before, and it was grammar based, and it was not all multiple choice. It was…they had to write out sentences, and so that was the part where I couldn’t use Flubaroo to check an answer. That became more awkward than just using pen and paper.”

Grading these assignments through automatic add-ons like Flubaroo was not possible, and reading the responses on the computer was not efficient. Therefore, grading these assignments cost Laura more time and effort than she would have given by grading them in a more traditional format. Even with the updates that Google made to the Forms platform, allowing for automatic grading, the platform still could not evaluate short-answer or essays responses.

In sum, Laura experienced three types of costs: professional time, personal time, and limited affordances. Costs were a *primary factor* for Laura when making pedagogical decisions. The costs were not always associated with the technology itself, but with the related contexts (e.g. travel time, preparation work, etc.).

**Summary**

Laura’s beliefs and values were the driving forces behind her teaching and decision making. They are summarized below in Table 9 and Table 10.

Table 9:
*Laura’s Expectancy Beliefs*

| | **Category** | **Laura’s Beliefs** |
|---|---|---|
| **Expectancy Beliefs** | Beliefs about Technology | Parochial |
| | | Context-general |
| | | Symmetrical |
| | | Functional-purpose |
| | | Efficiency-centric |
| | Beliefs about Self | Mastery skill |
| | | Acquiescent |
| | Beliefs about Students | Disengaged |
| | | Intelligent |
| | | Capable |
| | | Extrinsically motivated |
| | Beliefs about Context | Resource-controlled |
| | | Policy-restricted |
| | | Student-dependent |
| | | Peer-isolated |
| | Beliefs about Content | Other-determined |
| | | Book-centric |
| | | Technology-perimetric |
| | | Student-constructed |
| | | Need to become familiar with |

Table 10:
*Laura's Value Beliefs*

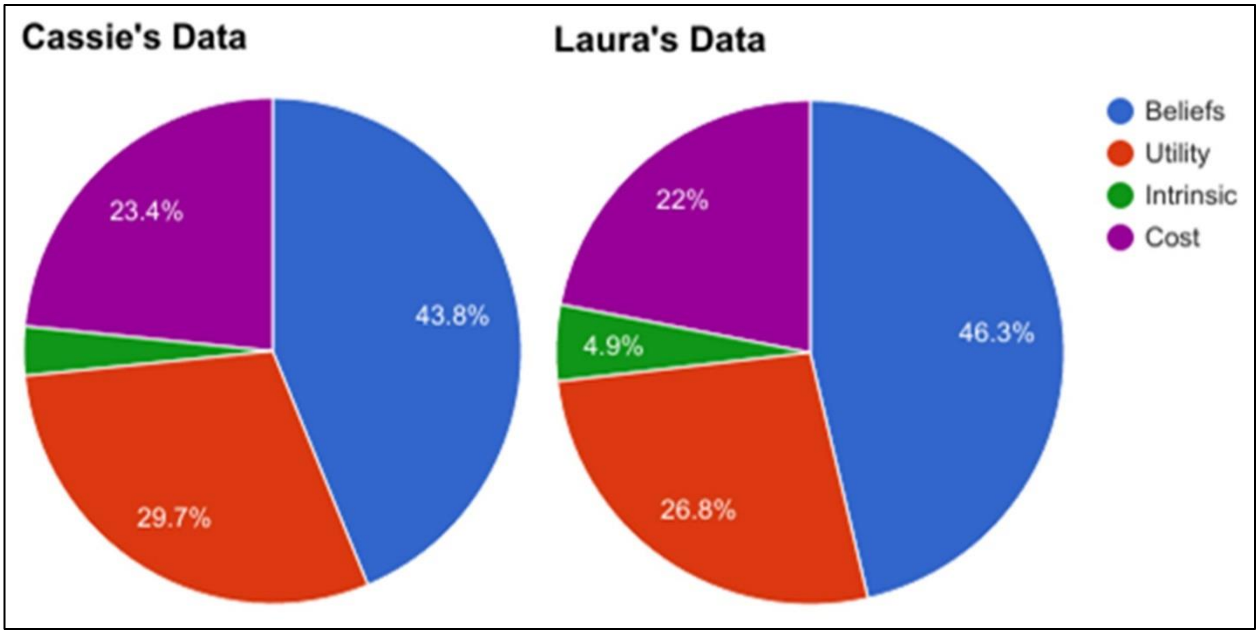
| | Category | Laura's Beliefs |
|---|---|---|
| **Value Beliefs** | Utility Value | Clarifying language |
| | | Saving time |
| | | Supplementing resources |
| | | Providing feedback |
| | Attainment Value | Not important |
| | Intrinsic Value | Not important |
| | Costs | Professional time |
| | | Personal time |
| | | Limited affordances |

Laura's beliefs about technology were extensive and deeply situated. Her consistent view of technology as a tool with flexibly of use in both function and context illustrated the expertise and confidence she had in herself. Her symmetrical representation of technology as tools for both herself and her students expressed an expertise as well, recognizing that her use of technology also affected students, rather than only acknowledging the use of tools by students as affecting them. However, these beliefs contributed to her efficiency-centric pedagogical views and decisions. She valued utility in the tools that she used, and she saw costs as a primary concern in her decision making.

## Comparisons

There were some similarities between the two cases in this study. The descriptive data for both teachers was almost identical. As Figure 12 below depicts, the percentage of each category was almost identical.

Figure 12: Comparison of Data Code Percentages




Beliefs were by far the most frequently present type of motivation that existed for both teachers. Costs and utility value were also significant categories, with high appearances across all types of data sources. Utility value manifested for both teachers in time-saving and value-adding features.

## Summary

The results of this study provided some answers to the research question of what motivates teachers to integrate or resist technology innovations in a school moving toward one-to-one devices. In both cases, the resounding answers to this question were teacher beliefs, utility of technology, and costs of technology innovations. What was more obvious from a detailed study of the data was that these categories are inherently messy, complex, and influential of each other so that they cannot be cleanly dissected from each other. The influences of beliefs over utility value and cost were evident in the reciprocal relationship created. The nature of teacher motivation in relation to student attitudes and contextual factors shared similar overlaps that made it impossible to fully separate. The whole of teacher motivations for integrating or resisting technology innovation was inherently greater than the sum of the parts. This fit the theoretical explanation offered in Expectancy Value Theory as it is a synergistic theory (Trautwein, et al., 2012).

There were, however, differences across the cases as well. While not clearly apparent from the simple qualitative data, further analysis revealed a strong distinction between the two teachers. Despite having access to the same non-digital resources, approximately the same number of years teaching, the placement in the same classroom and school setting, there are vastly different qualities that appear in the connotations of their data.

Additionally, the fact that Cassie had access to one-to-one devices every day affected her beliefs as there were no concerns about device availability, an aspect of teaching with which Laura had to contend in order to integrate technology, which may have also affected her beliefs about the context and the school.

Another interesting note for comparison was the difference in costs for the teachers. Despite having to contend with actually acquiring devices for students to use, Laura had fewer instances of costs than Cassie did. This was perhaps due to Laura's self-identification as a tech-savvy person. While Laura's self-identification was certainly a belief she held that Cassie did not feel, it also could manifest as a lower cost to use technology. If Cassie viewed technology as difficult and challenging because of her beliefs, she may have also found that integration of technology innovations cost her more in time and effort.

There were innumerable factors affecting the participants that contributed to the participants technology integration and resistance; however, there are several broad categories that allow for comparison across the two cases. These categories are included in Table 11 and Table 12 below where the categories in which participants differed are highlighted.

Table 11:
*Comparison of Expectancy Beliefs with Highlighted Differences*

| | Category | Cassie's Beliefs | Laura's Beliefs |
|---|---|---|---|
| Expectancy Beliefs | Beliefs about Technology | Ecumenical | Parochial |
| | | Asymmetrical | Symmetrical |
| | | Context-specific | Context-general |
| | | Fixed-purpose | Functional-purpose |
| | | Student-centric | Efficiency-centric |
| | Beliefs about Self | Developing skill | Mastery skill |
| | | Zone-dependent | Acquiescent |
| | Beliefs about Students | Effortful | Disengaged |
| | | Intelligent | Intelligent |
| | | Independent | Capable |
| | | Intrinsically motivated | Extrinsically motivated |
| | Beliefs about Context | Resource-influenced | Resource-controlled |
| | | Policy-restricted | Policy-restricted |
| | | Student-dependent | Student-dependent |
| | | Peer-shaped | Peer-isolated |
| | Beliefs about Content | Other-determined | Other-determined |
| | | Book-centric | Book-centric |
| | | Technology-perimetric | Technology-perimetric |
| | | Teacher-delivered | Student-constructed |
| | | Need to control | Need to become familiar with |

Table 12:
*Comparison of Value Beliefs with Highlighted Differences*

| | Category | Cassie's Beliefs | Laura's Beliefs |
|---|---|---|---|
| **Value Beliefs** | Utility Value | Allowing flexibility | Clarifying language |
| | | Saving resources | Saving time |
| | | Accessing information | Supplementing resources |
| | | Providing feedback | Providing feedback |
| | Attainment Value | Not important | Not important |
| | Intrinsic Value | Not important | Not important |
| | Costs | Instructional time | Professional time |
| | | Competing content | Personal time |
| | | Personal frustration | Limited affordances |

These areas helped to clarify the differences these two teachers demonstrated in their integration and resistance of technology innovation. Cassie demonstrated more instances of technology integration in her teaching; although, she had more novice beliefs about her abilities and the role that technology could play in her classroom. Laura, however, believed in her expert abilities but showed less integration. This unexpected outcome suggests that there is a hierarchy in the beliefs and values that must be taken into account when trying to understand teacher motivation.

# Chapter 5: Discussion, Synthesis, Limitations, and Implications

## Introduction

This case study followed two teachers to answer the research question: What motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices? The topic of motivation is a complex one, and there are many factors in teaching that contribute to a teacher's decision-making process. Several factors were similar for both teachers. They spent their entire careers in the same English department with only two years separating their experience levels, both of which are over a decade long. In addition, they both had similar resources—in forms of support staff, books, time, and funding—with one marked difference: the Chromebooks available to Cassie's class. Even though many of their experiential and contextual factors were the same, the evidence gathered and analyzed for this study indicated that the teachers differed in their use of digital technology and their motivation to use it.

The discussion that follows examines the results presented in the previous chapter in light of existing literature, drawing on the knowledge already available in the field and shedding light in new areas. In the following sections, I first discuss the results in light of the existing literature. Next, I synthesize the results and literature by identifying four cross-cutting themes. Then, I identify limitations of the study. Finally, I highlight implications of the results and suggest future areas of research and practice.

## Discussion

In the sections that follow I discuss the results for each teacher in light of the existing research literature, beginning with their expectancy beliefs and then focusing on their value beliefs

## Expectancy Beliefs

The literature is filled with studies that report strong connections between teachers' beliefs and their technology integration (e.g. Ertmer, 2001; Ertmer, 2005; Galvis, 2012). However, the nuances of this connection are not well described and understood. Thus, this study sought to closely examine the nuances in two teachers' beliefs and understand them in light of the existing research on expectancy beliefs.  This manifested in several subcategories, including the context in which they were teaching and the students who were in their classes. Themes emerged within the subcategories that were also shared across both cases, suggesting that they are influential in a variety of contexts. Beliefs about technology, while not the same for the participants, were highly influential. Further beliefs about students were extremely important to both teachers. This makes sense given that the students are such a large part of the teaching context, which also had its own set of related beliefs. Value beliefs also played a role in the motivation of these teachers. Costs manifested in a variety of ways for both individuals, but they appeared to be a primary factor for Laura, while they were a secondary factor for Cassie. Technology enabled both teachers to do something not just faster but at a higher quality, allowing Cassie to be more efficient and Laura to solve problems.

**Beliefs about technology.** In a general way, Cassie's and Laura's beliefs about technology were similar: both saw digital technologies as tools to use with a purpose. However, a closer look reveals nuanced differences in this general belief.

For instance, Cassie's view was ecumenical, while Laura's was parochial. Interestingly, Cassie's ecumenical view was asymmetrical with her actions and Laura's parochial view was symmetrical with her actions. In other words, Cassie held a broad view of technology (i.e., any tool is a technology: a pencil, a piece of paper, a laptop, a ceiling projector), but only used digital technology in teaching. Laura, on the other hand, held a narrower view of technology (i.e., only digital tools are technology: a smartphone, a desktop), using only digital technology in her teaching. Both of these conceptualizations are consistent with the literature reviewed in Chapter 2 in that they define technology as a tool (Cole & Derry, 2005); in addition, their operationalization of the definition is all digital, remaining cohesive with standards and legislation in the field (ISTE, 2008; ESSA, 2015).

Cassie viewed technology in context-specific ways. For instance, she saw a tool as usable at either school (e.g., Google Docs) or home (e.g., Facebook), but not both. Cassie's view was consistent with the literature on resistance reviewed in Chapter 2 because it represented a risk (Howard, 2013). To her, using technology that was not intended for the workspace, like Facebook, was a violation of school policy. She held that bringing in other tools would risk violating that policy, which was against her personal moral code. To avoid this risk, Cassie adopted a context-specific view of technology that minimized her risk because it kept her personal and professional uses of technology separate. In contrast, Laura saw a tool (e.g., G-Suite) as usable at both school and home. She did not perceive the elements of risk that Cassie did, nor did she experience any of the personal risks that Cassie felt. Laura's belief was also consistent with the literature on risk reviewed in Chapter 2 (Howard; Timucin, 2009) because she did not perceive technology used at both home and school as a risk, which, in turn, did not affect her motivation. In contrast, Cassie was a more reserved individual, so her aversion to risk was consistent with her personality. She was also still working to perfect the College Composition course, which was newer to her than the English 11 course was to Laura.

Cassie viewed technology as having a fixed purpose, while Laura viewed it as having functional purposes. Once Cassie determined that a tool was working well, she fixed a specific purpose to the technology. With that purpose fixed, she was decidedly resistant to change, which lowered her motivation to innovate, or try new things with that same platform. Only when a problem of consequence arose, like the challenge her students faced when submitting assignments, did she un-fix her view and accept that an alternative purpose could be affixed to the technology. Cassie's fixed-purpose view resembled the literature on resistance reviewed in Chapter 2 (Bovey & Hede, 2001; Stanley, Meyer, & Topolnytsky, 2005) as she was resistant to change in her teaching practices, only volunteering to alter her practices when there was a problem. Conversely, Laura's functional-purpose views resembled the literature on integration reviewed in Chapter 2. She chose specific tools to solve problems in the classroom in a responsive way, integrating her knowledge of the content, the technology, and her pedagogy, which are the key components of integration (Koehler & Mishra, 2005).

Cassie viewed technology integration through a student-centric lens, focusing on its use from their perspective. This resulted in her focusing most on the student learning component of technology use. This belief was consistent with the literature in Chapter 2 on technology use, which indicates that it can positively affect student learning (Junco, et al., 2013; MacArthur, Ferretti, Okolo, & Cavalier, 2001). In contrast, Laura viewed technology integration through an efficiency-centric lens, focusing on getting the most out of technology, regardless of whether she or they were using it. Laura focused more on the classroom management aspect of technology. This is also consistent with the literature in Chapter 2 on technology use, which indicates that technology can be used as a classroom management tool to guide student behavior for the purposes of increasing engagement and learning (Evertson & Emmer, 2016).

Cassie and Laura both demonstrate strong beliefs about technology: what it is, where it is, and why they use it. The findings remain consistent with the domain-focused nature of EVT as they are broad categories, rather than specific tasks (Trautwein, et al., 2012). These beliefs are not true expectancy beliefs, which the literature defines as beliefs about one's ability to be successful, but rather are about personal knowledge that affect expectancy beliefs (Eccles, et al., 1983).

**Beliefs about herself.** The importance of beliefs is not a surprising theme to find within the data of this study. The literature, both theoretical and empirical, identified beliefs as strong predictors of behavior (Bandura, 1997; Borders, Earleywine, & Huey, 2004; Eccles & Wigfield, 1995; Pajares, 1996). However, on first glance, one could argue that beliefs were a poor predictor of behavior considering that Laura, who saw herself as a capable technology user actively made decisions not to use digital tools. On closer examination, there are several possible contributors that could have affected the behavior of both Cassie and Laura.

Cassie's view of herself as a non-tech-savvy individual framed her identity as a person who still has developing skills; however, despite her self-admitted success in using a wide variety of platforms including Prezi, Google Apps, and Kahoot, she avoided technology-focused PD activities for fear of not being adequate, showing zone-dependent beliefs. This is consistent with theory where negative beliefs inhibit motivation (Eccles, et al., 1983). Even with her avoidance of these PD activities, she maintains an intense commitment to bettering herself through trial and error in the classroom and through peer support, demonstrating a mastery goal orientation as she is developing her technology-specific skills and abilities (Ames, 1992; Midgley, et al., 2001). In contrast, Laura demonstrates a belief in mastery skill levels when using technology. This leads to an approach orientation (Ames, 1992), where she is willing to try new things like her proposed changes to the literature unit because she believes she will be successful. Laura also demonstrates an acquiescent attitude; however, it is not technology related. Instead, when she feels that she cannot successfully manage a conflict, such as the one with her students' cell phone use, she avoids the battle, an avoidance behavior (Ames, 1992). Cassie's view of herself is somewhat surprising because she is so visibly effective in using technology. Because her course is completely embedded in the G-Suite platform, her continued identification as a non-tech-savvy user came as a surprise to those who had seen her in action. In this sense EVT provided a nuanced understanding her views because it takes into account her beliefs about herself. While it does not explain why she has those beliefs, it does offer an explanation as to why she avoids innovation but not use.

Expectancy beliefs, the beliefs about one's success or failure, are a key component of EVT. The beliefs that each teacher holds about herself are critical elements to predicting their integration or resistance to technology innovation. However, these beliefs alone are not sufficient to predict their behavior. The fact that Laura had less digital technology integration when she had stronger beliefs in her ability to be successful and a placed a high value on technology use demonstrates the synergistic nature of EVT where a high expectancy belief cannot overcome low task value components (Trautwein, et al., 2012).

**Beliefs about students.** In general, Cassie and Laura accounted for many of the same things when considering their students: what students were capable of learning and doing, what students needed to know, what would benefit student learning, and what would work in their specific classroom context. The consideration of these criteria is consistent with the literature in Chapter 2 that, "technology is a means, not an end; it is a tool for achieving instructional goals, not a goal in itself" (Ringstaff & Kelley, 2002, p. 1). However, their beliefs about their students shaped their expectancy beliefs for integrating technology.

Laura and Cassie were both deliberate in their decisions to manage student behavior; however, some of these decisions were about the exclusion of technology, rather than the inclusion of digital tools. Laura, believed her students were capable but disengaged; therefore, she chose to review guided reading questions by having students move to write on the board, rather than using a laptop cart where students could digitally collaborate. This allowed students to get up and move, something that she felt improved their attention and behavior. She also described her use of the Quizlet Live game where students competed against one another while learning vocabulary. Her beliefs about her students need for interaction and/or movement shaped her instructional decisions to either include or exclude technology for behavioral influence. This is consistent with the literature in Chapter 2 that suggests various technology platforms can influence classroom behavior (Sanchez, et al., 2016).

Cassie, on the other hand, believed her students were effortful and independent. She monitored their behavior, but chose instead to focus on teacher effectiveness. She was able to grade the resumes that students submitted and return them to students in a timely manner via GoogleDrive. Her decision to provide feedback via GoogleDocs made her more efficient because she could provide a larger quantity of high-quality feedback to them. She also required students to complete peer reviews, trusting that they would work responsibly and not get sidetracked on conversations about clothes, weekends, or prom. This is consistent with the literature in Chapter 2 which identifies both teacher and peer feedback as beneficial to student learning (Zheng, Lawrence, Warschauer, & Lin, 2015) and that technology can supplement face-to-face classes (Lonn & Teasley, 2009).

While it was not a reflection of their own motivations, Cassie and Laura identified the type of motivation to which their students responded, and that knowledge shaped their beliefs

(Eccles, et al., 1983). Cassie believed her students were intrinsically motivated, while Laura believed her students were extrinsically motivated. Because of this belief, Cassie expended less effort trying to motivate her students through classroom activities, allowing them to regulate themselves, while Laura focused on activities that could interest students, such as the writing prompt to describe their own wedding. This difference between teachers is consistent with the literature in Chapter 2 where intrinsic motivation is associated with increased persistence, self-regulation, and better performance (Cullen & Greene, 2011).

Cassie and Laura both demonstrate strong beliefs about their students. These beliefs are not true expectancy beliefs, which the literature defines as beliefs about one’s ability to be successful, but rather are about personal knowledge that affect expectancy beliefs (Eccles, et al., 1983). They also shape the utility value that each teacher believes various technologies offer. Because of the differences in their students, Cassie and Laura experienced different utility values for various technologies. What was useful for one group--independent work time with asynchronous communication--was not conducive to the other group that needed the ability to get up and move. The nature of EVT allows for the individual teacher to value tasks differently based on their usefulness in the classroom.

**Beliefs about context.** Both teachers saw their context as policy-restricted. Despite having desires to use other platforms, policy limited the tools that were available. For example, Cassie wanted to use Hulu and Netflix as resources, and Laura had an interest in integrating phones into class. Similar to the local school policies, national policies have influence over what happens in the classroom either through direct legislation (Schrum & Levin, 2009) or through pressure for high scores that trickles down in the form of administrative mandates such as increased testing and changes to the amount of instructional time (Jennings & Renter, 2006;

Reback, et al., 2014). These policy-mandated changes contribute to change fatigue in teachers (Orlando, 2014).

Both teachers also saw their context as student-dependent. They made decisions based on what was best for their students, incorporating their beliefs about students into their decisions. For example, Cassie allowed students to use their notes on tests/quizzes, while Laura provided an audio recording of the text to allow students access. This is consistent with the literature surrounding technology integration: teachers made decisions that fully integrated technology, content, and pedagogy together to be effective in their instruction (Koehler & Mishra, 2005). Further, it explains the selection of various tools according to their perceived utility value (Eccles, et al., 1983) as each teacher chose the tools that would be the most useful in her classroom.

Cassie saw her context as resource-influenced. She was able to change her teaching decisions because of the availability of technology. The presence of technology added to what she could do with her students, creating an approach environment (Ames, 1992). Laura, however, saw her context as resource-controlled. Not having Chromebooks hugely increased her cost for integrating technology. This created an avoidance behavior in Laura (Ames, 1992) because she felt the costs would prevent her from finding full success; they were too great to achieve all the other objectives she had, and incentives like increased student learning were not enough to overcome environmental barriers (Lei & Morrow, 2010).

Cassie saw her context as peer-shaped. She constantly took in what others around her were saying. While Cassie was attending the professional development sessions, albeit reluctantly, Laura, her peer, was leading them. This gave Cassie an opportunity to think about innovation in many more forms than Laura, which allowed Cassie to have more possibilities for something new to her. This behavior is consistent with the literature reviewed in Chapter 2 where professional development participation is one way to help teachers think about innovation (Bakkenes, et al., 2010). Laura, however, saw her context as peer-isolated. As the go-to person in the department, she did not have peers locally with which she could discuss ideas or share best-practices as equals. Rather, she was the more experienced individual. Laura was isolated by her knowledge and experience. Her lack of peers gave her fewer opportunities to participate in the social nature of innovation. This is also consistent with the literature reviewed in Chapter 2 which indicates the importance of the social nature of innovation in education (Bakkenes, et al., 2010; Lei & Morrow, 2010).

Cassie and Laura both demonstrate strong beliefs about their context. These beliefs are not true expectancy beliefs, which the literature defines as beliefs about one's ability to be successful, but rather are about personal knowledge that affect expectancy beliefs (Eccles, et al., 1983). EVT acknowledges that the cultural milieu plays a role in shaping expectancy beliefs (Eccles, 2005). In this case, the culture or context in which these teachers are working shapes their beliefs about technology integration and resistance. By acknowledging the role that context plays in shaping beliefs, EVT sharpens its focus as a theoretical lens for the research question.

**Beliefs about content.** Cassie and Laura both viewed the content they taught as other-determined. Administrators from the community college or their high school department, respectively, made decisions about what they were to teach. They were not part of these content decisions. For instance, Cassie and Laura both described a last-minute content change that was made for them about which book to include in their classes. Under these circumstances, both teachers developed a book-centric view of their content. Thus, the textbook for Cassie and the novel for Laura were not only sources of content but sources of frustration and discomfort that left them feeling ineffectual as instructors. These feelings--frustration and discomfort--shaped their motivation, which is consistent with the literature from Chapter 2 that identifies emotions as having a role in shaping self-schemas, which, in turn, shape goals (Schunk, et al., 2014). Top-down changes in content like that experienced by Cassie and Laura are also a source of "change fatigue" (Orlando, 2014), which at the time of this study left the teachers viewing technology as perimetric to their curriculum.

Both classroom teachers were forced into innovative curriculum changes because of administrative policy. In this situation, expecting them to create even more novel lessons is unrealistic as they both have limited time to prepare lessons. The novelty in the content required each teacher to use time, but for different purposes. Cassie also had forced innovations with the new textbook as well as the limits on Netflix and Hulu on her own past curriculum, but she demonstrated a need to control the new curriculum. Cassie believed that her prior practices were the best way to teach her students and, therefore, resisted the changes. This is consistent with the literature reviewed in Chapter 2 where resistance to change occurred when teachers believed that current practices were the best practices (Mayaa, 2007). This is also consistent with control-value theory (which shares the influence of affective reactions with EVT), where increased control leads to increased motivation (Pekrun, 2000). Laura, on the other hand, felt the need to become familiar with the book and once she had, she stated a desire to change the unit now that she had completed teaching it the first time.

Cassie believed that content was teacher-delivered while Laura believed that it was student-constructed. Cassie had a set curriculum where she distributed information to students that they would then apply. This is consistent with the literature reviewed in Chapter 2 where resistance to change occurred when teachers believed that current practices were the best practices (Mayaa, 2007). This is also consistent with control-value theory (which shares the influence of affective reactions with EVT), where increased control leads to increased motivation (Pekrun, 2000). Laura, however, expressed a desire to respond current student knowledge and prepare activities where students could construct their own meaning, like literature circles. This is consistent with the literature reviewed in Chapter 1 and Chapter 2 in that it shows a relationship between content familiarity, pedagogical practices, and technology use--a key component of the TPACK Framework (Koehler & Mishra, 2005). Laura has become familiar with the content and can now make decisions to change pedagogical practices and include technology tools in those revised practices.

Teachers' beliefs about content affect their short- and long-term goals for their students and themselves. This has a direct influence on expectancy beliefs (Eccles, 2005). Further, previous experience with the content was not possible with the new content, which could have affected the self-schema of the teachers. The interrelated nature of these categories is well-represented in EVT through the synergistic nature of the theory where interactions between the categories occur making the whole greater than the sum of the parts (Trautwein, et al., 2012).

**Utility value**

Cassie and Laura recognized the usefulness of technology for saving resources (including time) and providing feedback, reflecting a strong understanding of the components of integration: the technology itself, the pedagogical strategies that fit their students, and the nature of the content they were teaching (Koehler & Mishra, 2005). Both teachers evidenced strong motivations for using integrated technology, which is distinct from innovating with technology. They used tools that they knew well for useful purposes, but the focus of innovation was harder to observe.

For example, Cassie noted that using Kahoot for review allowed her to save temporal and physical resources. Similarly, Laura explained that having a prepared GoogleDoc that she could project saved her time as she didn't have to wait for students to write the answer on the board or to explain the handwriting to those in the class who had difficulty reading the handwriting on the board. This is consistent with the literature reviewed in Chapter 2 where other teachers have identified time and resources as something they value having that is often sparse (Lonn & Teasley, 2009; Orlando, 2014).

Cassie found utility in technology that allowed flexibility in her teaching. She used GoogleDocs to allow students to communicate with each other and her asynchronously as well as turn in their assignments outside of the classroom, something that was very important to her students who were frequently involved in other school activities that pulled them out of class. This is similar to the literature reviewed in Chapter 2 where technology enabled teachers to be flexible in their classroom management (Schaffer, 2016). On the other hand, Laura found utility in technology that allowed clarification of language in her teaching. She used audio recordings so that students could hear the dialect presented in Their Eyes Were Watching God. This is consistent with the literature reviewed in Chapter 2 where adding technology to traditional assignments enhanced student learning (Taylor & Duran, 2006).

Cassie found utility in technology that allowed her and her students access to information. For instance, she had students access job announcements in real time using internet sites like Indeed.com and Monster.com. This is consistent with the literature reviewed in Chapter 2 as Cassie saw the digital classified pages as offering a more effective way to instruct students than traditional methods where students search newspaper classifieds or write a generic resume and cover letter (Zhao & Cziko, 2001). Laura, on the other hand, found utility in supplementing resources. While the school provided textbooks and class sets of novels for students, she sought out audio recordings and digital platforms for teaching vocabulary words. This is also consistent with the literature reviewed in Chapter 2 as Cassie saw the digital classified pages as offering a more effective way to instruct students than traditional methods where read novels independently or made paper flashcards of vocabulary words (Zhao & Cziko, 2001). While both of these teachers found a way to use technology to enhance teaching beyond the traditional methods to which they had access, they did so in different ways: accessing information and supplementing resources.

Teachers' beliefs about context and content affected their short- and long-term goals for their students and themselves. This, in turn, shaped their beliefs about what was useful and valuable in their teaching, which had a direct influence on expectancy beliefs (Eccles, 2005). The interrelated nature of these categories is well-represented in EVT through the synergistic nature of the theory where interactions between the categories occur making the whole greater than the sum of the parts (Trautwein, et al., 2012).

**Attainment value**

Attainment value was not a factor in either Cassie's or Laura's motivation to integrate technology innovations. This was somewhat surprising based on the theoretical model of Expectancy Value Theory and prior research where attainment value was confirmed via factor analysis (Eccles & Wigfield, 1995). One explanation for this is that the individual personalities of the two teachers did not seek recognition. In other words, they avoided drawing attention to themselves through awards or other recognition that would be captured in attainment value. This fits with prior research that identified each subcomponent of task value (utility value, attainment value, intrinsic value, and cost) as separate factors (Trautwein, et al., 2012). The lack of attainment value was not surprising for me as a researcher because of the teachers' personal values. They both seek to recognize others frequently in their work. Further, there are few acknowledgements (prizes, awards, etc.) available in the local school system beyond annual Teacher of the Year recognition, and neither of these teachers is involved with state or national organizations that provide recognition for teachers (ex. National Council for Teachers of English, State Council for Teachers of English, etc.) This lack of opportunity for recognition could also compound the natural avoidance for attention that these two teachers exhibited.

**Intrinsic value**

Intrinsic value was also not a factor in either Cassie's or Laura's motivation to integrate technology innovations. While both mentioned specific activities being "fun" neither teacher showed evidence through triangulation of data to support intrinsic value being a motivating factor. This was somewhat surprising based on the theoretical model of Expectancy Value Theory and prior research where attainment value was confirmed via factor analysis (Eccles & Wigfield, 1995). As noted in Chapter 3, I know that Laura does have an interest in technology, including new gadgets and tools, suggesting that there was an element that was not captured in data collection that is present. Another explanation is that the other subcomponents of task value were strong enough to mask a lack of intrinsic value, which is possible based on prior research that identified each subcomponent of task value (utility value, attainment value, intrinsic value, and cost) as separate factors (Trautwein, et al., 2012). Knowing each of the participants personally, it does not surprise me to find intrinsic value absent for Cassie. She maintains a paper calendar and writes in hardbound journals, and her social media use is always used for personal projects, rather than teaching projects. Laura, however, is a self-described "tech-nerd", so the absence of intrinsic value for her is surprising. This could be due to factors outside motivation affecting her choices. For example, her frustration with lack of funding for devices could prevent her from choosing the devices and software that she would inherently enjoy using with students. Another explanation could be that the data collection's taking place toward the end of the year when standardized tests were present could have resulted in the lack of triangulation for intrinsic data.

**Costs**

Both Cassie and Laura experienced costs in integrating technology into the classroom. Cassie felt the costs of instructional time and competing content. For example, she lost instructional time to dying batteries that had to be handled before students could work, and she faced competing content when she had to teach students to ignore some grammar suggestions from GoogleDocs. This is consistent with the literature reviewed in Chapter 2 that suggests time was an important factor in teachers' motivation and decision making (Chen, 2008). Laura, on the other hand, experienced the cost of both personal and professional time. She faced the loss of instructional time when she had to relocate students to use computers as well as when she prepared and administered state standardized tests, and she encountered the loss of personal time when she had to create unit plans for the new novel. that affected students, instruction, planning, and other aspects of their professional lives. This is consistent with the literature reviewed in Chapter 2 that recorded a loss of instructional time to increased requirement for testing at more frequent intervals so that teachers and administrators have more data on student progress (Jennings & Renter, 2006) as well as an increase in work hours for teachers, affecting personal time (Reback, et al., 2014; Grissom, Nicholson-Crotty, & Harrington, 2014).

Cassie felt personal frustration as a cost when integrating technology. For instance, she struggled for hours to use GoogleSites into the curriculum at the suggestion of a colleague, only to waste hours for it to remain unsuccessful. This is consistent with the literature reviewed in Chapter 2 where she experienced resistance to risk when she was unable to successfully integrate this particular platform in a meaningful way for her students, despite working to make it functional (Timucin, 2009). Laura, on the other hand, felt limited affordances were a cost when integrating technology. For instance, desire to use cell phones for instructional purposes that was unable to come to practice because of a lack of useful affordances that would help her to teach. This is consistent with the literature reviewed in Chapter 2 that explained beliefs, which should be strong predictors of behavior (Pajares, 1996; Bandura, 1997), sometimes conflict with behaviors.

Expectancy value theory assists in understanding these phenomenon as it offers the flexibility for teachers to value things differently, placing value on the task itself and acknowledging their beliefs. Teachers' beliefs about context and content affected their short- and long-term goals for their students and themselves. This, in turn, shaped their beliefs about what was useful and valuable in their teaching, which had a direct influence on expectancy beliefs (Eccles, 2005). Given that the literature recognizes that technology integration is a time-consuming, hands-on process that required participants to conceptualize integration of a specific technology for a specific content area in a specific learning environment (Morsink, et al., 2010), EVT acknowledges both the positive and negative aspects of beliefs and values that contribute to teacher motivations through a synergistic model where interactions between categories occur making the whole greater than the sum of the parts (Trautwein, et al., 2012).

**Synthesis**

Given the results and literature discussed in the previous pages, four cross-cutting themes synthesize the challenge addressed by this study: the complexity of motivation, the influence of beliefs, the role of technology, and the universal limitation of time. Each of these themes provides a partial answer to the research question: What motivates teachers to integrate or resist technology innovation?

First, it is clear from the results that teacher motivations are messy, tangled abstractions with complex interactions. Context is related to content and students, and elements of self will interact with each of these components individually. The established synergistic nature of motivation explained in EVT (Trautwein, et al., 2012) cannot be oversimplified in practice. This is important to the practice of motivating teachers because shifting one element will likely have impacts on other areas. Decreasing cost, for example, could also increase utility value. Beliefs about students may influence beliefs about content and context. Interventions in the classroom will likely alter more than just the intended target, thus requiring careful consideration, planning, and observation of effects when making changes. In response to the research question posed at the outset of this study, there is no clear, simple answer that can be plainly stated.

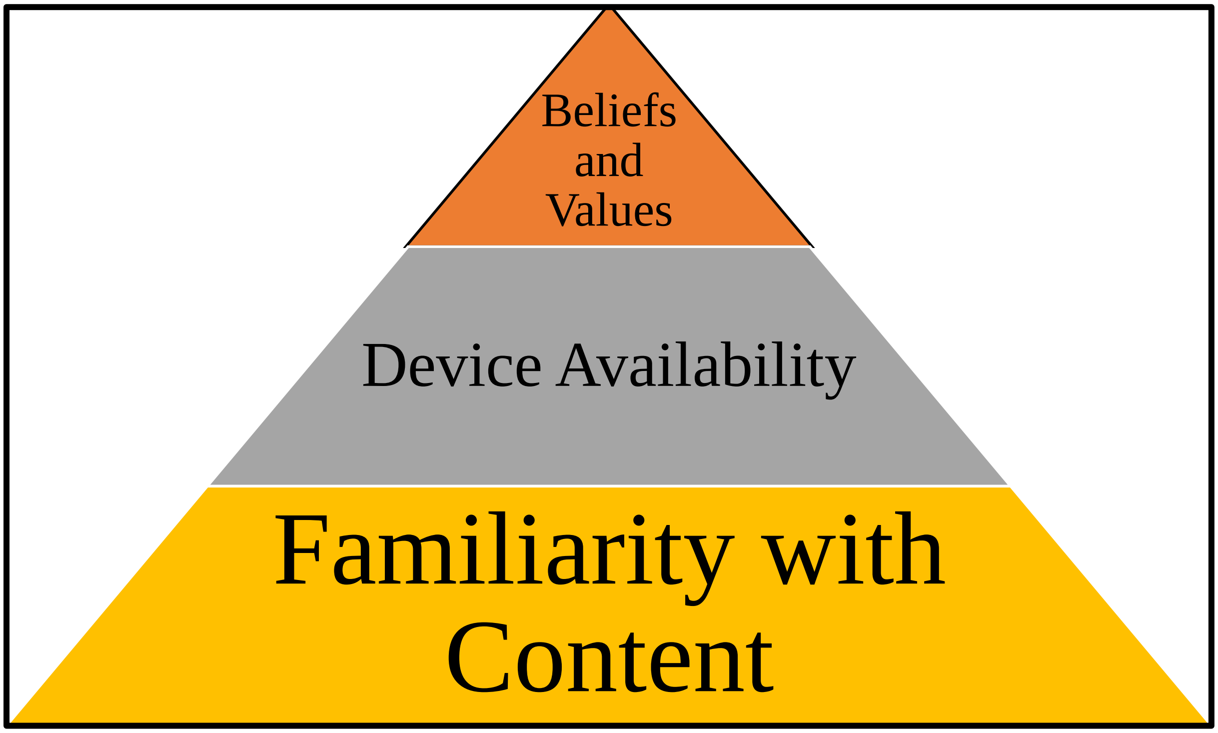
Second, the beliefs of the individual are highly influential. This theme is to be expected because much of the literature across various theories identifies beliefs as strong predictors of behavior (Bandura, 1997; Borders, Earleywine, & Huey, 2004; Eccles & Wigfield, 1995; Pajares, 1996). However, the data in this study suggests that these beliefs are individualized to the point where they cannot be generalized, even when individuals have many similarities in common areas. Despite sharing much in their professional lives—years of experience, content area, department, workplace history, general student population—these teachers had very different beliefs about technology and themselves. Even when there are many common characteristics, the answers will still vary. This is important to the practice of motivating teachers because it indicates that one-size-fits-all technology integration will be ineffective at meeting the needs of teachers, even those with much in common. Similarly, professional development designed to increase technology integration will also fail if it assumes a one-size-fits all approach. In response to the research question, each individual will have unique expectancy and value beliefs that shape her motivations.

Third, technology plays a role in teacher motivations for integrating or resisting technology innovation. This role, however, is not a straightforward one because technology use and technology innovation are not the same thing. As stated in the literature, “It is becoming increasingly clear that merely introducing technology to the educational process is not enough to ensure technology integration since technology alone does not lead to change” (Koehler & Mishra, 2005, p. 132); however, not having devices readily available increases the cost for teachers to use them, particularly in the time it takes to secure access. This cost could be ‘measured’ in terms of class time lost when students have to move to another location where devices are available or planning time needed to secure devices that are mobile and have to be brought into the classroom. Further, the literature also states that, “developing good content requires a thoughtful interweaving of all three key sources of knowledge: technology, pedagogy, and content” (Mishra & Koehler, 2006, p. 1029). Without devices that have low costs to access, even teachers who believe in their own success and the value of technology integration will not integrate innovations into their classes. Further, to have true integration, teachers have to be familiar with the digital tools in order to best negotiate the relationship between technology, pedagogy, and content. This is important for practice as it indicates that blindly spending money to purchase devices will not lead to integration, nor will withholding devices until there is a distinct path for use result in quality integration. There is a fine line where teachers have access to technology but also have familiarity with the technology to create true, valuable integration. In response to the research question, low-cost access to technology with which they are familiar enough to create meaningful integration contributes to teacher motivation. Further complicating this understanding is the nature of resistance. Motivation for resistance is not the opposite of motivation for use. Rather, motivation for resistance suggests gaining something based on the active resistance to technology, rather than the passive avoidance of it.

Fourth, the data presents evidence that time is the resource that is universally in short supply. Utility value came from saving time. Costs occurred when practices required time. Lack of time was something that both teachers shared, and it was well-represented in the literature (Lonn & Teasley, 2009; Mayaa, 2007; Orlando, 2014). This is important to practice as it indicates that teachers will need time to successfully innovate with technology integration. In response to the research question, time to learn about, experiment on, and create with technology may contribute to teacher motivation.

Based on the data & discussion presented in this and the previous chapter, I suggest that there is a hierarchy of needs that exist teacher motivations for true innovation. This hierarchy is illustrated in Figure 13 below.

Figure 13: Hierarchy of Technology Motivation Influences




Teachers must first have a keen sense of content. This may only be possible after having taught the content once before as knowing something and teaching something are two very different things. The source of curriculum is very important in the familiarity of content as well as even using a new textbook for the same content can be highly disruptive in a teacher's sense of the content she is teaching. Only once this content is thoroughly understood can a teacher expend time and energy on technology innovations. This is a critical facet of TPACK.

Second, the teacher must have access to devices. As stated in the literature, "It is becoming increasingly clear that merely introducing technology to the educational process is not enough to ensure technology integration since technology alone does not lead to change" (Koehler & Mishra, 2005, p. 132); however, not having devices readily available increases the cost for teachers to use them, particularly in the time it takes to secure access. This could be class time when students have to move to another location where devices are available or planning time to secure devices that are mobile and can be brought into the classroom. This is also a critical component of TPACK where the technology, content, and pedagogical conditions (including room location and access) must align for true integration to occur.

Only after the first two basic needs have been addressed can the beliefs and values that individual teachers hold come into play. This hierarchy explains why Laura, who self-identified as confident technology user, had few innovations in her classroom and, further, sometimes elected not to use digital tools in instances where the could have been integrated. When devices (e.g. cell phones) were readily available, she did not hold beliefs that they would be beneficial for her or for students. Cassie, on the other hand, had devices, but she saw herself as someone who struggled with technology and though she considered revisiting blogs in her class, she did not integrate them despite having daily access to devices.

It is essential to remember that this hierarchy is not necessarily representative of technology use. Cassie used technology daily in her class; however, the things she did were not necessarily innovative for her. She had extreme comfort with GoogleDocs, Prezi, and PowerPoint, the platforms that she regularly used.

EVT itself is helpful in understanding some of the nuanced aspects of motivation that are harder to interpret. The theory offers an explanation for why Laura who views herself as perfectly capable of being successful does not always integrate innovative technology because of the costs. Similarly, it also offers explanatory power to Cassie’s self-described status of non-tech-savvy while she integrates various software platforms weekly. In that sense, it is a helpful theory for understanding the research question.

## Summary

In sum, through close analysis of the data across these two cases, this study answers the research question: What motivates teachers to integrate or resist technology innovation in the context of a school moving toward one-to-one devices? The answer to this question is neither simple nor straightforward. As the reviewed literature and the data from this study demonstrate, there are interrelated factors that influence teacher decisions in a myriad of ways.

The four themes discussed in the previous paragraphs offer part of the answer to the research question: the complexity of motivation, the influence of beliefs, the role of technology, and the universal limitation of time.  There is evidence from both teachers that none of these themes exists in isolation as a complete answer or motivating factor. Beliefs were highly influential, but so was the role of technology and the universal limits of time. Thus, the evidence from this study indicate that these themes are all interconnected and cannot be viewed in isolation while maintaining a clear view of teacher motivation.

These themes also impacted the non-motivational factors of the study: technology, resistance, innovation, and integration. Beliefs about technology itself and about one’s ability to successfully incorporate technology were tied to the decisions to integrate tools. Time management was a factor for innovation, as both participants had limited planning time during the day and busy personal lives that they had to balance with their need to prepare strong lessons. Beliefs about context were heavily influenced by administration and policy changes, which, in turn, led to resistance to change because the content itself was changing. The purely motivational factors were influenced by the outside constructs. The number of connections that appear in the data was large, and the nature of those connections was complex, representing the incredibly complicated nature of motivations.

Additionally, the data suggests that some things manifest as beliefs or values that must be addressed before other beliefs and values can hold influence. Content familiarity manifesting in beliefs about content as well as costs and device availability manifesting as cost were highly influential over the teachers. While their influence was not mathematically measured, the fact that the expected behavior of the tech-savvy teacher, integrating technology frequently, did not occur suggests that they were highly relevant to the teacher's behavior and have a greater hierarchical role than other beliefs and values.

## Limitations

This case study's findings are limited to the unique circumstances that create it. Thus, its findings are focused on the specific situation and dedicated to a deeper understanding of the teachers, rather than a broader, more generalized understanding of the field.

The frameworks that shaped the study itself are, in fact, also the source of limitations. The interpretivist paradigm, in which truths are many has inherent limits because reality is subjective and constructed (Lather, 2006). While steps were taken to ensure the quality of conclusions (e.g. triangulation, second rater, second judge, etc.), the paradigm still requires subjective judgments. Additionally, the use of an established framework for coding based on Expectancy Value Theory biased potential codes. While remaining open to other sources was an option, the effect of having a pre-established coding protocol created a bias that automatically applied the EVT lens to the data, rather than viewing it without the guiding framework. The study's findings are also limited by my past relationship with both the research site as well as the teachers involved. My personal and professional relationship with both participants allowed me to have insider knowledge that simply would not have been available to an outsider either because of changed behavior of the participants or because of my increased interaction with them in the role of colleague and peer, rather than researcher. While methodological strategies were deployed to ensure the rigor of the study (e.g. triangulation of data, member checking, secondary coder, thick descriptions, and bracketing), they are not perfect strategies and cannot completely erase the bias that is inherently a part of this study. This is evident in the discussion of intrinsic value: I know from personal knowledge that it is present for Laura; however, there was not enough data captured to illustrate that point. Improving data collection through longer and more detailed studies of each teacher would be beneficial to improving both the quality and quantity of data sources.

The selection of content units within the study is a limit to the study for several reasons. First, the content units these teachers selected were not units where they felt comfortable with the content and were, thus, less likely to try innovations, regardless of their beliefs or comfort levels. This could also have affected teacher knowledge of the best way to integrate technology with pedagogical strategies and specific content (Mishra & Koehler, 2006). Second, there was no inherent requirement for the units selected to include technology. While this decision was deliberate in the methods, it also limited the data to what was available in the unit itself, which may not have been an accurate representation of the teacher. Third, the timeline of these content units was also a weakness in the study as it did not allow for further analysis across different classes as only one section was available during the day. Nor did it allow for long-term study across multiple units to see changes in technology use with the various pedagogical and content goals, which could have been a factor in the selection of technology use (Mishra & Koehler, 2006). Further, data collection took place at the end of the year. This is a busy time for teachers because of standardized testing, but it is also a time when energy reserves are depleted, and burnout is ever-present. Selecting another time of year or collecting data throughout the year would be beneficial in creating a more robust representation of participants

## Implications

This study is unique in its use of Expectancy Value Theory (EVT) to examine teacher motivation for integration or resistance to technology innovation. The nature of an interpretivist paradigm acknowledges “truths as many” (Lather, 2006, p.196); therefore, there are many truths that offer implications from this study. The study does begin to fulfill the call for more research that others have produced in the literature: barriers to technology integration (Buabeng-Andoha, 2012); contextual factors of 1:1 programs (Harper & Milman, 2016); instructor perspectives and attitudes (Kay, 2012; Manca & Ranieri, 2013). Future studies in all of these areas is still necessary to fully develop an understanding of teacher motivations for integration or resistance to technology innovation. Several questions for h and discussion related to these questions have developed as a result of this study:

1. Are there ways to minimize the time required for innovation so that teachers are more likely to try new tools/content/platforms that may save them time later?

2. Once barriers to technology innovation are identified, how can administrators help teachers to be more effective in their innovation?

3. What aspects of the teacher’s perspective can be better understood to improve the quality of teacher integration of technology innovation?

4. What aspects of teacher motivation could be better understood by pairing Control Value Theory and Expectancy Value theory for a fine-grained and coarse-grained lens, respectively?

Further, the results of this study have significant implications for teaching practices:

1. Mandated changes to curriculum contribute to teacher change fatigue and prevent them from exploring innovations of their own.

2. The presence of devices in classrooms is an important contributing factor to teacher technology use. Having access to mobile laptop carts or computer labs does not offer the same affordances that one-to-one device programs brings.

3. Teacher attitudes toward technology are highly influential, as the literature suggests. Improving teacher confidence in technology use has the potential to impact their integration of innovation in the classroom.

4. There are costs and benefits to technology integration. Beyond the monetary cost of devices, true integration requires an investment of time and effort on the part of the teacher that takes away from other things that the teacher could do. However, there are benefits, such as ease and quality of student feedback that benefit the student.

The importance of understanding teacher motivation and technology cannot be understated. Technology is an essential part of education today allowing students and teachers opportunities that are not otherwise available. Millions of dollars of education budgets are geared toward technology inclusion (ESEA, 2001). Spending that money in the most efficient way possible requires an understanding of why teachers are or are not integrating technology in innovative ways throughout their classrooms. In the end, there are many opportunities to build on this work and branch into meaningful directions to provide greater insights and details about what motivates teachers to integrate or resist technology innovation in a school moving toward one-to-one devices.

**APPENDICES**

## APPENDIX A

### Preliminary Email to Teachers

Dear teachers,

Many of you know me, but for those of you who do not, my name is Diana Campbell, and I am a graduate student at Michigan State University. I am seeking two individuals willing to participate in a research study examining teacher motivation for integrating or resisting technology innovation over the course of several weeks this spring. Participation will include interviews, collection of artifacts (lesson plans, student work, etc.), teaching observations, etc. Each of the two participants will receive a $250 gift card to a major retailer of his/her choice.

If you are interested in participating, please complete this preliminary survey to provide more information. You can access the link here or at this web address:

If you have any questions or concerns, please feel free to reply to this email. If you would prefer a face-to-face or phone meeting, please let me know, and I will be happy to arrange it.

Thank you for your time,

Diana Campbell

## APPENDIX B

### Preliminary Survey Questions

1. How often do you use technology in your classroom?

2. Would you consider yourself to be a tech-savvy person? Why or why not?

3. Do you try new things in the classroom? Why or why not?

4. Are you willing to commit to interviews and classroom observations for several weeks?

# APPENDIX C

## Phase 1 Interview Protocol for Background (Pre-observation)

Begin each interview by stating: “Just tell me what comes to mind with each question. There are no right or wrong answers.”

1. Beliefs (EVT Constructs:  Achievement, Utility, Intrinsic Value or Costs)
    a. How do you define technology in your classroom?
    b. Are you able to use technology successfully in your teaching? Why or why not?
    c. Do you use technology?
        i. If so, how? For what purposes? Can you provide examples?
        ii. If not, why? What alternatives do you use? Can you provide examples?
    d. What do you enjoy teaching? Why?
    e. Are there any tools you prefer using? What are they and why?
    f. Are there any benefits for you personally that come from using technology?
2. Environment
    a. What resources are available to you? (If necessary, provide examples: books, teaching aides, digital devices, etc.)
    b. Does your school have a technology policy in place?
        i. How familiar are you with it?
    c. Do you have the tools and resources that you need to be successful when integrating technology?

## APPENDIX D

## Phase 2 Interview Protocol for the Unit (Pre-observation)

1. Tell me about this unit.
    a. How do you feel about teaching this unit?
    b. What are the learning goals for students?
    c. Is the pedagogy in this unit the same or different from other units you teach?
        i. Can you provide examples?
    d. How does technology fit/not fit into this unit?
        i. Can you provide examples?
    e. Do you gain anything personally from teaching this way?

## APPENDIX E

### Phase 3 Interview Protocol for Lessons within Unit (Post-observation)

1. Identify specific date to focus questions.
2. Technologies used
    a. Why selected
    b. What went well?
    c. What went wrong?
3. Observations
    a. Deviations from plans
    b. Specific phenomenon observed
4. Other artifacts
    a. Blank assignments
    b. Completed student work

## APPENDIX F

### Research Participant Consent Form

| |
|---|
| You are being asked to participate in a research study. Researchers are required to provide a consent form to inform you about the study, to convey that participation is voluntary, to explain risks and benefits of participation, and to empower you to make an informed decision. You should feel free to ask the researchers any questions you may have. |

| | |
|---|---|
| Study Title: | Teacher Motivations for Innovating with Technology |
| Researchers and Titles: | Diana Campbell, Doctoral Student |
| Departments and Institution: | Department of Counseling, Educational Psychology, and Special Education (CEPSE), College of Education, Michigan State University |
| Contact Information: | Diana Campbell, campb800@msu.edu, 804-721-4136 |

Dear Teachers,

You are invited to participate in a research study that aims to understand what motivates teachers to innovate with technology.

If you consent to participate in the research, you will participate in interviews and observations during the regular school day. Your consent (if you choose to give it) simply authorizes me to use the data collected for future research.

Participation in this research study is completely voluntary. All information gathered will be kept confidential. This letter outlines the terms of the research study so that you can decide if you would like to consent to participate or not.

**1. Purpose of the Research:**
The purpose of this research is to understand what motivates teachers to innovate with technology and to explore the usefulness of Expectancy Value Theory as a lens.

**2. What You Will Be Asked To Do**
If you chose to consent, you will participate in daily observations of your teaching during a unit of your choice. You will also participate in individual and group interviews. Artifacts from the observations in the classroom as well as from the professional development may be collected. Examples of potential artifacts include, but are not limited to, lesson plans, photos of classroom, student assignments, etc.

All hard copies will be stored in a locked desk, and computer files will be password protected. No identifying information will be published, and pseudonyms will be used in the final research documents. Files will be destroyed after 5 years.

**3. Benefits of Participation**
Each participant will receive a $250 gift card to a major retailer of his/her choice at the end of the study.

**4. Potential Risks**
Participation in this study does include a time commitment. Observation days will occur during the regular school day, and interviews will take place after school hours. There are no additional risks for participation in the study.

**5. Costs and Compensation of Participation**
Participants will receive professional development/recertification points for participation. Additionally, $250 gift cards will be distributed among the participants.

**6. Privacy and Confidentiality**
Information about you and your identity will be kept confidential to the maximum extent allowable by law. For internal use, your contributions to the study will be identified by pseudonym only. All documents will be kept in a secure location for no more than five years. Only Diana Campbell, members of her committee, and the MSU Institutional Review Board will have access to data for this study. This study may be published or presented at professional meetings, but the identities of all research participants will remain confidential.

**7. Your Right to Give Consent, Say No or Withdraw**
Your participation in this research study is completely voluntary. You have the right to say no. At any time, and for any reason, you may change your mind, you may choose not to answer specific questions and withdraw from this research study without consequence. Withdrawal from the research study will have no adverse consequences and you may discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled.

**8. Contact Information**
If you have concerns or questions about this study, or to report a problem, please contact the researcher, Diana Campbell, at campb800@msu.edu or 804-721-4136.

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University's Human Research Protection Program at 517-355-2180, Fax 517-432-4503 or email irb@msu.edu or regular mail 408 W. Circle Drive, MSU, East Lansing, MI 48824.

Please feel free to keep a copy of the consent form for your records.

If you would like to voluntarily participate in this research study, please sign the next page.

Documentation of Informed Consent.
Your signature below means that you voluntarily agree to participate in this research study.

I voluntarily give consent to participate in the research study entitled *Teacher Motivations for Innovating with Technology*.

Name: ________________________________________

Signature: ____________________________________

Date: _________________________________________

**APPENDIX G**

**EVT Coding Protocol Book**

| **EVT Category**<br>*As defined by Eccles, et al. (1983)* | **Possible Manifestations** | **Secondary Coding** | **Possible Manifestations** |
|---|---|---|---|
| Expectancy Beliefs<br><br>*the belief one holds in his or her ability to be successful in a general area* | • Personal abilities to be successful with technology<br>• Feelings of inadequacy<br>• Predicted failure | • Beliefs about students<br>• Beliefs about self<br>• Beliefs about context<br>• Beliefs about technology | • Student attitudes<br>• Student behavior<br>• Gravitation toward platform<br>• Nervousness |
| Attainment Value<br><br>*the worth a task provides in terms of what it offers to the one who completes it* | • Certifications<br>• Awards<br>• Recognition in staff meetings<br>• Placement on technology committees | No changes from original coding scheme | |

| | | | |
|---|---|---|---|
| Intrinsic Value<br><br>*the worth a task provides in terms of internal pleasure that one receives from participating in a task* | • Personal emotions<br>• Fun<br>• Interest in technology | No changes from original coding scheme | |
| Utility Value<br><br>*the usefulness of a task* | • Saving time or effort<br>• Assisting in child learning<br>• Making something easier<br>• Increases quality of product | • Useful for teaching<br>• Useful for grading<br>• Useful for time management<br>• Useful for content | • Access to content<br>• Deeper feedback<br>• Dual purposes |
| Costs<br><br>*the value of whatever is given up in order to include the* | • Giving up time<br>• Giving up money<br>• Losing something because of the use of technology | • Time (Personal)<br>• Effort<br>• Time (Professional | • More planning<br>• Distractions<br>• Frustration |

*technological*

*innovation*

## APPENDIX H

### Positive/Negative/Neutral Coding Protocol

| Category | Possible Manifestations |
|---|---|
| Positive | • Increased productivity<br>• Increased student learning |
| Negative | • Problems created<br>• Detracting from teaching |
| Neutral | • Neither positive or negative words associated<br>• Stated as fact, rather than opinion<br>• |

## APPENDIX I

### Bracketing Statements

- The high school does not have enough devices to support the students. Two computer labs and a few laptop carts isn't enough for almost 1,000 students, especially when there are so many problems that crop up with the devices (software isn't updated, batteries aren't charged, all devices are taken when students are testing, etc.). There is also a limited support for teachers who want to do new things. PD is broad and generalized across the entire school or district, usually involves watching videos, and is usually completely irrelevant to classroom use.
- The school district has resources to provide technology, but doesn't always seem to use it in the best way. As a researcher, I question much about the technology plan that has been authored, particularly the "research" it mentions but does not cite. Once the district bought 25+ gaming systems with educational games. No teachers knew how to use them, and no PD or support was available. They were purchased with money that was use-or-lose, but there is no plan for "extra money" so that it can be spent strategically.
- I'm really bothered by the lack of research cited in the technology plan, and I don't agree with some of the claims that they are making about what practices are supported by research.
- I wonder who the stakeholders are mentioned in the technology plan. Only "lead teachers" were invited to participate along with principals, central office administrators, and tech specialists. This means that teachers were by far underrepresented in the gathering of this information, which seeps counterproductive since teachers were the ones that were supposed to be using the technology and pushing it into classrooms.
- There is a lot that the department does because of tradition. There is a very low turnover rate in the department, and many of the "comprehension packets" that exist in the department are the same ones that have been around for years. The books in the bookroom are new copies of what has been taught for years. Adding things to the curriculum is something that is new, but it happens by adding literature, not by changing how we teach.
- Laura is frustrated with her circumstances, and that is weighing on her. I can see that she isn't happy with what is happening in her classroom, and she's generally frustrated with her situation.
- It's really interesting how other people's views don't match up with what the teachers say about themselves. Both Laura and Cassie are leaders in the department and are individuals that teachers seek out for answers, but both of them share concerns about being "bad" teachers, and I know that they aren't. I would be very happy to be the kind of teacher that they are. They are two individuals that I admire greatly, and I worry that I'm not representing them sufficiently. I

remember the professional development that Cassie mentioned. John Streebe came in January of 2011 to work with the staff during a transition from 7 45-minute classes that lasted all day long to a 4x4 block schedule where students had 4 90-minute classes for half the year and 4 completely new 90-minute classes after the semester break. He spoke for an entire day about the use of teams in the classroom to motivate students and about his testing strategy where he had students take the test individually and then work as a team to complete the test together and learn from their mistakes immediately. This was a somewhat revolutionary concept for our school, but only two or three teachers changed their classroom seating arrangement, and Cassie is the only one who has maintained that seating change.

- These students are really frustrating Laura, and this has gone on throughout the entire unit. They are very disconnected, and she sees it, but she isn't addressing it, and I think that's more departmental than anything else. This teaching the book, the literature, the plot, rather than teaching verbs like analysis, production, etc. is really showing. The kids can tune out the plot and just read the summary. They aren't getting what they are supposed to be getting. Laura knows it, and it's bothering her.
- I know that Laura has intrinsic value in technology. We are both tech nerds and have "geeked out" over some things, but that isn't coming through in her interviews or her teaching.
- Laptop carts at the high school are horrible. The cords come back in a giant rats' nest of wires. The laptops aren't always charged. They cannot hold a charge for a full day and they are slow to load because of all the security protocols that are in place to protect students. Software is not always updated regularly (even basic things like Flash).
- Many of the individuals in the IT department have no teaching background. Besides the two ITRTs no one else in the technology department has any teaching background. In terms of TPACK, they don't have it. This makes it really difficult for the IT people in the school to consider what it is that teachers need in the classroom.
- Professional development that was provided at the beginning of the year was mass produced for 50-100 teachers at a time. There was no chance to ask questions, and a lot of it included trying to watch movies that didn't work.

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