

UNLOCKING DIGITAL LITERACY: A MULTIPLE CASE STUDY OF DIGITAL LITERACY
INSTRUCTION AND THE INTERACTIVE DECISION MAKING OF
TEACHERS IN A TEXAS CHARTER SCHOOL

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The rapid expansion of computers and digital technology requires citizens to be digitally literate. Teachers must prepare students for a digital world despite the lack of consensus on a definition or its components. This multiple case study explored the digital literacy instruction and interactive decision making of teachers with varied levels of expertise. Each participant completed a survey and the General Decision Making Style Questionnaire prior to a series of interviews and classroom observations. Findings from a qualitative analysis of the data suggest variations in the use of digital literacy components during instruction and that skills are related to one another. Findings also indicate similarities and differences in interactive decision making and teaching expertise behaviors related to instruction. Based on these findings, recommendations to better promote digital literacy are directed toward teachers, administrators, teacher preparation institutions, and future researchers. Current events emphasize the need for increased efforts in turning the key of digital literacy for students.

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CHAPTER 1

INTRODUCTION

You can't have an industrial revolution, you can't have democracies, you can't have populations who govern themselves until you have literacy. The printing press simply unlocked literacy. What's important is not how you put those words together in a machine, what's important is what a population does with it.

Howard Rheingold (1995) made this statement during an interview with PBS, two years after the publication of his seminal work *The Virtual Community: Homesteading on the Electronic Frontier* (1993). His estimation of the revolutionary importance of the printing press aligns with the prevailing view of this historical event (DeMichele, 2016; Kreis, 2000/2012; Tames, 2006; Whipps, 2008). It is easy to see the importance of the printing press looking back at more than 500 years of history, yet, after only a few decades, many are already comparing the impact of the printing press with the current and future impact of computers and the Internet (Belshaw, 2012; Considine et al., 2009). Crompton (2004) considers today's technology a descendant of the printing press and, when comparing personal computers and the World Wide Web to previous inventions, states, "No innovations since Gutenberg's first use of movable type had been a comparable agent of change" (2004, p. 100). Our society has already changed in many substantial ways because of the rapid increase of technology and the almost immediate availability of information via the Internet. Heather Brooke, American journalist and freedom of information advocate, states, "Our printing press is the Internet. Our coffee houses are social networks" (2012). We may not be able to predict exactly what society will do because of computers, but the changes in the past 30 years suggest the impact may be as great as that of the printing press. The immediate and long-term impact, however, is dependent on the digital literacy of our society. For members of society to do something with technology, they

must be digitally literate. “With the increasing exposure to digital working and learning environments, digital literacy has been conceived as a ‘survival skill,’ a key that helps users execute complex digital tasks effectively (Aviram & Eshet, 2006, p. 1).

One aspect that goes hand in hand with the printing press and the computer age is teaching. The availability of printed text to more people of every socioeconomic status would not have had as great an impact if the people had not learned to read. Someone had to teach the citizens of the late 1400s to read the text that was in their hands. The printing press alone did not unlock literacy. It may have been the key, but whoever taught the citizens to read that text, turned the key. The same is true of digital literacy. The availability of information and the ability to connect with others from around the world will not have as great an impact on today’s society unless people know how to access, critically evaluate, and effectively use the information and connections. In a recent online article, Benjamin Herold (2017b) shared 10 experts’ advice to teachers regarding preparing students for tomorrow’s jobs, “...many of the country’s top minds are sharply divided over just how disruptive technology’s impact will be, and just what kind of job market today’s students will eventually face.” Predictions of experts are widely varied, and any reliable data is only good five years out (Herold, 2017a). We do not know exactly what today’s students will be doing in the future or what skills and knowledge will be required, yet society expects teachers to prepare students for this future. As Rheingold suggests, what is important is what society, including teachers, does with new technology. So, what are teachers doing to address this issue? It is the goal of this study to investigate how teachers are unlocking digital literacy in their classrooms and what, if any, effect teacher expertise and teacher interactive decision making have on their instruction.

1.1 Statement of the Problem

Advancements in technology have changed our society and changed the skills students need to be adequately prepared for future work and community participation. These rapid changes have left teachers struggling to understand exactly what digital literacy is and which competencies are important (Blau et al., 2016; Hicks & Turner, 2013). Teachers are being told to teach digital literacy, but many do not have a clear understanding of what it is and what they are supposed to be teaching (Bali, 2016; Chase & Laufenberg, 2011; Considine et al., 2009; Sofkova & Cederlund, 2017). Common Core standards, state standards, and many educational guidelines are often vague and offer little practical strategies for promoting digital literacy. “Mentions of digital texts and tools appear throughout the common-core standards, but the document is certainly more prescriptive in some places than others” (Heitin, 2016b, p. 13). Digital literacy is part of our society and will continue to evolve, so we need to ensure future success for today’s students by making sure they are digitally literate. Teachers are the primary entity tasked with this responsibility, so it is important to understand how they are teaching digital literacy and what effects teaching expertise and decision making may have on their instruction.

1.2 Purpose of the Study

To better understand the nature of digital literacy instruction, it is important to look more closely at how teachers teach digital literacy and the skills and characteristics of teachers who are teaching. The importance of digital literacy, the frequency of teacher decision making during instruction, and the impact of teaching expertise make the relationship of these phenomenon a logical focus. This study will expand existing knowledge in all three areas: digital

literacy, teaching expertise, and interactive decision making. More knowledge of these fields may better equip preservice teachers and in-service teachers for today's complex learning environment and may help them unlock digital literacy for their students. The purpose of this multiple case study is to explore the digital literacy instruction and interactive decision-making characteristics of teachers with varied levels of expertise.

1.3 Research Questions

1. What components of digital literacy are teachers including in their instruction?
2. What is the nature of the interactive decision making of teachers with varying levels of expertise during digital literacy instruction?

1.4 Background of the Problem

Most members of society can see the ways technology has impacted our world. Country music singer-songwriter Brad Paisley sings about the changes he has observed during his lifetime in his song "Welcome to the Future":

When I was ten years old
I remember thinking how cool it would be
When we were going on an eight-hour drive
If I could just watch TV
And I'd have given anything
To have my own Pac-Man game at home
I used to have to get a ride down to the arcade
Now I've got it on my phone

(DuBois & Paisley, 2009)

Smart phones and other handheld devices allow us to watch TV and videos, play games, and listen to music wherever we are. Access to media and information is literally available at our fingertips. According to Internet World Stats (2017) world-wide use of the Internet has increased from 0.4 percent of the world population in 1995 to 51.7 percent in June of 2017.

This access, however, does not ensure the information is credible or that anyone can find it. The complexity of the information means there is no correct way to navigate a website or its links and no barrier to publishing. Anyone can present information without editorial review. This allows emphasis on extreme views or assertions and exposes the public to illegal acts and false information without fact checking (Belshaw, 2012). Access alone is not enough to ensure successful use, so digital literacy is the key to fully benefiting from digital tools and information. Currently, however, there is a lack of consensus on a definition of digital literacy and on an integrated theoretical framework. This uncertainty adds to the lack of understanding in this area.

There is, however, a growing consensus of scholars who view digital literacy as an emerging concept that encompasses all the skills and competencies needed to navigate new technology and the information it provides (Belshaw, 2012). Paul Gilster (1997) first used the term in his book *Digital Literacy*, but other terms have had periods of popularity. Bawden (2001) studied the occurrence of the terms: information literacy, computer literacy, library literacy, media literacy, network literacy, and digital literacy from 1980 to 1999. His findings show how use of the term digital literacy has evolved from others. Belshaw (2012) discusses the historical progression of terms and offers reasons for the initial acceptance and then rejection of each earlier term. In summary, a new term became necessary to describe the skills used for a new technology, such as computer literacy or media literacy. Buckingham (2015) believes by attaching the term literacy to new technology, some sought to justify focused research in that area; however, increased use of each term exposed its inadequacy to define the broader sociocultural uses of digital tools. The sociocultural approach to literacy promoted by the New

Literacy Studies in the latter part of twentieth century considered literacy to be more than a cognitive process, situated in specific contexts or discourses, and always for a purpose (Knobel & Lankshear, 2007). These ideas about traditional literacy prompted a broader look at digital literacy and expanded its definition to include cultural and civic competencies. For example, Reynolds' (2016) social constructivist digital literacy framework, 6 Contemporary Learning Practices, builds on earlier models and adds sociocultural ideas. Chapter 2 contains a more detailed explanation of this framework and other frameworks associated with digital literacy. Over time, more and more researchers are seeing the need for a broader umbrella term that encompasses the varied, often vague, use of earlier terms and that combines overlapping concepts and skills (Belshaw, 2012; Heitin, 2016a; and Martin & Grudziecki, 2006). Recently, Iilomaki et al. (2016) found digital literacies to be one of the most often used terms in research, and Heitin (2016a) found it to be the prevailing term among educators.

Recently, Bull et al. (2017), acknowledge the emerging nature of digital literacy and point out the lag between the concept and research to support sound instruction and assessment. As a result, teachers are putting into practice evolving ideas of what it means to be digitally literate. Until recently, discourse on the subject has been practice- oriented (Aviram & Eshet, 2006) or skills-based (Bawden, 2001; Martin & Grudziecki, 2006). Findings from a synthesis of digital literacies instructional practices (Hagerman & Spires, 2017) suggest teachers are using a variety of digital tools and ideas. The authors categorize the focus of the 75 classroom-based studies as requiring students to use digital tools to consume information, create products, and communicate or participate in social spaces. They note, however, that the, “targeted competencies often seem inextricable from, or dependent on, others” (Hagerman &

Spires, 2017, p. 5). This supports the concepts of digital literacy as complex and ambiguous, what Chase and Laufenberg (2011) refer to as “squishiness”. Digital literacy is important for future success and society expects teachers to teach it, but there is no consensus on what it is and what competencies are required to be digitally literate. The concept of teaching expertise shares some of these same descriptors. It is important to student success, and society expects it of teachers, but it is unclear what it really means and what qualities and skills a teacher should possess to be an expert.

Teachers are a large part of the population and an integral part of our nation. They are essential to the learning process and largely responsible for student achievement and preparation for a digital future. On any given school day, approximately 3.1 million public school teachers and 0.4 million private school teachers enter classrooms in the United States to teach students (Snyder & Dillow, 2015). This endeavor to educate today’s youth involves a large portion of our society, yet the value the public places on teachers and this task varies from citizen to citizen and from year to year. In the first part of the 20th century, after a careful analysis of schooling and society, George Counts separated from John Dewey and other progressives who promoted student-led learning. Counts, the father of Social Reconstructionism, encouraged a more aggressive approach to deal with the disparity in educational opportunity, and he and his supporters believed teachers to be in the best position to initiate change (Stanley, 1992). Gutek (1970) states, “His [Counts’] colorful, and sometimes evangelistic language, pleaded the causes and voiced the demands of the long neglected American teacher” (p. 202).

In the second half of the 20th century, like Counts’ analysis of schooling and society, John

Goodlad conducted a large, on-scene study titled “A Study of Schooling”. He shares the results of this study in his book *A Place Called School*, which Theodore R.Sizer describes as the, “Rolls-Royce of educational inquiries” (Goodlad, 2004, p. ix). His study focuses on all aspects of schooling, including the role of the classroom teacher. Goodlad states that, during the late 70s and early 80s when the study was conducted, teachers experienced “an atmosphere of criticism, declining confidence and support, and little appreciation” (2004, p. 167). Some research at the time seemed to support this position, but an increasing number of other studies identified the teacher as a key factor in learning. Goodlad concludes:

...we know that teachers, who are able to demonstrate certain effective teaching practices when called upon to do so, do not necessarily use these practices hour after hour in the classroom, and that they are restrained and inhibited by circumstances under which they teach –such as too many students in a confined and relatively inflexible space, too many hours each day with classes, administrative controls and restraints, interruptions, and students whose minds are on matters other than the subject matter before them. These are things teachers often identify as limiting their effectiveness (2004, p. 168).

Goodlad’s later study (1991), a 5-year “Study of the Education of Educators”, added to the understanding of the importance of the teacher by addressing the need for improving teacher preparation programs. If teachers are important, how they are prepared is also important.

In the latter part of the 20th century and early part of the 21st century, educational reforms influenced the public perception of teachers. The emphasis on standardization, high-stakes testing, scripted lessons, and accountability diminished the teacher’s role to simply a deliverer of facts (Katz & Rose, 2013). Politicians and business leaders applied the industrial model to educational delivery believing that teaching requires few unique skills. Labaree (2013) lists the following reasons for the public perception that teaching is easy: (a) “...it seems to be an extension of child-rearing”; (b) “...teaching is extremely familiar”; and (c) “...the knowledge

and skills teachers convey are the knowledge and skills all competent adults have” (p. 37).

Labaree refutes these perceptions and claims, “In many ways, teaching is the most difficult of professions” (2013, p. 33).

Recent developments in scientific inquiry and educational reforms, however, have led to greater interest in teachers and teacher quality. The increased attention produced new knowledge and understanding in the field and revealed its complexity. Current research on effective teaching and teaching expertise provides some understanding of quality teaching, yet, like digital literacy, there is no consensus on what it is (Cochran-Smith, 2005; Munoz et al., 2013; Palmer et al., 2005). Society expects expert teachers to teach digital literacy but does not agree on what teaching expertise or digital literacy really mean.

Politicians, business leaders, and citizens who view teaching as easy may not understand its demands or the settings in which it occurs. Teachers are successful only if students choose to learn and the reasons for not learning are many. Students are compelled to be in the classroom by several outside forces: parents, job market, culture, truant officers. They do not arrive each day seeking a professional service. To engage learners, teachers must construct a teaching persona that combines their characteristics, personality, and interests with content and pedagogical knowledge to motivate students to want to learn. There is not a standard way of doing this, and it requires ongoing revisions as students and curriculum change (Labaree, 2013, p. 34-36). A recent survey of more than 34,000 teachers and staff identified new school initiatives without proper training and support, mandated curricula, and standardized tests as some of the greatest stressors. Less than half of those surveyed felt that public officials, the media, and school boards treated them with respect and 73% often found work to be stressful

(News in Brief, 2015, p. 42). The complexity of teaching persists despite and in some ways due to the public's limited perception of the task.

More recently, however, educators, researchers, and organizations are speaking out against this mindset and, like Counts and Goodlad, are emphasizing the importance of teachers and teacher preparation. For example, mathematics professor and researcher Deborah Ball (2015) considers teaching and teacher preparation the primary policy necessity of our time. A review of research by the RAND Corporation concludes, "Many factors contribute to a student's academic performance, including individual characteristics and family and neighborhood experiences. But research suggests that, among school-related factors, teachers matter most" (2012, p. 1). Arne Duncan, United States Secretary of Education from 2009-2016, emphasizes the importance of teachers, pointing out the need to empower teachers so they can be agents of change (2015).

As these examples illustrate, recognition of the importance of teachers often includes a focus on better teacher preparation programs and/or ways to develop teaching expertise. In order to prepare good teachers, however, one must understand what modern teachers face when they enter a classroom. A thorough understanding of the context is vital to knowing what characteristics and skills a good teacher must possess to be effective there. One factor that greatly influences teacher effectiveness is class size (Konstantopoulos & Chun, 2009; Schanzenbach, 2014; Zyngier, 2014). According to the National Center for Education Statistics in 2011-2012 the average class size was 21.2 pupils for public elementary schools and 26.8 pupils for public secondary schools (Snyder & Dillow, 2015). This means a teacher must consider the needs of each child and how best to teach the required content. A daunting task to be sure, but

combined with the demands of standardization, high-stakes testing, a diversified student population, new technology, and other outside forces, it seems impossible. A classroom teacher must understand and/or possibly explain how his or her actions relate to one or more current educational trends, such as the achievement gap, technology, digital literacy, data-driven decisions, differentiated instruction, mainstreaming, critical thinking, or 21st century skills. The demands and complexity of the task may be why various sources report teaching to be one of the most stressful jobs (Brinson, 2010; Wiggins, 2015). Koedinger et al. (2013) illustrates the complexity of instruction by focusing on just three of the many important factors that affect real-world learning – instructional technique, dosage, and timing. The teacher controls each of these factors, yet the possible combinations are astounding. They computed that 205 trillion options are possible when considering just a portion of the instructional techniques, dosage levels, and timing (Koedinger et al., 2013, p. 935). A teacher must decide which option(s) is best for the class, which highlights the importance of a teacher’s decision-making skills. Decision making is an important part of instruction, including digital literacy instruction.

Many of the voices that promote the importance of teachers and teacher preparation recognize the value of decision making and include it as an essential skill of the profession. Schussler et al. (2010) distinguish between a teacher’s intelligence and a teacher’s inclination and sensitivity to know what knowledge and skills to use. They suggest it may be a component of what Cochran-Smith (2005) refers to as the unknown “black box” of teacher quality. Having pedagogical knowledge, content knowledge, knowledge of each student’s needs and abilities, knowledge of the latest educational strategy or digital tool, and knowledge of school, district, state and national policies is not enough. A teacher must know *when* and *how* to use each piece

of knowledge to reach student, district, and state goals and to promote cultural values. The magnitude of the task supports the claim of Watts-Taffe et al (2012) that the “role of teacher as an informed decision maker is paramount” (p. 305).

Having time to consider all these factors while creating lesson plans is important, but the task is much more difficult when the unexpected occurs while teaching that prepared lesson. Richards and Lockhart (1994) state, “Although planning decisions may form the starting point of a lesson, they are not the sole determinant of what happens during a lesson” (p. 83). Cuban (2011) states, “Effective teachers, then, like top jazz musicians and basketball rebounders improvise – decide on the spot – as they deal with both the routine and unexpected in the art of teaching” (p. 3). The ability to improvise, to make interactive decisions, may distinguish good teachers from great teachers and may affect digital literacy instruction.

In 1968, Jackson (1990) classified teaching into two phases, preactive and interactive. Interactive teaching is what the teacher does when standing face to face with students. Preactive teaching occurs during the other times, during planning, before and after actual instruction. Teachers make decisions during the preactive phase of teaching as they prepare lesson plans; decisions such as, what to teach when, and what methods, strategies, and tools will be most effective. These decisions may happen in solitude or in small grade level team meetings. However, as every teacher knows, a lesson rarely goes as planned. In the case of digital literacy, planning to use a specific digital tool or to focus on a specific competency does not always turn out as expected. The tool may not work as expected, or the student may start clicking on links and end up on sites that have nothing to do with the goal.

The dynamic nature of the classroom and digital environments requires teachers to

make decisions while they are teaching, during the interactive phase of teaching. Interactive decisions are the decisions a teacher makes during the interactive phase of teaching (Alverman, 1987; Byra & Sherman, 1993; Housner & Griffey, 1985; Peterson et al., 1978; and Shavelson et al., 1977). In their simplest form, these interactive decisions are part of the scaffolding of student understanding, the give and take that occurs as teachers guide students to new knowledge. Interactive decision-making takes place in Vygotsky's Zone of Proximal Development. Much like the partner that leads in a dance, the knowledgeable other decides the best way to deal with a look, a shrug, or a student response to promote student learning (Vygotsky, 1980).

In summary, the rapid increase and expansion of technology took place during educational reforms that renewed interest in teaching, including teaching expertise. This closer look at teaching led to a greater focus on teacher decision making and subsequently, interactive decision making. Research in all three areas is relatively new and the importance of each concept to students' future success merits further study.

1.5 Significance of the Study

The purpose of this study is to explore the digital literacy instruction and interactive decision-making characteristics of teachers with varied levels of expertise. To date, few expertise studies or interactive decision-making studies have investigated the qualities or decision-making traits of teachers during digital literacy instruction. Most of the digital literacy research focuses on defining it and using various digital tools during instruction. Little research has focused on the elements of digital literacy taught and what factors may affect instruction.

1.6 Definition of Terms

- *Digital literacy*. As mentioned previously, there is no consensus on what digital literacy is. There are, however, many definitions. The ambiguous nature of digital literacy and the need to focus on both skills and cultural uses has led to a growing consensus that the definition of digital literacy should be a broad umbrella term encompassing all these characteristics (Aviram & Eshet, 2006; Bawden, 2001; Belshaw, 2012; Knobel, 2008). The definition used for this study comes from the DigEuLit project (Martin & Grudziecki, 2006):

Digital Literacy is the awareness, attitude and ability of individuals to appropriately use digital tools and facilities to identify, access, manage, integrate, evaluate, analyse and synthesize digital resources, construct new knowledge, create media expressions, and communicate with others, in the context of specific life situations, in order to enable constructive social action; and to reflect upon this process. (p. 255)

It is used in this study because it aligns most closely with Belshaw's 8 essential elements of digital literacies conceptual framework.

- *Interactive decision making (IDM)*. Clark and Peterson (1984) reviewed researchers' definitions of interactive decision making and, although there is some debate about the selection of alternatives or possible courses of action, found they agreed on the following definition, "a deliberate choice to implement a specific action" (p. 74). Since that time, other studies have presented more specific definitions. Richards and Lockhart (1994) define interactive decision making as "on-the-spot decisions concerning different aspects of the lesson, many of which may not have been planned" (p. 78). They elaborate further by addressing the dynamic nature of the learning environment:

Lessons are dynamic in nature, to some extent unpredictable, and characterized by constant change. Teachers therefore have to continuously make decisions that are appropriate to the specific dynamics of the lesson they are teaching. These kinds of decisions are called interactive decisions. (Richards and Lockhart, 1994, p. 83)

Other researchers refer to this cognitive skill using different terms. Bailey (1996) describes interactive decisions as, "...decisions made in class, 'on-line,' in 'real time.' That is, these decisions made during but not necessarily through interaction" (p. 20). More recently, Schoenfeld (2008) and Griffith et al. (2013) use the term in-the-moment decisions to describe the decisions teachers make during instruction. The focus of this study requires a more specific definition than the one stated by Clark and Peterson or Schoenfeld and Griffith et al. The definition for interactive decisions used in this study builds on the dynamic, unplanned aspects of direct instruction mentioned in the definition presented by Richards and Lockhart. For this reason, this study defines interactive decisions as the decisions made by teachers as they observe and interact with students in learning environments.

1.7 Conceptual Frameworks

The three conceptual frameworks used in this study come from research in digital literacy, teaching expertise and interactive decision making. I present a brief description of the models here and provide more detailed explanations and tables in Chapter 2.

Belshaw's framework of 8 essential elements of digital literacies is a synthesis of other existing theories that acknowledges the plurality and ambiguous nature of the concept and focuses on what is useful in practice. Since the focus of this study is the practical application of digital literacy in classrooms, it is an appropriate lens for analysis. Belshaw's 8 essential elements of digital literacies are: cultural, cognitive, constructive, communicative, confident, creative, critical, and civic (p. 207).

Berliner (1988, 1994, 2004) based his model of pedagogical expertise on a five stage model of the mental activities involved in directed skill acquisition presented by Dreyfus &

Dreyfus (1980). He used the same titles for each stage and findings from his and others' studies to suggest distinguishing characteristics for each one. He first presented his model in 1988 and revised the descriptors for each stage based on continued research.

Shavelson and Stern's (1981) model of teachers' decision making during interactive teaching is based on a synthesis of research and suggests that interactive teaching involves the use of routines established through years of experience. Teachers monitor the classroom looking for cues and then make decisions about how to address each cue by ignoring, acting immediately, or acting later.

1.8 Assumptions

A major assumption of this study was that one or more of the TAL teachers would be expert teachers and skilled interactive decision makers. I also assumed they would behave as they typically do during my observations and that their responses on surveys, on questionnaires, and during interviews would be honest.

1.9 Delimitations

The focus of this study logically created several delimitations. I examined specific phenomena, digital literacy instruction, teaching expertise, and interactive decision making. I did not consider teacher planning, grade level, or school level decisions. I focused on teachers in a charter school setting with E-textbooks because I believed the less regulated structure and presence of more digital texts and tools increased the likelihood of the phenomena. I gathered information about each teacher's digital literacy knowledge, prior experiences, and decision-making style in order to find possible correlations with digital literacy instructional strategies,

levels of expertise and interactive decision-making ability. I did not consider their intelligence, social position, political views, or any other distinguishing characteristics. The three conceptual models framing my approach and analysis are prominent in their fields and relevant to the research questions of this study. These delimitations support the boundedness of case study research.

1.10 Summary

The previous overview of this study indicates the important reasons, the focus, and boundedness of this case study of digital literacy instruction, teaching expertise and interactive decision making. Chapter 2 further explains existing knowledge about the topics and presents summary tables for each framework.

CHAPTER 2

REVIEW OF LITERATURE

As previously stated, technology has become an integral part of our society which requires members to be digitally literate to be successful participants. Society expects teachers to prepare students to meet the challenges and demands of digital environments, yet there is no consensus on what digital competencies are essential or what constitutes teaching expertise. Studies in digital literacy include a range of terms that mirror the lack of agreement on a definition. Other studies focus on theory, offering theoretical frameworks for consideration and testing. The focus of most digital literacy studies is the use of a specific tool, program, or platform during instruction or the unique qualities of a specific technological context.

The focus and volume of research relating to teachers and teaching before the middle of the twentieth century reflects society's fluctuating views of the profession. Glaser (1976) describes early studies of teaching and learning as mostly theoretical with little focus on practice. Berliner (1994) attributes this to the devaluing of pedagogical knowledge by many legislators and parents for reasons like those cited earlier from Labaree (2013). Whatever the reasons, research in teaching and teachers did not expand until the 1950s and 1960s when cognitive science began to replace behaviorism as the prominent psychological theory. The knowledge gained because of this scientific transition led to the conceptual frameworks and relevant research for this study.

2.1 Conceptual Frameworks

The conceptual frameworks underpinning this study are prominent in their respective

fields and integrate findings from other studies. Each one also has aspects related to the other. Belshaw's 8 elements focus on what should be included in digital literacy instruction and recognizes the teacher as the user or decision maker in the classroom. Berliner's description of the stages of teacher expertise recognizes the role of decision making during instruction and highlights the progressive development of the skill. Shavelson and Stern's model of interactive decision making synthesizes findings that teachers carry out routines developed from prior experiences and knowledge. More experience often leads to a greater number of routines and may explain the ease and flow characteristics of expert teachers' classrooms. All three concepts inform this study and serve to frame data collection and analysis but will not function as the only interpretation for findings. Each one appears in the following review of literature as it relates to other studies in the field.

2.2 Relevant Research

The position of this study regarding current knowledge requires an understanding of its intersecting areas of focus: digital literacy, teachers, and decision making. Existing research in each area includes some work that overlaps the other areas and some that builds on knowledge from other disciplines. Some digital literacy studies include instruction in charter schools (St. John & Von Slomski, 2012; Troyer, 2017; Watson et al., 2014) and consider teacher knowledge and experience as influencing instruction (Neuman et al., 2015; Steckel et al., 2015). Ayres et al. (2004) connect teacher effectiveness research to the study of expert teachers which uses theories from expert-novice studies. Effective teaching research prompted greater interest in teacher thinking and thought processes, which led to studies in decision making. The review of

literature that follows supports my claim that this study is unique and adds to current knowledge in all three areas; digital literacy, teacher expertise, and decision making.

2.2.1 Digital Literacy

As the cognitive sciences expanded in the second half of the 21st century, computers and technology also experienced unprecedented growth and change. Gardner (2008) describes in detail the ways the two fields influenced each other and how they are related. For example, he mentions the Hixon Symposium of 1948 as important because of, “its linking of the brain and the computer” (p. 23). This relationship continues to be evident in research spanning the past 30 years. In their investigation of hypertext, Spiro et al. state, “The computer is ideally suited...for fostering cognitive flexibility” (1991, p. 3). The connection between digital tools and cognitive processes is also evident in Rouet’s study of hypermedia (2000), Aviram and Eshet-Alkalai’s theoretical work of digital literacy (2006) and Eshet-Alkalai and Chajut’s study of the digital literacy performance of various age groups (2010). The expansion of cognitive science and computers led to research in many fields related to digital literacy. The areas relevant to this study are those that involve teaching and educational tools, specifically, gaming, the Internet, electronic text, theory, and instruction.

2.2.1.1 Gaming

One of the outcomes of the growth and expansion of computers is the prevalence and role of video games in communities around the world. The earliest video games appeared in arcades during the late 60s and early 70s. By the early 80s, more than a decade before the widespread use of personal computers, Atari and other video game companies were offering

home versions of popular games, such as Pong, Donkey Kong, and Pac-Man (Kent, 2010). Today, playing digital games, “is ubiquitous, regardless of geography, ethnicity, culture, socio-economic status, or gender” (Henderson et al., 2008). Based on empirical data for children and youth, computer games, “are the most frequently used interactive media” (Beentjes et al., 2001, p. 95). It is common for a child’s first interaction with a digital environment to involve a game. Relevant studies in this area of digital literacy have focused on the effects of game use. Green and Bavelier’s (2003) study of video game players between the age of 18 and 23 years shows that video games can alter visual skills and improve abilities. Other findings suggest gaming affects cognition and behavior (Bavelier et al., 2011) and increases the potential for incidental learning (Eshet-Alkalai & Chajut, 2007). Fromme (2003) investigated the social effects of game use and concluded that participants do not give up other social activities if involved in gaming. Gredler (2004) recognizes the role and value of games for educational purposes. She clarifies the differences between academic games and simulations and presents a framework of design criteria for both. These studies suggest the prevalence and status of gaming are an important part of a student’s digital literacy knowledge.

2.2.1.2 The Internet

An important component of the digital revolution is the access to information and social networks provided by the World Wide Web. The Internet contains user led content and is very different from traditional information sources which offer three distinct roles of power: producer, distributor, consumer (Bruns, 2008). Many assume “digital natives,” students brought up with digital technology, naturally develop needed skills. Porat et al. (2018) indicates this assumption is false. Findings show that junior high students typically display higher confidence

in their skills than their actual performance, especially in social emotional skills. Relevant research in this area of digital literacy focuses on social influence, efficient searching, and critical evaluation.

2.2.1.2.1 Social Influence

The Internet not only provides access to information but connects users from around the world. Boyd and Ellison (2008) describe the history and features of social network sites and note:

What makes social network sites unique is not that they allow individuals to meet strangers, but rather that they enable users to articulate and make visible their social networks. This can result in connections between individuals that would not otherwise be made, (p. 211)

Amichai-Hamburger and Hayat's (2011) study of 22,002 participants from 13 countries challenges the notion of the Internet contributing to user loneliness. Their findings confirm that Internet usage can enhance the social lives of users. Virtual interactions, however, may affect empathy levels. A study of 704 preservice teachers indicates only moderate levels of virtual empathy in most participants (Garcia-Perez et al., 2016). Another study of the psychological influences of the Internet suggests different patterns of use depend on personality tendencies of extroversion and neuroticism and gender (Hamburger & Ben-Artzi, 2000). The social influence of the Internet, however, is not limited to personal use. Some businesses are using virtual communities of practice to foster the sharing of knowledge and ideas. Ardichvilli et al. (2003) investigated employee participation in virtual knowledge-sharing communities within a large corporation. Their analysis indicates that knowledge flows easily if employees view contributions as for the public good and as the property of the whole organization. They also

found barriers to the process when employees are reluctant to participate for fear of criticism or fear of misleading other members. These findings reveal some of the ways the Internet influences social interactions.

2.2.1.2.2 Efficient Searching

Searching for information is one the most important components of Internet use but having access to information does not mean everyone can find what they need. A user must know how to use search terms, organizational tabs, and a variety of website design features. Jansen and Pooch's (2001) review of Web searching studies found diverging methods and terminology and differences in the way users search online compared to other environments. Their study emphasizes the "...unique searching environment" of the Web (p. 244). Building on the work of Jansen and Pooch, Hargittai (2002) studied how people find information online. Based on the data collected from 63 participants ranging in age from 18-81, results indicate a large difference in the time it takes to find the desired content and possible patterns of what it takes to be a good searcher. Hargittai (2002) suggests that "the Web allows for a myriad of search strategies" (p. 27) and yet, "there are a few basic skills that significantly improve the chances that one will find what one is looking for" (p. 36). Her findings also suggest that, in general, users lack the basics of Web surfing. The work of Lazar et al. (2003) supports Hargittai's findings. Results of their study suggest that frustrating experiences use up one-third to one-half of the time participants spend in front of the computer. This frustration and loss of time hinders use which limits the benefits available to less proficient users. Efficient and effective searching is one of the most important ways to turn the key of digital literacy.

2.2.1.2.3 Critical Evaluation

Another equally important component of Internet use is the ability to evaluate the validity and reliability of information. In addition to their previously mentioned findings involving frustration during web searching, Lazar et al. (2003) also note, “An increasing unfortunate trend is to design Web interfaces that are purposefully deceptive and unpredictable” (p. 22). Anyone can add information to the Internet and their motives and honesty are not always honorable, “...anyone can say anything and that anything can be just as accessible as the findings of eminent scholars and scientists” (Minkel, 2000, p. 33). Research suggests that students are especially susceptible to the belief that it must be true if it is on the Internet. Calvani et al. (2012) studied the digital competence of 1056 adolescents (aged 14-16) and found participants to be literate in basic skills but, “they do not spontaneously doubt the reliability of Internet information” (p. 805). As part of their work to create assessments to evaluate civic online reasoning, Wineburg et al. (2016) collected and analyzed 7,804 student responses to 56 tasks. They conclude:

When we began our work, we had little sense of the depth of the problem. We even found ourselves rejecting ideas for tasks because we thought they would be too easy. Our first round of piloting shocked us into reality. Many assume that because young people are fluent in social media, they are equally savvy about what they find there. Our work shows the opposite. (p. 7)

Morahan-Martin and Anderson (2000) suggest a lack of skill in evaluating websites may have dire consequences for the 6 million people in the United States who go online to search for health and medical information. There are excellent sites available, but the unregulated nature of the Internet allows, “sites with misinformation, some promoting products, and others outright scams” (Morahan-Martin & Anderson, 2000, p. 731). This lack of skill is not limited to

children and young adults. Ng (2012) studied the ease of use of unfamiliar technologies and the degree of digital literacy of 53 undergraduate preservice teachers. Results suggest that students have little difficulty using unfamiliar technology, yet they do not adequately understand educational technologies and how to use them in purposeful ways. A positive outcome of her study is the participants' increased perception of improved digital literacy after instruction and learning. As Ng states, "...digital natives can be taught digital literacy" (2012, p. 1065).

2.2.1.3 Electronic Text

Another area of study related to digital literacy is electronic texts, sometimes referred to as e-books or hypertext, text with links to other texts. Although this study does not focus on the use of electronic texts, the subject is likely to appear in the collected data because of the almost exclusive use of electronic textbooks and other digital texts in the research setting. Personal use of e-books may also influence digital literacy ability because it has become common place. In 2007, the first marketable e-reader, the Amazon Kindle, sold out in two days and by 2011 Amazon sold more Kindle books than hard- and soft- back books combined (Biancarosa & Griffiths, 2012). Based on Alvermann's (1987) findings that textbooks play a role in interactive decision making, digital texts may also be a factor during analysis of participant teaching expertise and decision making. For these reasons, it is important to understand the prominent areas of research in this area.

Studies that compare the use and effects of printed text and digital text are one of the foremost areas of research in this field. Balcytiene (2003) studied the cognitive activities of 38 university students reading printed text or hypertext. The analysis revealed students with less prior knowledge about the subject matter benefit more from reading the hypertext. She also

discovered that self-regulated learners, rather than cue-dependent learners, profit most from the hypertext and that hypertext readers display three typical reading patterns. Other studies in higher education settings focus on student experience and satisfaction as it relates to e-textbook design (Baek & Monaghan, 2013; Hao & Jackson, 2014).

At this time, some studies suggest e-book users benefit academically compared to printed text users while other studies find no significant academic benefit. Korat's (2010) study of 40 Kindergartners and 50 first graders shows the e-book readers from each grade level attain a significant increase in word meaning and word reading compared to students in the regular instructional program. A review of research comparing printed and digital textbooks found digital texts have a positive effect on metacognition, self-regulated learning, self-efficacy, information exploration, problems solving, intrinsic motivation, and self-reflection, but the impact varies by type of setting and achievement level (Kim & Jung, 2010). They also conclude that there is no difference in learning between printed and digital text use. Eden and Eshet-Alkalai's (2013) study of the active reading and editing performance of 93 university students found no significant difference between performances in the two formats. Later studies also found digital texts to effect student motivation more than academic achievement (Barnyak & McNelly, 2016; Jang et al., 2016).

Other studies suggest each format is better for some tasks. Stoop et al. (2013a) found printed text to be superior for learning and digesting complicated and elaborate texts, and digital text better for quick information gathering, communication, and navigation. Their findings suggest instructors should design questions and exercises differently depending on text medium and should integrate these with the running text (Stoop et al. 2013b). Zhang and Kudva

(2014) also found that both printed and digital texts have unique attributes and functions which may vary by demographic, contextual, and situational factors.

Other areas of research focus on the use of digital texts with specific student populations. Shamir and Shlafer (2011) found improved performance in phonological awareness and concept about print for 136 preschoolers using an educational e-book. The improvement is most significant for children at risk for learning disabilities. Another study indicates dyslexic students using Facebook do so eagerly with little or no fear of exposing their literary weaknesses (Barden, 2014). Other studies focus on the use of technology to promote literacy in beginning readers. A review of research into technology and literacy for children aged 0 to 8 in an educational setting categorizes the educational use of technology as: “deliverer of literacy, site for interaction around texts; and medium for meaning-making” (Burnett, 2010, p. 247). Other research focuses specifically on how digitization has affected picture books (Sargeant, 2015) and the distinct features of e-books designed for young children (Hoffman & Paciga, 2014). These studies represent the dominant areas of research of electronic texts.

2.2.1.4 Theory

A fourth area of relevant digital literacy research focuses on the theoretical foundations of the topic. Due to the lack of consensus on a definition and a theoretical framework, some of the studies reviewed use related terms and focus on a specific skill or technology. Although a few studies present a definition and a framework, this review examines each area separately to emphasize the similarities and differences within each one.

2.2.1.4.1 Definitions

As mentioned previously, Bawden (2001) presents a thorough review of the occurrence of terms from 1980-1999. His review highlights the shift from a skills-based focus to a focus on information literacy and eventually media and digital literacy. He concludes,

To deal with the complexities of the current information environment, a complex and broad form of literacy is required. It must subsume all the skill-based literacies, but cannot be restricted to them, nor to any particular technology or set of technologies. Understanding, meaning and context must be central to it. It is not of importance whether this is called information literacy, digital literacy, or simply literacy for an information age. (Bawden, 2001, p. 251)

Bawden presents several definitions for the various terms reviewed but considers the concepts and their significance to practice more important than a definition. Another definition related to digital literacy is part of the European Reference Framework's eight key competencies for lifelong learning:

Digital competence involves the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT [Information Communication Technology]: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet. (European Communities, 2007, p. 7)

This definition, like others, combines ideas from various definitions into a broad notion of digital literacy but offers little or no practical guidelines for instruction or assessment (Buckingham, 2015; Perlmutter et al, 2010; Rosen, 2012). They do not acknowledge or include the sociocultural aspects or plural view of literacy championed by Knobel (2008) and Belisle (2006) (in Martin, 2008). Findings in Kurtz and Peled (2016) confirm this lack of focus on social responsibility and digital integrity in classrooms. More recently, Njenga (2018) recommends a "socio-economic development-oriented definition" that focuses on the "outcomes and consequences" of digital literacy (p.1). One exception to this focus on student skills is the

definition of digital literacy presented by Martin and Grudziecki (2006) as part of their work with the DigEuLit project. They, like Bawden, present a similar review of the progression of terms and emphasize the overlap in definitions. Unlike other definitions, their definition includes the contextual and social action components of digital literacy. This distinction, along with the reasons presented with the definition in Chapter 1, are why this study uses their definition of digital literacy.

2.2.1.4.2 Frameworks

Theoretical frameworks for digital literacy, like terms and definitions, have evolved from a skills-based focus to a broader sociocultural perspective. Burnett and McKinley (1998) categorize early models of information seeking into three types: information retrieval models, educational models, and broader models that combine the other two types. Models in the first group focus on designing and improving information retrieval systems. The educational models emphasize learning with technology. The third type of model approaches information seeking as a process. Models relevant to this study, like the second and third type, focus on the process of using technology to learn.

The Educational Testing Service created one of the earliest and most practical frameworks for educational purposes in 2002. This framework for information communication technology (ICT) literacy consists of three proficiencies:

- Cognitive proficiency — the desired foundational skills of everyday life at school, at home, and at work. Literacy, numeracy, problem solving, and spatial/visual literacy demonstrate these proficiencies.
- Technical proficiency — the basic components of digital literacy. It includes a foundational knowledge of hardware, software applications, networks, and elements of digital technology.

- ICT proficiency — the integration and application of cognitive and technical skills. ICT proficiencies are enablers; that is, they allow individuals to maximize the capabilities of technology. At the highest level, ICT proficiencies result in innovation, individual transformation, and societal change. (p. 18)

ICT proficiency includes five specific tasks: access, manage, integrate, evaluate, and create. This framework acknowledges the social role of digital literacy but does not address context.

Table 2.1

California Emerging Technology Fund Framework

BASIC ELEMENTS OF DIGITAL LITERACY		
Elements	Definitions	Competencies
Access	Knowing about and knowing how to collect and/or retrieve information.	Search, find, and retrieve information in digital environments.
Manage	Applying an existing organizational or classification scheme.	Conduct a rudimentary and preliminary organization of accessed information for retrieval and future application.
Integrate	Interpreting and representing information - summarizing, comparing, and contrasting.	Interpret and represent information by using ICT tools to synthesize, summarize, compare, and contrast information from multiple sources.
Evaluate	Making judgments about the quality, relevance, usefulness, or efficiency of information.	Judge the currency, appropriateness, and adequacy of information and information sources for a specific purpose (including determining authority, bias, and timelines of materials).
Create	Generating information by adapting, applying, designing, inventing, or authoring information.	Adapt, apply, design, or invent information in ICT environments (to describe an event, express an opinion, or support a basic argument, viewpoint or position).
Communicate	Communicate information persuasively to meet needs of various audiences through use of an appropriate medium.	Communicate, adapt, and present information properly in its context (audience, media) in ICT environments and for a peer audience.

Source: California Emerging Technology Fund (2008), p. 3.

Another educational framework prepared for the California Emerging Technology Fund synthesized common elements from existing digital literacies frameworks into six basic elements with definitions and competencies shown in Table 2.1. This framework encompasses many of the basic skills necessary for participation in a digital society yet does not include cultural or civic components. (Eshet-Alkalai (2004) first presented his framework of digital literacy and then revised it in 2012 to include a sixth skill. It is one of the most prominent skills-

based conceptual frameworks for digital literacy. The revised model consists of the following skills:

- Photo-visual skills (understanding messages from graphical displays)
- Reproduction skills (utilizing digital reproduction to create new, meaningful materials from preexisting ones)
- Branching skills (constructing knowledge from non-linear, hypertextual navigation)
- Information skills (critically evaluating the quality and validity of information)
- Socio-emotional skills (understanding the “rules” that prevail in the cyberspace and applying this understanding in virtual communication)
- Real-time thinking (the ability to process large volumes of stimuli at the same time, as in video games or in online teaching). (eshet, 2012, p. 267)

This framework reflects the cognitive processes involved in digital literacy and focuses on skills.

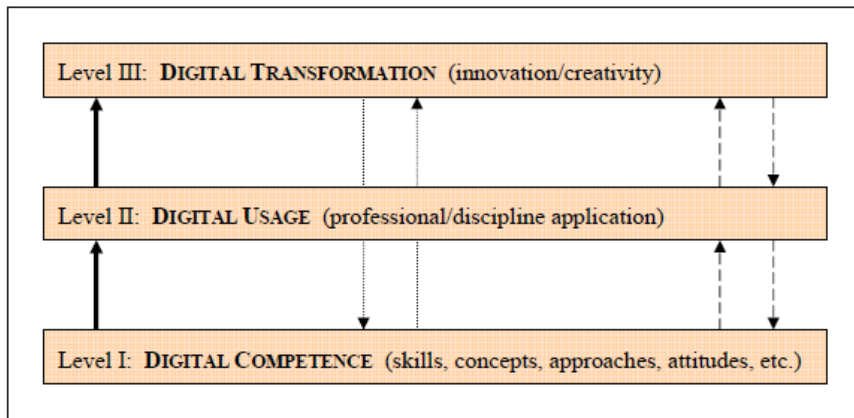
It does not include a broader sociocultural view of digital literacy.

In addition to reviewing the historical usage of various terms related to digital literacy and presenting a definition, Martin and Grudziecki (2006) suggest three levels of digital literacy shown in Figure 2.1. This model suggests that digital literacy development begins with digital competence which includes 13 processes shown in Table 2.2. The second level, digital usage, involves applying these processes in real life settings in appropriate and effective ways for a specific context and community. The third level, digital transformation, occurs when the previous two levels enable innovation, creativity, and change within the individual and/or community. Users do not necessarily proceed from one level to another but utilize aspects of various levels depending on ability and context. Martin and Grudziecki also consider a user to be digitally literate when he or she displays proficiency at the usage level. Their framework includes skills, cognitive processes, and the sociocultural aspects of digital literacy. It is

comprehensive and excellent for assessing students’ digital literacy; however, it does not focus specifically on instruction.

Figure 2.1

Martin & Grudziecki’s Levels of Digital Literacy



Source: Martin & Grudziecki (2006), p. 255.

Table 2.2

Martin & Grudziecki’s Processes of Digital Competence

process	descriptor
statement	To state clearly the problem to be solved or task to be achieved and the actions likely to be required
identification	To identify the digital resources required to solve a problem or achieve successful completion of a task
accession	To locate and obtain the required digital resources
evaluation	To assess the objectivity, accuracy and reliability of digital resources and their relevance to the problem or task
interpretation	To understand the meaning conveyed by a digital resource
organisation	To organise and set out digital resources in a way that will enable the solution of the problem or successful achievement of the task
integration	To bring digital resources together in combinations relevant to the problem or task
analysis	To examine digital resources using concepts and models which will enable solution of the problem or successful achievement of the task
synthesis	To recombine digital resources in new ways which will enable solution of the problem or successful achievement of the task
creation	To create new knowledge objects, units of information, media products or other digital outputs which will contribute to task achievement or problem solution
communication	To interact with relevant others whilst dealing with the problem or task
dissemination	To present the solutions or outputs to relevant others
reflection	To consider the success of the problem-solving or task-achievement process, and to reflect upon one’s own development as a digitally literate person

Source: Martin & Grudziecki (2006), p. 257.

Two other prominent frameworks include components very similar to Martin and Grudziecki's. Belisle (2006) (in Martin, 2008) suggests digital literacy includes three models or parts: autonomous or functional literacy, sociocultural literacy, and intellectual empowerment or transformational literacy. Beetham et al. (2009) review digital literacy frameworks and present a summary framework focusing on learner competencies. They suggest seven main terms or framing ideas in their framework of frameworks:

1. Learning to learn, metacognition
2. Academic practice, study skills
3. Information literacy
4. Communication and collaboration skills
5. Media literacy (including visual, audio, and video literacies)
6. ICT/digital/computer literacy
7. Employability (p. 35-37)

Belisle's three models align very closely with Martin and Grudziecki's three levels of digital literacy. Beetham et al.'s framework of frameworks includes the same basic skills as Martin and Grudziecki but uses different terms and categories. Their frameworks also focus on what learners can do rather than instruction.

Each of these frameworks includes important components of digital literacy instruction; however, a focus on teaching digital literacy requires a framework designed to influence practice. Belshaw's (2012) matrix of 8 essential elements of digital literacy, summarized in Table 2.3, highlights the plurality of digital literacy, recognizes its ongoing and evolving nature, and

seeks to be useful to educators. Rather than present a definition of digital literacy, he considers it to be one of several literacies defined as:

Literacies involve the mastery of simple cognitive and practical skills. To be “literate” is only meaningful within a social context and involves having access to the cultural, economic and political structures of a society. In addition to providing the means and skills to deal with written texts, literacies bring about a transformation in human thinking capacities. This intellectual empowerment happens as a result of new cognitive tools (e.g. writing) or technical instruments (e.g. digital technologies). (Belshaw, 2012)

The contextual and ambiguous nature of digital literacy requires flexibility that allows stakeholders to co-construct and negotiate a definition within a specific community. Belshaw introduces the matrix of 8 essential elements, “to serve as a flexible framework able to be easily contextualized and adapted to specific situations” (2012, p. 199). He considers the eight elements to be of equal importance and closely-linked to one another and suggests these

Table 2.3

Summary of Belshaw’s 8 Essential Elements of Digital Literacies

Element	Definition	Description
Cultural	the need to understand the various digital contexts an individual may experience	<ul style="list-style-type: none"> • Each context contains different codes and ways of operating, things that are accepted and encouraged as well as those that are frowned upon and rejected • As devices become cheaper and easier to use, the barrier to entry becomes less to do with technology and affordability and more to do with cultural and social factors. • Best acquired through immersion in a range of digital environments
Cognitive	expanding the mind by using cognitive tools	<ul style="list-style-type: none"> • Through the co-creation and contextualization of digital literacies, not through attempting to impose an ‘objective’ definition • Developed by focusing on a variety of mental models and lens and exposure to various ways of conceptualizing and interacting in digital spaces

(table continues)

Element	Definition	Description
Constructive	creating something new, including using and remixing content from other sources to create something original	<ul style="list-style-type: none"> Understanding how and for what purposes content can be appropriated, reused and remixed
Communicative	understanding how communications media work	<ul style="list-style-type: none"> how to communicate in digital networked environments developed by learning about public networks and by being a part of them involves practical application a pivotal element – being aware of the construction and unique ‘rhetorics’ of interactive communication
Confident	based on the understanding that the digital environment is more forgiving regarding experimentation than physical environments	<ul style="list-style-type: none"> a more cavalier approach to situations in digital environments understanding that digital literacies are mutable (liable to change) an important skill in problem-solving
Creative	doing new things in new ways	<ul style="list-style-type: none"> using technologies to perform tasks and achieve things previously impossible or out-of-reach focusing on redefinition rather than substitution requires teachers with a different mindset, willing to take risks
Critical	the reflection upon literacy practices in various semiotic domains	<ul style="list-style-type: none"> Who is included? What are the power structures and assumptions? Helps explain the power of the other elements Closely linked to the communicative element
Civic	the ability for the literacy practices resulting from new technologies and tools to support the development of Civil Society.	<ul style="list-style-type: none"> The ability of people to connect to one another using digital technologies can be the catalyst for society change and upheaval This can be positive and negative Closely linked to the Confident element

2.2.1.5 Instruction

A fifth area of research related to digital literacy, and the most relevant to this study, focuses on digital literacy instruction. As previously discussed, the rapid expansion of technology led to increased pressure on teachers to use these tools in their classrooms, regardless of the lack of consensus on a definition and a framework for digital literacy instruction. As scholars worked to define and develop frameworks, teachers used technology with their students. The knowledge gained from both endeavors highlighted the complexity and challenges of the task and, more recently, led to a better understanding of effective digital literacy instruction. As previously stated, most of current research focuses on teachers using a specific technological device or program with a specific student population. The focus of this study is how teachers are teaching specific digital literacy competencies, so any studies promoting a device (such as iPads or laptops) or tools (such as Prezi or Glogster) or an instructional practice (such as digital storytelling and flipped instruction) are not included in this literature review. A more detailed explanation of this distinction follows. Research that is relevant to this study includes tool implementation, challenges, and instructional recommendations.

2.2.1.5.1 Tool Implementation

One of the earlier explorations of technology and literacy instruction recognizes the tendency of instructors, “to use new tools in old ways” (Labbo et al., 1998, p. 275). With almost prophetic foresight, these authors emphasize the importance of both digital literacy and teacher support and training to ensure a digitally literate society that uses new tools in *new ways*. Current research, however, suggests many teachers still have this tendency. A review of

75 studies of digital literacies instruction and learning suggests many teachers continue to focus on how to use various technological tools to reach traditional literacy objectives (Hagerman & Spires, 2017). The goal of their study was to identify, “promising practices” (p. 2) and it suggests competence “seems likely” (p. 13) when students engage in specific types of projects that require gathering information from diverse texts and demonstrating understanding in diverse ways. Digital literacy is more than a student using technology or putting devices in the hands of students. It requires teachers who are digitally literate. As Levy (2018a) states, “It is crucial that school and district administrators emphasize teacher digital literacy to avoid policies that simply mandate placing technology into the hands of students without thought for how that technology will be used” (p. 5). It also requires more than a basic understanding of digital vernacular. Richard Grazier (2016) emphasizes this idea in his discussion of what it means to be digitally literate, “Digital literacy does not simply equate to knowing how to use a hashtag or using the latest chat acronym, but also requires knowledge, skill and, most importantly, how to use technology in the most effective way possible” (p. 1). Bali (2016) clarifies these differences by distinguishing the *what* and *how* of technology as digital skills and the *why*, *when*, *who*, and *for whom* as digital literacy. Instruction must involve more than using devices, tools or trendy practices if teachers are to promote digital competency.

2.2.1.5.2 Challenges

Using technology in ways that promote digital literacy is a challenging task. As demands for digital literacy instruction have increased, more and more research highlights the problems teachers face. Some of these challenges are the result of outside forces beyond the control of the teacher. One challenge involves the rapid and continuous change in devices and tools.

Teachers must keep up with these changes and evaluate their value in the classroom. Levy (2018b) acknowledges this problem and provides a list of basic digital skills teachers should possess. She suggests yearly revision to account for changes in technology and its uses. Even if teachers are familiar with the latest tools, the tools may stop working and require technical support. Inan and Lowther (2010) found technical support, “important in explaining technology integration” (p.147).

Digital skills and knowledge of current tools is important, but it is only one aspect of digital literacy. Another challenge is the outside focus on skills rather than broader digital competencies. Bali (2016) discusses some of the differences between teaching digital skills and teaching literacy and emphasizes meaningful tasks, “Teaching digital literacy does not mean teaching digital skills in a vacuum but doing so in a context that is authentic and makes sense to students” (p. 25). Findings from the NMC/CoSN Horizon Report support authentic learning and consider it a necessary part of digital instruction (Freeman et al., 2017).

Other outside factors influence learners and make digital literacy instruction more challenging. Eshet-Alkalai and Amichai-Hamburger (2004) applied Eshet-Alkalai’s model of digital literacy in a study of the literacy skills of different groups of scholars. The three groups of twenty participants each included 11th grade high school students, 3rd year college students, and 30-40-year-old adults who had completed college. All had advanced computer skills and performed five tasks related to five digital skills. Results indicate younger participants were better at photo visual and branching literacy skills. Older participants were better at reproduction and information literacy tasks. This suggests that factors such as age may influence the effects of instruction. Hatlevik and Christophersen’s (2013) study of 4087 upper

secondary school students suggests other factors outside the classroom predict digital competence. Conditions at home, i.e. language integration, cultural capital, and academic aspiration, predict and explain a large portion of the significant variation in digital competence between and within the 24 schools. Findings also suggest school class accounts for some of the variation. Results from both these studies suggest teachers and instruction can influence digital literacy achievement despite the influence of outside factors.

Another challenge of digital literacy instruction is adapting pedagogy and content in ways that promote digital competence. Although instructors have a great deal of control over this area, research suggests it is very difficult and complex. Chase and Laufenberg's (2011) study refutes claims that access to technology is the only reason for differences in digital competency. Their experiences suggest having access is important, but the key to digital literacy is an inquiry-based curriculum that challenges students to use technology to inquire, investigate, explore, and create. Using technology in new ways requires adapting pedagogy, which does not happen automatically. Blau et al.'s (2016) study investigates the technological, pedagogical, and content knowledge (TPACK) of 15 junior high school teachers during the second year of a one-to-one laptop initiative. Findings show a significant increase in teacher's technological knowledge but moderate connections between technology and pedagogy and technology and content. In a similar study, Dalal et al. (2017) investigate high school teachers' perceptions and decision making related to the integration of technology. Results indicate many teachers may not be successfully integrating technology in meaningful ways. Most were confident in their ability to do so, but data suggest most use technology for presentation and information. Alenezi (2016) identifies three areas of focus for classroom integration of educational technology:

hardware-based, software-based, and instructional design. Findings suggest obstacles differ between elementary and high school classrooms and exemplar teachers integrate technology more often. Several studies also found that a teacher's beliefs, attitudes, motivations, and self-efficacy influence integration (Alenezi, 2016; Bingimlas, 2009; Hobbs & Tuzel, 2017; Lorenz et al., 2018).

The results of a teacher-researcher partnership to use technology and adapt pedagogy in a high school English class highlight the extent of the challenges teachers face (Rust, 2017). Rust reports a collision of tactics and strategies in five categories: vantage points, genres, boundaries, tasks, and expectations. Based on the findings, she calls for teacher education to help instructors work through the challenges in collaborative and authentic settings. Sofkova and Cederlund (2017) also report on the challenge of transforming educational methods. Results from their multiple case study investigating the relationship between digital technology and literacy in early literacy classrooms confirm the complexity of the task. Findings suggest that context and pedagogical approach influence instruction. A teacher's view of technology as a resource for literacy development, a competence area that enhances literacy development, or as something that broadens literacy development influences digital literacy instruction. These findings, like Rust (2017), emphasize the need for ongoing professional development and discussion to address the challenges of digital literacy instruction.

Another challenge is the lack of training teachers receive in higher education. Hasse (2017) acknowledges the increasing demand on teachers to foster digital literacy and argues for the inclusion of technological literacy in preservice teacher education programs. Generally, colleges and universities have been slow to study the impact of technology (Goodfellow, 2011)

and to address the need for more and broader skills instruction (Nelson, Courier, & Joseph, 2011). Existing studies indicate positive outcomes are possible. For example, Roblyer et al.'s (2010) study indicates students are more likely to use social media than faculty and are more open to using it in class. Results from Hsu and Wang (2011) show an increase in student retention rates with the use of digital text and blogging in a college developmental reading class. These studies highlight the need and the possible benefits of digital literacy instruction in higher education courses.

In the past decade, researchers have started to investigate this challenge. Some studies focus on assessing preservice teacher digital competence, but more focus on strategies to teach competencies to preservice teachers. One study compares 174 preservice teachers' self-assessment of digital competence with an objective assessment. Results indicate that participants overestimated their digital competence in all seven objectives related to digital competence (Maderick et al., 2016). These results are similar to Dalal et al.'s (2017) findings that inservice teachers are overconfident in their ability to integrate technology. Another assessment study describes the design and development of a virtual environment to evaluate the digital competence of preservice teachers. The program, ETeach3D, provides information that enables teacher education programs to improve digital literacy training (Estev-Mon et al., 2016).

Most studies focusing on preservice teachers and digital literacy investigate ways to include technology in established programs. Fry and Seely (2011) explore a formative assessment approach to training preservice teachers to effectively search and evaluate journals and Websites. Results demonstrate the value of this approach and the need for training in

digital literacies. Kumar and Vigil's (2011) study evaluated 54 preservice teachers to determine how they use Web 2.0 tools. Results indicate a large gap between daily personal use and use for educational purposes and emphasize the need for modeling the use of technology in teacher education courses. Studies exploring the benefits of integrating technology within methods courses are finding positive outcomes. One study found that small changes in practice created positive outcomes within the college when teacher educators incorporated educational technology curriculum within their methods courses (Foulger et al., 2015). Kiili et al. (2013) employ a similar strategy in their study of the application of an academic literacies framework within a course designed for preservice teachers.

2.2.1.5.3 Instructional Recommendations

Researchers are beginning to investigate the challenges of digital literacy instruction, and results from existing studies suggest various strategies for improvement. Considine et al. (2009) discuss the different literacy practices today's students bring to the classroom because of their exposure to a variety of digital tools. Educators should consider this and bridge the gap between what they know and what they need to learn. Lindstrom and Niederhauser (2016) points to the importance of this practice, "...the authors were able to identify and describe how classroom teachers unintentionally marginalized the kinds of digital literacies that are valued in the larger society" (p. 103). Another study suggests teachers need to develop the ability to cope with change to adapt to the fluid nature of a digital society (Levinsen, 2011).

As in current research in preservice teacher education, much of recent research in digital literacy instruction focuses on teachers integrating technology into the curriculum. Hsu et al. (2013) investigate the confidence and pedagogical practice of middle school teachers.

Results reveal little evidence of integration in practice despite high teacher confidence levels. Based on their findings, the authors recommend, "...teachers need to master advanced ICT skills, which is a strong indicator of their technology integration abilities to facilitate students' cognitive skills" (p. 322). Mishra and Koehler (2006) present a framework to describe the types of knowledge a teacher should master to effectively integrate digital literacy. Building on the work of Shulman (1987) they suggest three types of necessary knowledge currently known as technology knowledge, pedagogy knowledge, and content knowledge (TPACK) (Koehler & Mishra, 2009). Walsh's (2010) case study of 16 teachers in nine primary classrooms suggests teachers are gradually changing pedagogy to embed technology in literacy learning across the curriculum. Findings confirm the need for a new understanding of literacy that encompasses contemporary tasks and products. Reed's (2017) case study of the instructional practices of a high school English teacher is an example of the integration of content with digital competence. The teacher's use of multimodal projects, virtual classroom spaces, Chromebooks, and effective classroom management fosters high-level skills and digital competence. Existing research indicates some promising strategies for teaching digital literacy competencies, but there is still much to learn if teachers are to effectively turn the key. As Hicks and Turner (2013) state, "How far have we come? What have we changed? How are digital literacies really being taught, if at all" (p. 58)?

2.2.2 Teachers

Much of current literature on teachers is a product of the increasing dominance of cognitive psychology over behavioral psychology during the 1950s to 1970s. Most experimental psychology of learning and cognition before this transition was theoretical with little application

or connection to practical issues (Glaser, 1976; Joyce et al., 1981). In the late 1800s, decades before the expansion of cognitive science, Dewey and others, such as Thorndike, Skinner, and Bruner, promoted linking educational theory to practice (Glaser, 1976). Berliner (1994), Glaser (1976), and Yaxadanmehr et al. (2016) attribute this eventual expansion to several factors including the translation and publication of Anton deGroot's (1965) study about master chess players. This study was the first to look at exemplary behavior in a specific domain. His findings showed that chess masters had stored memory of moves from their years of experience that enabled them to quickly recognize patterns of play. Another reason for the expansion was the growing interest in computers. During the same time period, computer science was developing expert systems, computers that could perform as a human expert in a certain field. Increasing attention from both cognitive science and computer science launched a surge of interest in expertise that eventually impacted studies on teaching and teachers. The relevant studies related to teachers focus on teacher quality and teacher thinking.

2.2.2.1 Teacher Quality

Research into quality teaching includes a variety of descriptive terms. The two used most often are effective and expert. Expert shares its origin with and is strongly related to experience. Berliner (1994) traces the use of these terms back to the apprenticeship systems of guilds and unions. Society considered experienced craftsmen as experts in their field. It became apparent, however, that some members possessed more superior skills and abilities than others at the same level of experience. These distinguishing qualities came to be known as expertise. On the other hand, the term effective is typically associated with a teacher who successfully achieves a desired outcome, often a standard or expectation of student

achievement. Fenstermacher and Richardson (2005) suggest quality teaching consists of two parts: good teaching and successful teaching. Good teaching considers the worthiness of the activity while successful teaching is the realization of expected outcomes. Based on this definition, expert teaching aligns better with good teaching, and effective teaching with successful teaching.

It is important to note that many studies in teacher quality compare teachers by years of experience. Researchers describe participants as expert/novice, preservice/in-service, or experienced/inexperienced teachers. Palmer et al. (2005) identified years of experience as a necessary, but incomplete, component of teaching expertise in their review of the criteria used by researchers to select expert teachers. Other terms used to describe quality teachers, such as exemplary, model, mentor, and highly qualified, appear less often in research. For this reason, the following review focuses on studies of teacher effectiveness and teacher expertise.

2.2.2.1.1 Effectiveness

The first wave of studies following the expansion of cognitive science focused on defining and improving teacher effectiveness. The increased focus on teaching and teachers was new, but the tendency to capture only observable behaviors was a carryover from the behavioristic perspective. Effectiveness research emphasized behavioral objectives and competency-based instruction with a focus on the effects of teachers' skills and dispositions on students (Carter, 1990; Joyce et al, 1981). In the late 1970s and early 1980s, researchers began including student achievement with effective teaching behaviors to find causal relationships. This influenced teacher preparation programs as well as teacher evaluation and certification standards (Hoffman & Pearson, 2000). For example, Hiebert et al. (2007) designed a framework

for teacher preparation programs based on a set of competencies and skills one can use in the classroom to find causal relationships between teaching and learning. Most research focused on observation of behaviors with almost no studies on thought processes or interaction with students (Joyce et al, 1981; Reynolds, 1992). From a meta-analysis of teaching effectiveness research between 1995 and 2004, Seidel and Shavelson (2007) found that correlational studies dominated the field, and most were very different from the teaching-learning process. For this reason, they conclude that overall estimates of effectiveness are misleading due to the variety of approaches studied. More recently, Straumanis (2012) states, “Decades of good research demonstrate that, judged by the criteria for robust learning, the least effective teaching methods are some of the ones most commonly practiced in schools, colleges, and universities...” (p. 8). Findings of Reynolds (1992) and Stronge (2010) (as cited in Munoz et al.,2013) support this summary and identify few empirical studies that distinguish what effective teachers do that less-effective teachers do not.

Although current research does not provide a consensus on the specific skills of effective teachers, it does suggest some characteristics. One of these involves classroom management. Shulman (1987) states that most existing knowledge of effective teaching dwells on classroom management. In a quantitative study using value-added modeling methods, Munoz et al. (2013) found that more effective teachers, determined by student reading achievement scores, consider classroom management and organization to be the primary characteristic of effective teachers because it allows them to focus more on student learning. Glock and Kleen (2019) also suggest that novice teachers are more likely to respond harshly to student misbehavior than more experienced teachers. These findings support earlier qualitative

studies that distinguish masterful classroom management as a key characteristic of effective teachers (Sabers et al., 1991; Wharton-McDonald et al., 1998).

Three other characteristics associated with effective teachers are related and often evident in both quantitative and qualitative studies of teacher thinking and decision making. Effective teachers are reflective, flexible, and adaptive. Reflective teachers think about their teaching while they are teaching. They exhibit flexibility and adaptability when they adjust their plans to remedy or make the most of unexpected student responses or behaviors. Reflection is an important part of a teacher's disposition (Schussler et al., 2010) and an indicator of more frequent effective teaching behaviors (Giovannelli, 2003). Hoffman and Pearson's (2000) summary of research in teacher preparation lists all three qualities as desirable goals for teacher education programs. Griffith et al.'s (2010) qualitative study found that 38 preservice reading teachers exhibited reflective behaviors and other qualities of effective reading teachers when those characteristics were explicitly promoted in a reading methods course and field experiences. Joyce et al. (1981) consider flexibility to be "an essential characteristic of the teacher" (p. xvii). Schön (1983) considers reflection-in-action to be an important skill for teachers and an important component of "double vision", the ability to shape or act on a situation while processing information that influences future decisions. Teacher reflectivity, flexibility, and adaptability have also been associated with teacher thinking and decision making (Parsons, 2012; Parsons et al., 2011; and Richards & Lockhart, 1994; Snow, 1972; Soslau, 2012). A general and descriptive review of literature summarizes the following factors as associated with effective teaching: "Effective teachers have classrooms which maximize learning...play an active role in the classroom...[with] a large 'kitbag' of routines and teaching strategies...have

friendly, mature relationships with their students, and demonstrate caring, humour and commitment” (Ayres et al., 2004, p. 146).

These findings suggest that behavioristic views and methods have added some understanding to the characteristics of effective teaching, but may not be useful for studying intrinsic, cognitive phenomenon (Berliner, 1994). They also seem to support Barrow’s (2006) claim that teaching is not a science with a usable list of best practices or rules for good teaching. He claims that each teaching event is unique due to the variability and unpredictable nature of humans, so only basic principles are needed to guide teachers, “...in the end, personal experience counts for most. Teachers have to determine for themselves how best to teach particular children...” (Barrow, 2006, p. 306).

2.2.2.1.2 Expertise

Like effective teaching research, the increase of research in teacher expertise relates to the transition from behaviorism to cognitive science, but it took much longer to get started. Few researchers described quality teachers as experts or considered the concept of teacher expertise until the 1990s. One reason may be the lack of definitive results from effective teaching research and the inadequacy of behavioristic methods for studying intrinsic phenomenon. This may have prompted some educational researchers interested in teacher quality to consider its implicit or more cognitive aspects. Another reason for the delay of research focusing on teacher expertise may stem from trends in the general study of expertise. Prior to the cognitive science shift, expertise research in the first part of the twentieth century included few studies focusing on the cognitive aspects of expertise (Yazdanmehr et al., 2016). The same study that prompted increased interest in cognitive science and computer science,

Anton de Groot's study of chess masters, also sparked new interest in the field of expertise research. Initial studies in expertise, however, still ignored the field of teaching and teachers, possibly for the same reasons society devalues the profession (Berliner, 1994).

The focus of early studies of teacher expertise suggests influences from cognitive science and expertise research. When educational researchers began using the methods and ideas of cognitive science, they focused on teacher thinking, which involved decision making and teacher knowledge. Studies in these areas, like many educational studies, compared experienced and inexperienced teachers. As research in the expertise field expanded, more and more educational researchers applied those findings to their work and began using the terms expert and novice to describe participants, even though one distinguishing quality was still years of experience. The focus of these studies was on the characteristics or qualities of expert teachers, rather than behaviors or skills. Using qualitative methods, Westerman (1991) studied the thinking and decision making of five expert and five novice teachers. She found that expert teachers were more aware of student behavior and adapted lessons more often than novice teachers. Sabers et al.'s (1991) qualitative study of seven expert, four advanced beginners, and five novice teachers found similar results. Expert teachers were able to monitor multiple situations with more detail and insight than novice teachers.

One of the first researchers to build upon findings from expertise studies was Berliner (1988). He used his data and data from expertise studies to create five stages of pedagogical expertise: novice level, advanced beginner level, competent level, proficient level, and expert level. He suggests that teachers move from one stage to the next as they gather more experience but cautions that experience does not guarantee expertise. Many experienced

teachers remain at the competent stage and few reach the stage of expertise. His work is summarized in Table 2.4 and serves as one of the current study's theoretical frameworks.

Berliner (1994) also found enough consistency among expertise research and the small number of teacher expertise studies at the time to identify eight robust propositions about expertise in pedagogy.

Proposition 1: Experts excel mainly in their own domain and in particular contexts.

Proposition 2: Experts often develop automaticity for the repetitive operations that are needed to accomplish their goals.

Proposition 3: Experts are more sensitive to the task demands and social situation when solving problems.

Proposition 4: Experts are more opportunistic and flexible in their teaching than are novices.

Proposition 5: Experts represent problems in qualitatively different ways than do novices.

Proposition 6: Experts have accurate and fast pattern recognition capabilities.

Proposition 7: Experts perceive meaningful patterns in the domain in which they are experienced.

Proposition 8: Experts may begin to solve problems slower, but they bring richer and more personal sources of information to bear on the problem that they are trying to solve. (Berliner, 1994, p. 18-59)

The apparent consistency of teacher expertise findings from a few years contrasts greatly with the varied and unreliable findings of teacher effectiveness research over a much longer time period.

Table 2.4

Summary of Berliner's Stages of Teaching Expertise

Novice	Advanced Beginner	Competent	Proficient	Expert
No experience or limited experience	Some experience, 2 or 3 years	Approximately 3 to 4 years of experience	Approximately 5 to 7 years of experience	More than 5 to 7 years of experience
Deliberate	Insightful	Rational	Intuitive	Arational
Understands common classroom terms and conditions and acts based on context-free rules	Building episodic and case knowledge to use for present situations	Make conscious choices about what they are going to do – set priorities and rational goals with sensible ways to achieve them	Intuition or know-how becomes obvious	Have an intuitive understanding of situations and sense the most appropriate way to respond
Behavior is usually rational, relatively inflexible, and usually conforms to learned rules	Developing strategic knowledge - when to follow or break the rules they have learned.	Determine what is and what is not important as they teach	Experiential knowledge allows for more precise prediction of events	Have fluid and seemingly effortless performance
Often fail to take full responsibility for their actions, lack personal agency	Context begins to guide behavior but may lack a sense of what is important	Learn to make curriculum and instruction decisions -when to stay on topic and when to move on and feel more responsible for what happens in their classrooms	Still likely to be logical and intentional in response decisions	Unconscious of choosing what to address and how to respond
	Often fail to take full responsibility for their actions, lack personal agency	Behaviors are not yet fast, fluid, or flexible	A small number of teachers move into the proficient stage of development.	Do things that usually work
	Not all teachers leave the advanced beginner stage; a small but significant number of teachers remain fixed at this stage	Many third-, fourth- and fifth-year teachers, as well as more experienced teachers, reach a competent level of performance.		Few teachers reach the expert stage of development.

As research in teacher expertise increased, it continued to develop as a component of decision-making studies. (The decision-making section of this review will include these studies in greater detail.) Other researchers, however, investigated expertise in specific content areas. Tsui (2003, 2009) investigates the decision making of expert second language teachers. More recently, Yazdanmehr et al. (2016) proposes a model for teacher expertise in English Language Teaching (ELT), and Watson (2019) explores the decisions math teachers make. Other studies focused on specific types of expertise, such as adaptive expertise (Soslau, 2012) and expertise in Project Based Learning (PBL) settings (Yew & Yong, 2014).

A newer study in the general field of expertise offers a promising new path for teacher expertise research. Kuhlmann and Ardichvili (2015) present a summary of the characteristics of expertise development in any domain and call for more research focusing on applied professions. Expertise in applied professions develops as a by-product of work, you learn as you do. This describes learning to teach. Schön (as cited in Tsui, 2003) describes learning to teach as the “paradox of learning ... novice teachers enter the classroom to do what they do not yet know how to do in order to learn how to do it” (p.93). Teaching, as an applied profession, may benefit from the application and testing of the theory presented by Kuhlmann and Ardichvili.

2.2.2.2 Teacher Thinking

Another relevant area of teacher research includes studies on teacher thinking. This field of research began in the 1970s and expanded after a report from the National Conference on Studies of Teaching led to funding from the National Institute of Education (NIE) (Borko & Shavelson, 1990; Clark & Peterson, 1984). This report emphasized the importance of understanding teacher thinking.

It is obvious that what teachers do is directed in no small measure by what they think.... To the extent that observed or intended teacher behavior is "thoughtless," it makes no use of the human teacher's most unique attributes. In doing so, it becomes mechanical and might well be done by a machine. If, however, teaching is done and, in all likelihood, will continue to be done by human teachers, the questions of the relations between thought and action become crucial. (p. 1) (as cited in Borko & Shavelson, 1990, p. 312)

Despite the funding and focus on the importance of teacher thinking, however, Joyce et al. (1981) note, "Over the last twenty-five years there have been scarcely a half-dozen investigations of the thinking processes of teachers" (p. 227). Of the few studies conducted during the 1970s, three represent the foundational paths of future research. Snow (1972) highlighted the importance of teacher thinking by including the cognitive activities of teachers as a component of his model teacher training system. This presented thinking as a desirable teacher quality and pointed to its inclusion in teacher education. Crist et al. (1974) (as cited in Clark & Peterson, 1984) were the first to use Jackson's preactive, interactive, and postactive phases of teaching to categorize teachers' cognitive activities. Most of the research to follow used this framework to investigate various aspects of teacher thinking. Shulman and Elstein (1975) used their review of general studies on thinking, judgment, and decision making to suggest connections for educational research. Their suggestions moved research along and illustrated the benefit of an interdisciplinary approach to the field. Though few, early research added to existing knowledge and led to more studies in the field.

As research in this field expanded, initial investigations focused primarily on teacher planning done during the preactive and postactive phases of teaching (Borko & Shavelson, 1990; Housner & Griffey, 1985; Joyce et al., 1981). Many of these qualitative studies compared experienced and inexperienced teachers but often took place in experimental settings with prescribed objectives and/or students the teacher did not know (Housner & Griffey, 1985;

Peterson & Clark, 1978; Shavelson et al., 1977). The findings from these studies were not consistent with studies in natural settings, but one common theme appeared. Like the findings from Anton deGroot's chess study, many studies found that experienced teachers have routines or schemata that they use when teaching (Bishop, 1976; Byra & Sherman, 1993; Leinhardt & Greeno, 1986; Shavelson & Stern, 1981). These stored memories of experiences with students and the subject matter, help teachers process and handle classroom demands more effectively, much like chess masters' stored memories benefit their play. Borko and Shavelson (1990) presented a cognitive framework for analyzing thinking and used it to review research on planning and interactive decision making. Johnson (1992) focused on the cognitive demands of six preservice ESL teachers and found unexpected student responses and a desire to maintain class flow dictated their actions. The preservice teacher responses sought to address student understanding, increase motivation and involvement, and maintain control. Teacher thinking research also produced Schön's (1993) term "double vision" mentioned previously and an emphasis on reflection in action. Since the 1990s research in teacher cognition has increased and the focus has expanded to include many variables (Li, 2017). For example, Dewitz and Jones (2012) investigated the ways an experienced elementary reading teacher uses basal readers. They describe her thinking behaviors as insightful and intelligent. As the number of studies in teacher thinking increased, more and more dealt with thinking as it relates to decision making and the lines between the fields blurred.

2.2.3 Decision Making

As thinking studies became more prominent, more and more focused on thinking that occurs during decision making. Bishop (1976) considers it to be, "at the heart of the teaching

process" (p. 42). Shavelson (1973) emphasizes the importance of decision making as the basic skill of teaching. Their work, along with Shulman and Elstein (1975), led to a focus on teacher decision making research in the 1980s and 1990s and, more recently, a focus on decision making in different subject areas (Borko, Roberts, & Shavelson, 2008). One early review of studies indicates that decision making research often includes thinking and judgment, and most focus on individuals and process tracing approaches (Shulman & Elstein, 1975). Several exploratory studies find experienced teachers rely on certain routines or habits to manage classroom behavior and instruction (Bishop, 1976; Calderhead, 1981). Many initial studies in the field take place in experimental settings, not actual classrooms (Housner & Griffey, 1985; Peterson & Clark, 1978; Shavelson et al., 1977; Zahorik, 1970). This often produces results inconsistent with studies in more natural settings; such as Sawyer's (2001) longitudinal case study of three teachers' decision making over 10 years and Maloch et al.'s (2003) study of 101 preservice teachers from three reading teacher preparation programs. Shulman's (1986) study on the types of teacher knowledge highlights decision making as the skill used to know when to use what knowledge.

Decision making studies in the last decade focus on how it relates to other concepts or to the development of frameworks. In a case study of two classrooms, Watts-Taffe et al. (2012) study the role of decision making in differentiation. They present some common characteristics of effective differentiated instruction. Rubenstein (2013) uses a more quantitative web-based approach to study the relationship between response times and answer accuracy. Boschman et al. (2014) use multiple case study design to investigate the decision-making approaches of three teams of Kindergarten teachers involved in planning for a technology-rich environment.

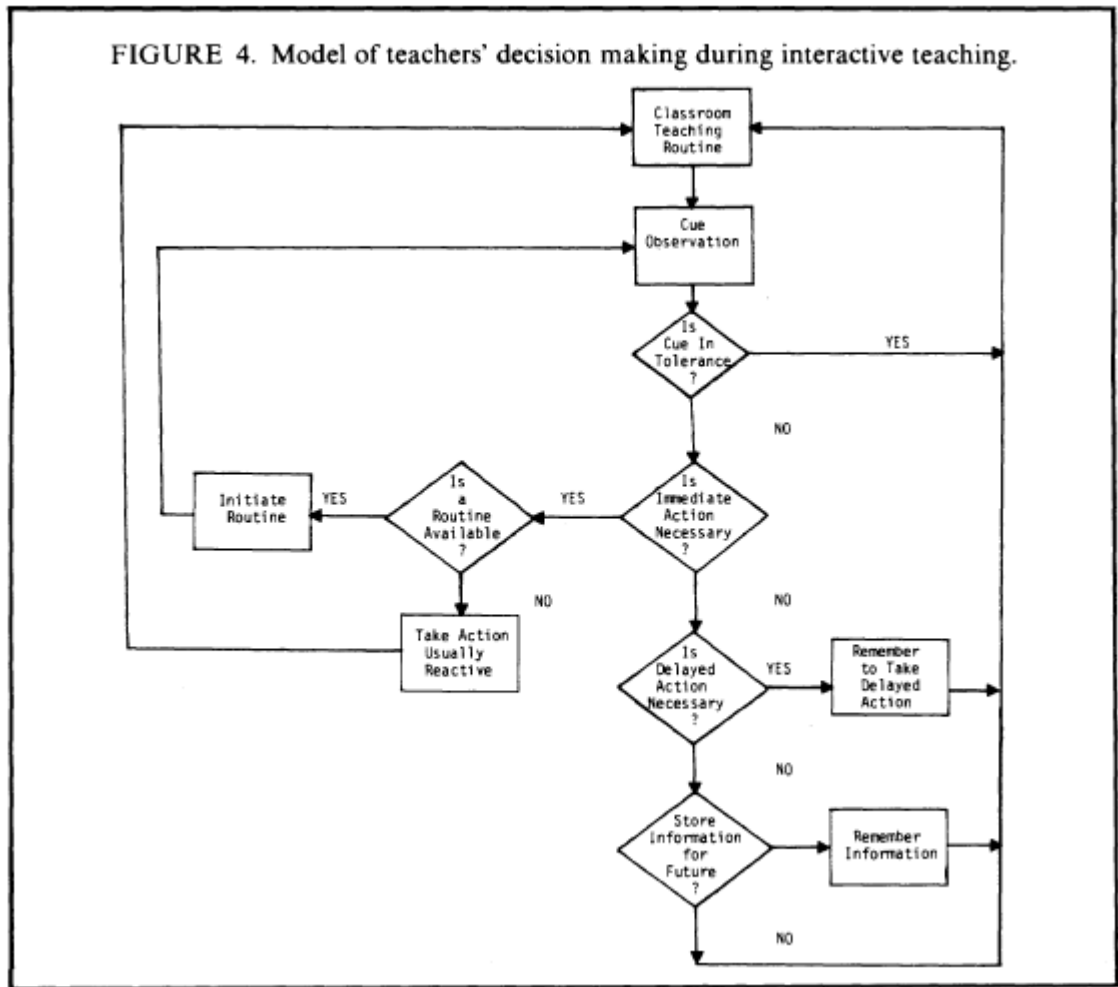
Findings suggest that practical concerns and teachers' knowledge and beliefs play an important role in design reasoning. Some researchers focus on creating frameworks to use when studying decision making. Clough et al. (2009) created a framework for science instruction. Others created models for data-based decision making (Cramer et al., 2014; Dunn et al., 2013).

Soon after decision making research began, Joyce et al. (1981) reviewed decision making studies at that time and found that most focus on planning during preactive teaching and few on decisions made during interactive teaching. They claim very little existing knowledge about this type of decision making exists and suggest a map for future research in this area. Westerman (1991), cited previously, is one of the first studies to consider the decision making of expert and novice teachers during all phases of teaching. Although some general decision-making studies still exist, the focus seems to have shifted to interactive decision making.

Research focusing on interactive decision making centers around five categories: types, influences, teacher education, language, and models. Shavelson and Stern's (1981) review of existing studies on teachers' pedagogical thinking presents a model for teachers' interactive decision making shown in Figure 2.2. This model serves as one of the frameworks for this study and is cited in many later studies of interactive decision making. Early studies of this phenomenon focus on decision making during each phase of teaching and frequently further classify interactive decisions. Results from Calderhead's (1984) work with experienced and preservice teachers describe three types of interactive decisions, reflective, immediate, and routine. Borko and Shavelson's (1990) review considers interactive decision making to be one of two types of interactive thinking; the other being deliberate action.

Figure 2.2

Shavelson & Stern's Model of Teachers' Decision Making During Interactive Teaching



Source: Shavelson & Stern (1981), p. 483.

Later studies focus on various influences of interactive decision making. Alvermann's (1987) two-dimensional content analysis investigating the effect of textbooks on interactive decision making finds other factors in addition to student behavior influence teachers' interactive decision making. A qualitative analysis of the reasons teachers stray from their lesson plans connects interactive decisions with a teacher's repertoire of knowledge and skills (Bailey, 1996). More recent studies include Griffith et al. (2013) which uses case study strategy

to examine the forces that guide interactive decision making. They conclude that professional knowledge can improve decision making and mediate the influence of complex forces. Li Li expands the field by exploring why and how teachers make interactive decisions. She discovers four reasons why teachers make interactive decisions: an unexpected learner contribution, the task or activity, a potential learning opportunity, and insufficient knowledge (Li, 2017). Her 2020 study builds on these factors to uncover three aspects of the interactional strategies teachers use during interactive decisions. One aspect is making a swift decision to use or bypass unexpected learner contributions. Another is knowing students well and adapting a task or activity to better fit them. The third aspect is using disciplinary or cultural knowledge, or the lack thereof, as an opportunity to integrate student knowledge with content (Li, 2020).

Two of the larger areas of focus for interactive decision making are its use in teacher education and in language classrooms. Schoenfeld (2008, 2011) worked with preservice teachers to determine if decision making during interactive teaching can be modeled. More recently, Griffith (2017); Griffith et al. (2016) and Griffith and Lacina (2015) investigated ways to model decision making for preservice teachers. Griffith and Groulx (2014) created and tested a profile for teacher decision making survey for use with preservice teachers.

A final area of focus for interactive decision-making research relates to language studies. Tayar and Lakshmi (2013) classify the decisions and activities of English teachers in India using the preactive and interactive phases of teaching. Gün (2014) studied the shared attributes of 10 experienced language teachers and found several common pedagogical and affective attributes. Zhu (2014) focused on the interactive decisions of English teachers in two primary schools in China. Findings suggest teachers in open-ended, student-focused classrooms exhibit

more skill in interactive decision making. The studies from each area represent existing research in interactive decision making.

2.3 Summary

This review of existing literature about digital literacy, teachers, and decision making illustrates how each field expanded and developed from the growth of cognitive science. Studies in digital literacy have focused on theories and frameworks and how various digital tools are used. Research is expanding to include a broader and more purposeful look at how to promote digital competency. Teacher quality studies adapted findings from the field of expertise to better understand teacher expertise. The focus on cognitive processing led to teacher thinking research, which ultimately produced decision making studies, including interactive decision making. This supports my claim that this study is unique and adds to current knowledge in all three areas; digital literacy, teachers, and decision making.

CHAPTER 3

METHODOLOGY

3.1 Research Design

The purpose of this multiple case study was to explore the digital literacy instruction and interactive decision-making characteristics of teachers with varied levels of expertise. The nature, sample size, and focus of the study necessitated a qualitative approach (Merriam, 1998; Miles et al., 2013; Stake, 2003). The target phenomena, digital literacy instruction and interactive decision making, are complex, unobservable, and take place in a social setting. My sample is small, and my in-depth focus is purposive. Each of these characteristics aligns with qualitative research. In addition, I believe the way people interpret or describe their actions, interactions, and behavior is a source of knowledge. By observing, participating, and experiencing both focus phenomena in their natural setting, I came to better understand that knowledge. My stance was ontological and epistemological. My methods (observations, interviews, and questionnaires) focused on the participants' interpretations of their actions and experiences. My role as nonparticipant observer allowed me to experience the phenomenon as it naturally occurs.

My desire to identify and describe the elements of digital literacy instruction and the characteristics of teachers and to analyze several features of each participant aligns with reasons to use case study as a research strategy (Gomm et al., 2000; Stake, 2006; Yin, 1989). Yin (2003) defines a case study as, "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (p. 13). He continues,

The case study inquiry

- Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result
- Relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result
- Benefits from the prior development of theoretical propositions to guide data collection and analysis. (p. 13-14)

My choice of case study also fits with the common use of case study in education, “to document the emic perspectives of the participants” (Chapman & Kinloch, 2011, p. 381).

Furthermore, Barone (2011) states, “...case studies are most often used when the researcher has no control over the behaviors being studied” (p. 22). Although findings suggest the focus of this study influenced both phenomena, especially as it progressed, I had no control over the digital literacy instruction or interactive decision-making behaviors of the teachers.

My decision to seek out and use data from multiple cases was based on claims made in research. “A multiple case study enables the researcher to explore differences within and between cases. The goal is to replicate findings across cases” (Baxter & Jack, 2008, p. 548). By exploring multiple cases, the knowledge gained about digital literacy and its relationship to teacher expertise and interactive decision making is strengthened (Stake, 2000, 2006; Yin, 2003). Barone (2011) also states that multiple cases enhance the credibility and significance of the study’s results. A multiple case study may also lead to similar findings across cases or lead to different findings for a specific reason (Ashley 2012). These are the reasons I chose multiple cases for this study.

3.2 Research Questions

1. What components of digital literacy are teachers including in their instruction?

2. What is the nature of the interactive decision making of teachers with varying levels of expertise during digital literacy instruction?

3.3 Setting

To find out more about digital literacy instruction in the classroom, I had to intentionally be where teachers are making decisions about how to use and develop digital literacy skills.

That means the participants had to be teachers who interact with students in learning environments that involve digital tools and texts. The environment, also, had to be conducive to interactive decision making. To date, research suggests small group settings (Griffith et al., 2015) increase the need for interactive decision making. Experienced teachers are also more likely to be skilled decision makers (Gün, 2014; Housner & Griffey, 1985; Osam & Balbay, 2004). I found both elements in the learning environment at Texas Academy of Leaders (TAL).

Texas Academy of Leaders is a charter school located near a major metroplex in northern Texas. Dr. Victoria Kraus, Superintendent/CEO and Founder, along with the Board of Directors oversee the operation of the school. TAL received approval from the state of Texas to open as a charter school in August 2016. The school offered grades 6th -10th its first year and expanded to 11th grade for the 2017-2018 school year. TAL features small classes of no more than 15 students, longer class periods, longer school days, and a 200-day school year. Every student has a Chromebook and E-textbooks are used in every class. Teachers also use a variety of digital resources for instruction. An important part of the school's environment is based on Parker Palmer's (2011) Five Habits of Heart for Democracy:

- An understanding that we are all in this together.
- An appreciation of the value of "otherness."
- An ability to hold tension in life-giving ways.

- A sense of personal voice and agency.
- A capacity to create community.

TAL adapted these ideals into their Habits of the Heart for Community.

- We are all in this together.
- We value and appreciate each other.
- We will learn to hope in an imperfect world.
- We will grow confident in our own voice and power.
- We will work to strengthen our community every day.

These values are also evident in the school's mission statement.

- [Texas Academy of Leaders] is dedicated to educating students through engaging activities at the highest academic standard.
- [Texas Academy of Leaders] provides a safe environment to practice skills needed in postsecondary and future work experiences through caring, individual-focused teaching and learning.
- Mastering the mind, high academic expectations for all learners.
- Mastering the heart, respect and relational trust for all.
- Mastering skills for tomorrow's workplace developed throughout the curriculum.
- Mastering community, engaging in service to others beyond the Academy.

The Academy is in an old school building, previously abandoned by the city's independent school district. The founder purchased the building and then worked with staff, students, and parents to repair and refurbish it to fit the needs of TAL. The three-story brick building has 13 large classrooms reminiscent of 1915 with a wall of windows allowing natural light and plenty of room for instruction and movement. Most classrooms have a smart TV to project from any Google Chromebook. The lower level contains a large open space used for lunch, physical education, assemblies and performances. Six murals painted by a local artist are

located on walls throughout the building. These murals depict the Texas countryside and one medieval castle.

TAL operates as an open enrollment public charter school and welcomes students of any academic ability. It does not discriminate in admissions based on sex, national origin, ethnicity, religion, disability, artistic or athletic ability, or the child's current school district. Students are required to wear khaki pants, shorts, or skirts and a Polo style shirt (solid, striped, polka dots, etc.). The admission process includes a Pre-Admission Form, interview with an administrator, and completed enrollment packet. TAL admits students based on the number of openings in each grade level. If there are more applications than openings, administrators use a lottery system to determine admission and placement on a waiting list.

Instructors at TAL come from a variety of backgrounds and years of experience. When the study began, there were nine full-time instructors, six certified and three degreed, five male teachers and four female teachers. Some had more than 15 years of teaching experience and others were first- or second-year teachers. During the hiring process, the superintendent looks for open-minded, student-focused educators who are interested in doing school differently. One of the unusual aspects of TAL is Dr. Kraus's decision to pay every employee the same salary. She intentionally designed the salary schedule to reflect the school's focus on building a community where every member's responsibilities are equally valued and important to student success.

3.4 Researcher Role

My role at TAL was solely as an observer. I have a professional relationship and friendship with Dr. Kraus and previously taught at a school where she was my supervisor for

seven years. One of the current teachers at TAL is also a former coworker, but he is not one of the participants in this study. I did not know any of the other teachers or students. I visited TAL and spent two days there prior to the beginning of the study to become familiar with the setting and teacher routines. Based on the teachers' backgrounds and levels of experience and the digital nature of the educational setting, I assumed each teacher would be at least moderately adept at making interactive decisions about digital literacy. My visits also assisted me in planning for data collection and increased participant rapport. As I became more familiar with the setting and participants, I purposefully looked for disconfirming evidence to mitigate any positive or negative biases toward the participants, especially confirmation bias and the halo effect (Thorndike 1920). I also took steps to ensure trustworthiness, reliability, validity, and transferability to address any biases I may have.

3.5 Participants

In addition to digital literacy instruction and interactive decision making, another key aspect of this study is teacher expertise. As previously noted, it is common for studies in teacher quality to compare participants by years of experience. A review of the criteria used by researchers to select expert teachers identified four categories often used for selection: experience, social recognition, professional or social group membership, and performance-based criteria (Palmer et al., 2005). Based on their findings, they propose a rubric for selecting samples of expert teachers consisting of two gates:

First Gate: Screening

Teachers should have: (a) three to five years of experience in a specific teaching content area and with a particular population of students, *and* (b) teacher knowledge as reflected in relevant certification and degrees that correspond to the field in which these teachers are currently teaching.

Second Gate: Performance Indicators

Recognition as an exemplary teacher by: (a) multiple constituencies, for example, fellow teachers, researchers, administrators, teacher educators, based on recent and relevant indicators of teaching effectiveness to include knowledge and skills, *and* (b) should be confirmed with documented evidence of teacher impact on student performance. (Palmer et al., 2005, p. 23)

The teachers at TAL exhibited the descriptors of each gate in varying degrees. Some had one or more descriptors in both gates and others did not have any of these descriptors. As mentioned in Chapter 1, it was a major assumption of this study that the teachers would exhibit varying stages of teaching expertise. Data collection and analysis based on Berliner's stages of teaching expertise confirmed this assumption, indicating behaviors from the advanced beginner to expert stages.

3.6 Sample and Sample Selection/Population

One quality of case study research is its boundedness (Barone, 2011; Merriam, 1998; Miles et al., 2013). The purpose of this multiple case study was to explore the digital literacy instruction and interactive decision-making characteristics of teachers with varied levels of expertise. Possible participants would not be using traditional textbooks or teaching in a traditional school setting, therefore the selection of the possible participants for this multiple case study was purposive (Hesse-Biber & Leavy 2011). To study digital literacy instruction, participants and their students had to be teaching with and using digital tools. Texas Academy of Leaders issues each student a Google Chromebook and uses electronic textbooks for instruction. This increases the frequency of digital literacy instruction. The size and type of school allowed for easier access as a researcher. Charter schools also have more flexibility in meeting state achievement requirements, so teachers have the freedom to teach in less

traditional ways. These factors increased the likelihood that digital literacy instruction would be evident and frequent during classroom observations. Due to the content and nature of one class, digital tools were not used often, so I eliminated one teacher from the sample population. After explaining the study, its purpose, and requirements, six of the eight remaining teachers agreed to participate, signed the Informed Consent form, and completed the Teacher Survey. Out of convenience, I eliminated one participant when three attempts to meet for the initial interview failed and there was not enough time to carry out the required observations before the end of the school year. After collecting half of the prescribed data, it was necessary to exclude another participant when circumstances led to her leaving the school. The remaining four teachers comprise the final participants.

3.7 Data Collection

An important component of case study research is the use of multiple sources for data collection to substantiate any findings (Barone, 2011; Cutler, 2004; Yin, 1989). As suggested by Baumann and Bason (2011), I used teacher surveys to gather information across cases to generate rich descriptions and to create follow up questions for the initial interviews. The teacher survey contains basic questions designed to classify teachers by type and number of years of teaching experiences, educational background, and use of technology. Their answers were also used to approximate their levels of development in Berliner's stages of teaching expertise. After agreeing to participate, participants completed the teacher survey and the General Decision Making Style questionnaire (GDMS) (Scott & Bruce, 1995). The GDMS questionnaire allowed me to approximate each teacher's decision-making style and compare it with their perceived style and their teaching behaviors in the classroom. Like Sohail (2013), I

used this tool to better understand each teacher's decision-making patterns. It is frequently used in business and medicine and occasionally in educational studies (Baker, 2012). Several studies confirm its reliability and validity (Loo, 2000; Reyna et al., 2014; Spice & Sadler-Smith, 2005).

After collecting the surveys and questionnaires, I reviewed each participant's responses and arranged to meet for an initial interview. I used an interview guide for each semi-structured interview to ensure the same general topics and questions were addressed with each participant (Johnson & Christensen, 2012). This and all interviews were recorded using a Sony handheld digital audio recorder. After each interview, I downloaded the file and placed a copy in a Dropbox file shared with my transcriptionist. Completed transcripts were placed in the same Dropbox file. I reviewed each transcript when it was available, checking for accuracy and correcting any discrepancies.

The purpose of the initial interview was to clarify any answers on the teacher survey and to explore in greater detail each teacher's background, abilities, motivations, beliefs, and existing knowledge of digital literacy and interactive decision making (Purcell-Gates 2011). It also provided teachers with the opportunity to self-select their decision-making style.

After the initial interview with each teacher, I conducted four classroom observations on four different days during a six-week period. Observations typically lasted for two class periods or 2.5 hours. Three participants were observed for a total of 10 hours and, due to scheduling conflicts, one participant was observed for 8.75 hours. The purpose of the direct observation sessions was to obtain information about digital literacy instruction and the interactive decisions made during instruction (Johnson & Christensen 2012). These observations also

provided evidence to support each teacher's level of teaching expertise. Each observation session was recorded using the same Sony audio recorder placed in the center of the room. As a nonparticipant observer, I sat in a corner of the room. Initially, the teachers would introduce me and explain my presence. Students knew my role, but my interaction with them and the teacher during the observation was limited (Hesse-Biber & Leavy 2011).

During each observation session, I noted what I observed as it happened in the classroom (Purcell-Gates 2011). These field notes clarified and enhanced my understanding and provided details to create thick and rich descriptions of the setting and events. I used the classroom observation protocol to narrow my focus on the targeted phenomena. My field notes also helped me note instances of interactive decision making during the observation, which I used when preparing for the stimulated recall interviews. These notes also provided additional information when recorded dialogue was unintelligible.

After each observation session, I would listen to the recording and digitally mark each instance of teacher decision making. During the first stimulated recall interview, I used these pre-marked points to guide the teacher through the data, allowing him or her to choose which ones to discuss. Even with these marked points, however, listening to each one and allowing him to select the ones to discuss became time consuming. I adjusted my strategy by creating a Track Marks Guide of each observation session to be used during the stimulated recall interview. As I listened to the recording, I used my field notes to identify and clarify the events. I marked these events in the audio file and noted when each one ended. These marks were listed in chronological order in the guide with end times and a brief description of the event to help the teacher remember the situation. I would give the teacher a printed copy of the Track Marks

Guide at the beginning of the stimulated recall interview and ask him or her to choose the ones to discuss. This worked much better and allowed us to more quickly move through the recorded sessions. See Appendix D for a sample guide.

Following the framework established by Calderhead (1987), the stimulated recall interviews took place the day after each direct observation session. I met with the teacher, usually during his or her planning period, to discuss the observation and play back the audio recording. Stimulated recall interviews allow participants to hear and comment on different aspects of their behavior (Dempsey 2010), to focus on critical incidents (Watts et al. 1997), and to catch what may have been overlooked at the time of the event (Purcell-Gates 2011). Data collected from each stimulated recall interview in this study supports each of these benefits.

During each stimulated recall interview, I followed the interview protocol and used the Track Mark Guide to help the teacher select instances of instruction to discuss. I would also seek clarification to enhance my understanding of instances involving digital literacy and discover what the participant was thinking before, during, and after each interaction. Data from these interviews enhanced my understanding of the teacher's digital literacy instruction and patterns of interactive decision making.

When all observation sessions and stimulated recall interviews were completed for every participant, I reviewed the data and my ongoing notes. As I listened to each recording and checked for accuracy, I noted any observations or patterns. I used these notes and my ongoing initial analysis of all the data to prepare a preliminary case summary for each participant. I presented this summary to the teacher during the final interview. The primary purposes of the final interview were to discover what the teacher had learned from the study and to clarify and

triangulate my preliminary interpretations of the data with each participant (Purcell-Gates, 2011). I also wanted to express my gratitude and appreciation for their contributions to the study and answer any questions they may have.

The following data was gathered for each participant: a teacher survey, which included the General Decision Making Style Questionnaire (Scott & Bruce, 1995), four direct classroom observations, four observation field notes, four stimulated recall interviews, a final interview, and interview notes. Data was gathered for each teacher between April and June of 2018. Each of these data sources provided insight into the instructional practices and decision-making process of the participants. Over time, many dilemmas and teacher behaviors were like those in previous observation sessions which indicated some data saturation.

3.8 Data Analysis

The analysis of data began with the collection of the teacher surveys and GDMS questionnaires and continued inductively in an iterative process as more and more data were collected (Hesse-Biber & Leavy, 2011). Merriam (1998) considers this the “right way” to collect and analyze data in a qualitative study, and Lincoln and Guba (1985) present this process of constant comparison as one well-suited for naturalistic studies. By gathering analytic memos, as Strauss and Corbin (1998) recommend, I was able to compare new data with existing data and revise as needed to promote consistency.

The transcription of interviews and observations and the digitalization of field notes allowed for repeated readings of data for different purposes. Initially, I read to become familiar with the data and to check for accuracy. Each reading after the first focused on a different aspect or feature of this study: elements of digital literacy, instances and patterns of

interactive decision making, and characteristics of any of the stages of teaching expertise. When all the data had been gathered and transcribed, I began a more focused analysis. I considered all the data for one participant (case) at a time. I highlighted incidents of digital literacy and quickly realized that observation transcripts, stimulated recall transcripts and field notes overlapped. I decided to combine these data sources into one document using different colors of text: observation-black; field notes-blue; stimulated recall-red. This allowed me to see a more complete picture of the observation session. After I combined this data for each case, I digitally highlighted incidents of digital literacy in green. Then I went back to the original combined data and highlighted all the incidents of interactive decision making in blue. Finally, I returned a third time to the combined data and highlighted incidents of teaching expertise in pink. When I completed this digital highlighting process for each case, I went back and combined the highlighted portions of each focus area into one document for coding and further analysis.

This iterative process of constant comparison continued as I focused on each teacher separately. One purpose of choosing a multiple case study approach is to build stronger understanding, but a broader more compelling focus may diminish the detail and richness of each case (Stake, 2000). To lessen this possibility, I followed Seidman's (2006) idea of "crafting a profile" of each teacher (p. 120). I used the patterns and themes which emerged from my analysis of all sources related to that teacher to create a personal narrative, using the words of the teacher to support the narrative. I created preliminary profiles of each teacher and shared them during the final interview. I compared the more thorough personal narratives with the

preliminary profiles and the teacher's comments during the final interview to create a final case profile, included in chapter four.

At this point in the study, I begin looking for "connecting threads" in the data, memos, and teacher profiles (Seidman, 2006, p. 125). I continued to regard each teacher individually and revise the profiles as needed, but my focus was no longer on each case exclusively. This strategy aligns with Yin's (1989) five levels of questions in case study protocol and Grossman's (1990) second level of cross-case analysis. This analysis of data at different levels and my use of "thick description" in Chapter 4 align with Lincoln and Guba's (2009) idea of developing a "working hypothesis" to improve chances of "transferability" to other settings based on "fittingness" (p.13).

3.9 Trustworthiness

An essential component of any qualitative study is the steps taken to ensure trustworthiness. Steps taken in this study align with the four criteria of Lincoln and Guba (1985): credibility, transferability, dependability, and confirmability. Several aspects of this study enhance its credibility. These include the use of different, well-established research and data collection methods and initial and ongoing attempts to increase rapport by encouraging honest answers and assuring participants that there are no "right" answers to questions asked. I also kept a running record of any impressions or insights related to how data was gathered, organized, and analyzed. Member checking was used to evaluate the accuracy of my preliminary summaries for each participant. During the final interview I presented the summary and asked each case to check it for accuracy. Peer debriefing was also used to further credibility. My transcriptionist's first-hand exposure to all recorded data, familiarity with

teaching, and work experiences assisted her in reviewing and commenting on each of the final case analyses and the comparison of cases analysis. She holds a bachelor's degree in psychology and a master's degree in education. Her work experiences include three years of collegiate-level teaching, 12 years as a licensed professional counselor, and 20 years in business working as an owner and a director of human resources. These experiences enhanced her interpersonal skills and her ability to assess and understand human behavior. All of these aspects make the findings of this study more trustworthy.

Some of the steps taken to boost trustworthiness also boost transferability. My thick descriptions of the setting, participants, observation sessions, and interviews promote credibility and allow readers to determine any application to other contexts. By comparing my results with previous studies, I position the findings within existing knowledge to present a more inclusive overall view of the phenomena. The previously noted details related to participant selection, data collection, and timing of the study also assist in transferability.

Some steps taken to strengthen credibility and transferability also ensure dependability and confirmability. Describing in detail how the established research methods were implemented, how data was gathered, and how the iterative inquiry process led to the findings promote the study's dependability. The use of multiple methods of data collection and the sharing of my reasons for decisions throughout the research process increase confirmability. Most importantly, the audit trail provides a detailed description of how the data gathered led to the recommendations found in chapter five. Each of these components support this study's trustworthiness.

CHAPTER 4

FINDINGS

The rapid increase and prevalence of technology and online resources has led to a need for digital literacy among current and future citizens. Teachers most often serve as the primary developers of digital literacy, and their teaching expertise and interactive decision-making affect instructional outcomes. The newness and lack of research in digital literacy instruction, teaching expertise, and interactive decision-making, individually and collectively, provide a need for this study. The qualitative approach of this study supplied practical data in the natural setting of all three phenomena, a classroom.

This study's investigation of digital literacy instruction and the interactive decision-making characteristics of teachers with varied levels of expertise intends to increase understanding of these phenomena and their relationships to one another. Researchers can use the findings to clarify what it means to be digitally literate and what factors influence instruction. Teachers can use the findings to evaluate and improve their digital literacy instructional practices and interactive decision-making skills. Teachers and administrative decision makers can use the findings to better understand digital literacy and what is needed to prepare students for a world filled with technology and online resources. Each of these outcomes illustrate the importance of this study to the development of a digitally literate society.

A multiple case study is used to present the findings gleaned from a deductive thematic analysis of data gathered from surveys, questionnaires, field notes, and audio recordings of interviews and observations. Themes are based on Belshaw's (2012) 8 essential elements of

digital literacies, Berliner's (2004) stages of teaching expertise, and Shavelson and Stern's (1981) model of teachers' decision making during interactive teaching. The following questions guided the study:

1. What components of digital literacy are teachers including in their instruction?
2. What is the nature of the interactive decision making of teachers with varying levels of expertise during digital literacy instruction?

To answer Question 1, I analyzed transcripts from audio recorded classroom observations using themes from Belshaw's 8 essential elements of digital literacies (cultural, cognitive, constructive, communicative, confident, creative, critical, and civic). To answer Question 2, I analyzed surveys, questionnaires, my field notes, and transcripts from audio recorded classroom observations and interviews using themes from Berliner's stages of teaching expertise (novice, advanced beginner, competent, proficient, and expert) and themes from Shavelson and Stern's model of teachers' decision making during interactive teaching (routine, cue, dilemma, immediate response, and delayed response).

The findings from each of these analyses are presented in this chapter as typifies a multiple case study, first by case and then across cases to illustrate themes within and throughout the data. For each of the four cases, I provide general biographical information about each participant, followed by summaries and supporting evidence for each phenomenon; digital literacy instruction, interactive decision making, and teaching expertise. After the four cases are presented, I compare common themes in each area of study, noting differences and unexpected findings.

4.1 The Case of Mr. Taft

Mr. Taft is a 27-year-old white male, finishing his second full year of teaching. His teaching experiences before coming to TAL include a semester of student teaching, a semester as a substitute teacher, and one semester as a teacher at a large public school. He earned a Bachelor of Science degree in agriculture science and a Master of Education in ag leadership, education, and communications. He holds Texas teacher certifications in ag science (6-12), social studies composite (8-12) and is working on a principal certification. At the time of the study, Mr. Taft was the social studies teacher for Grades 8 to 11 and worked as the science teacher for Grades 7 to 10 the previous year at TAL.

Mr. Taft's experiences with students outside the classroom include tutoring underclassmen during college and assisting with FFA and academic decathlon activities at his former high school. He actively mentors current and former students and serves as the sponsor for TAL's Dungeons and Dragons Club.

Mr. Taft's social studies classroom is located on the second floor of the school building and follows the typical structure of the other classrooms. The doorway is at one end of the room across from the outside, window-filled wall. His desk is positioned in the corner, directly across from the door, with a whiteboard on the wall between it and the door. A screen is attached to the back wall and student desks are positioned throughout the room in groups of two, three or four. Several types of flags and subject-appropriate posters are hung from the walls, and student work is displayed inside and outside the classroom.

4.1.1 Digital Literacy Instruction

In addition to Mr. Taft's basic biographical profile, it is important to understand his

background, perspective, and experiences with technology to enrich the descriptions of his digital instruction. On the initial teacher survey, he described himself as an “early adopter and tech enthusiast”. He clarified what that meant and explained the role of technology in his life during our initial interview.

Mr. Taft: Well, I have an iPhone 10, the newest iPhone. And I also, I watch YouTube, listen to Spotify, Audible audio books, Podcasts, Netflix, Amazon Video sometimes. It seems like all my consumption and stuff is now just through the internet.

Barbara: How many hours a day do you think you’re plugged in to something?

Mr. Taft: After school, I’d say on average, probably about 3-4 hours a day. That’s just literally when we get home, that’s all we do. Other than cooking and stuff like that.

Barbara: You said you’re an early adopter; what’s your earliest memory or exposure to technology?

Mr. Taft: 1995, my Mom brought home our first desktop computer, home personal computer, 1995, and it was a Dell Intel something.

Barbara: How old were you?

Mr. Taft: I was 5. I was born in 1990.

Barbara: Did you, did she get programs for you?

Mr. Taft: Yeah. Yeah, she bought it partly, she bought it basically for me. She bought it for her to do her taxes and for me to learn on.

Barbara: What kind of programs?

Mr. Taft: Mostly educational. There was a lot of first grade, second grade, third grade, the frog thing, you know. Also, she allowed me two games at a time, and they were usually city building games.

This excerpt illustrates Mr. Taft’s experience and familiarity with technology and adds to the understanding of his digital instructional practices.

Analysis of the observation data from Mr. Taft’s classroom reveals varying frequency of

each of the 8 elements of digital literacies. The participant also provided information about previous instruction during the final interview. The findings are presented based on each element and confirm Belshaw's description of some being closely linked with others. They are presented according to each element and supported by specific examples or illustrative excerpts from the transcripts.

4.1.1.1 Cultural

Belshaw (2012) defines this element as "the need to understand the various digital contexts an individual may experience" and suggests this element is "best acquired through immersion in a range of digital environments" (p.207). Analysis of the four classroom observation transcripts reveals Mr. Taft's students have been exposed to more than 26 different digital contexts. Fifteen of these are introduced directly by the teacher during instruction or as part of an assignment. Two are introduced by a guest speaker, four are used by the students independently, and Mr. Taft mentions five as being used prior to my observations. Examples include YouTube, various documentaries, the Zapruder film, a television show, a news clip, Script, an online Geographical information (GI) mapping tool, and Snapchat.

4.1.1.2 Cognitive

This element of digital literacy is closely related to the cultural element but focuses on using cognitive tools to expand the mind within various digital environments. It is developed by "conceptualizing and interacting in digital spaces" (p.208). Students must not only be immersed in a variety of digital contexts, but they must be given opportunities to think about and use the

information found there in different ways. Mr. Taft fosters this element through group discussions and assignments.

One example of this occurred during the first observation. Several students in the class were absent, so this discussion involved the teacher and five 10th grade boys. After lecturing about events leading to President Kennedy's assassination, Mr. Taft shows the Zapruder film to the class.

Mr. Taft: This video has no sound, and it's not very long, so we're just going to watch it. There's a lot of graphic detail, but it doesn't, you can see at one point, where he's normal, and then there's a bunch of blood. This is a very old film, taken in 1963. So, there he is, waving to fans. Goes past this sign, and see his hand right there, that's when he was shot the first time. That's when he felt the first shot. There was a shot that went in his back, went down into his body and into his leg; this is from the autopsy report that showed this magic bullet, magic bullet they called it. And it went through his leg. And so, there was like, and so he's sitting there like this, acting like, he heard a gunshot. It's very possible that he heard the gunshot and at that spot doesn't even know he's shot. You can be shot and not know you're shot. And so, apparently, they think that if he had been shot one time he would have lived, because the bullet found a weird way to get out and didn't damage a lot of stuff on its way down. So here we go. And then, she's trying to figure out what's wrong, and this is pretty, awful, okay. His wife, Jackie, doesn't know what's going on but hears the shot, but not sure what it is, she grabs an arm and tries to get him to talk to her, and he turns to her and then (snap sound) he's dead. And bam! Yeah. It's pretty bad. And you can't see the detail, but you can tell and obviously that's blood, and part of the scalp's coming down, and... Yeah. It's bad. And see, here, she's covered in blood, and the secret service tries to help her, help him, get out of the car, and was also shot the second time, but he doesn't die. He actually lives. So, there's a lot of, I mean, you can watch a million of these videos. There's so many people who are still obsessed with this assassination.

[Video shows detail of head shot - students react - he stops to discuss then goes on and shows commentary of the assassination]

Audio playing

Student: Where's Connelly?

Mr. Taft: Connelly was shot and didn't die. Much later...

Classroom noise

Students talking

Mr. Taft: Okay, so. Okay, you can see there's, where it says there's a lot of, if you watch the film a million, million times, you're never going to get a right answer and the way I can tell you is that once Kennedy was dead...

Student: How did it go? I mean I know they shot his head off, but like what did it do? Did it hit his brain?

Mr. Taft: It split his brain. Like it went right in here and lodged in his scalp. Lodged in his scalp. They said he wasn't dead until he got to the hospital though. But when he got to the hospital, he slowly perished. And if he had been around today, they could have revived him, but he would have had brain damage, and he would have had to leave the office of President anyways. But he would have lived.

Student: Wait. Was he aware?

Mr. Taft: Apparently, they say that he was aware up until his priest told him to let go of life, and he let himself die. Supposedly. There are a whole lot of conspiracy theories behind it, and we're not going to talk about all of them. But all you can understand is that, Kennedy's assassination was this moment in history, American history, where suddenly the innocence of a generation was gone. No longer did anybody think that things were perfect.

This discussion illustrates Mr. Taft pointing out visual cues to support different beliefs about the assassination, while emphasizing the range of interpretations made from the same film. He does not impose his beliefs or point to the one right answer. Mr. Taft uses this digital context to foster and expand student thinking. The student questions about the topic indicate they were thinking.

Another way this element is evident in the data is best summarized by Mr. Taft's explanation of his goals and purposes for student assignments related to digital sources, specifically a video. During the final interview Mr. Taft shared the following:

Mr. Taft: ... But also, whenever I give the students, say, a video, I also usually follow up with questions. And so, they actively have to go back and watch the video, probably twice or three times before they get all the questions. Because sometimes they'll go, like, okay he's asking this question and this video says this, but it's not the exact, they

don't match up exactly. I do that intentionally because I want them to think about it a little more. Because if I just matched it with all the videos, that's lazy, and it's like, they're just doing a seek-and-find. And I don't want them to do a seek-and-find. Like, you know, especially the high schoolers.

Mr. Taft intentionally exposes students to a variety of digital environments and fosters the cognitive element of digital literacy through classroom discussions and assignments.

4.1.1.3 Constructive

A third element of digital literacy focuses on using content from digital sources to create original work. The constructive element is evident throughout Mr. Taft's instructional practices, specifically his requirements for the Poverty Project and his response to a student taking pictures with his phone.

The first example occurs during the third observation when Mr. Taft is explaining the details of a final research project. The details of the assignment are on the whiteboard, which Mr. Taft refers to as he explains the requirements. Students will be using various digital sources in differing ways to create their own original document.

Mr. Taft: All right. So, let me explain this final research project. You have several due dates in here. Okay. But, first of all, you're gonna pick. [Student name]. [Student name]. Listen. You're gonna pick a person, place, thing, or event in U.S. history. Anything that we have talked about, and you're going to research, okay, and you're going to choose one of those things. If there's something you're not sure about, you're not for sure how you're going to do it, you're going to pick one. Two, using sources such as Google and Wikipedia, build a general knowledge framework about the material. So, you're going to use these things to help you get a better understanding of the subject you've chosen. Because it's something you may not know everything about. Okay. And then, you, Google Scholar and Script, which is another website, you're going to find one primary source...

Student: What's a primary source?

Mr. Taft: A first-hand account or physical object that was written or created during the time that's being studied. There's (unintelligible) to help you correctly. You pick a

primary source, so if you're into Abe Lincoln, you find Gettysburg Address is a good example. You use the Gettysburg Address as the primary source. Thinking about the secondary source, somebody who witnessed it and somebody who wrote about it. Those are your two secondary sources.

In this brief interchange, Mr. Taft mentions Google and Wikipedia and how content from these sources can be used. He continues by mentioning two other sources, Google Scholar and Script, and how they are to be used to find primary and secondary sources. He is describing how and why these digital environments can be used for the project.

In addition to this planned instruction, Mr. Taft also mentions the constructive element in response to a student using his phone to take pictures of two other students.

Mr. Taft: Okay. Okay. Sit down. Guys! I wouldn't trust... [Student name]! Get off of Snapchat. Or taking pictures of those two, why? They didn't give consent to it.

Student: [Student name], do you give consent to the pictures?

Mr. Taft: See, he doesn't give consent.

Mr. Taft uses this moment of unexpected and unacceptable behavior to emphasize the rules of consent for gathering and reusing digital content, even if it is just a photo of a classmate. Both these examples illustrate how Mr. Taft is building this element of digital literacy.

4.1.1.4 Communicative

The fourth element of digital literacy focuses on understanding the "construction and unique 'rhetorics' of interactive communication" (Belshaw, 2012, p.209). It includes applying this knowledge by communicating in digitally networked environments. This element is most evident in Mr. Taft's classroom observations through his use of Google Classroom. This is a free, online service created by Google for educators. It allows teachers to create, distribute, collect, and assess assignments in one digital environment. Teachers create class groups, which

students join. Students also have accounts that display each of their classes. This is just one of many learning management systems but understanding and using it exposes the student to the basic structure and uses of the others. Others I have used or am familiar with include: Blackboard Learn, Canvas, Schoology, ItsLearning, Eduphoria! and RenWeb. There are many others, each with unique tools and designs, but each one follows the same basic structure – a home page, with courses/classes, with ways to create, distribute, collect, and assess assignments. Knowing one helps you figure out others.

In addition to Google Classroom, there are eight other types of communication media evident in Mr. Taft's classroom. YouTube, Instagram, Meme, and Snapchat are mentioned or used during the recorded observations. During the final interview Mr. Taft also notes four other communication platforms the students used throughout the year: digital posters, slide or audio presentations, an audio script, and a podcast.

Mr. Taft: Yeah, um, we had a couple of digital posters, but also a lot of presentations, video, slides, I think slides are easy for them. I had one student who, actually, now that I think about it, there was one student who, for his final, he actually, he and another one, created a script, and they, using a microphone, they read a presentation off it. It was so long, they were like, we'd rather just do this then send it to you. I don't, I have it somewhere, but it's not uploaded, so I can't really, like, find it right now. Let's see if I (unintelligible). So, the Classroom, then to YouTube...

Barbara: So, did they create it on YouTube?

Mr. Taft: Um, well we did one video for sure that I know is not here, that I want to show you...Yeah. They had, I have had them, I had one class do a podcast. And they did, uh, I had them do that before, and they did like a radio broadcast for Pearl Harbor. So, a couple of them really latched onto that, a couple of them (unintelligible) out. But you know, that's part of it; you just gotta find where they enjoy.

Students in Mr. Taft's classroom learn how to communicate in and thru a variety of digital environments by being a part of them. Students create and share content in networks

within the school and public networks outside the school. Evidence of this digital literacy element is apparent in Mr. Taft's instruction.

4.1.1.5 Confident

Another element of digital literacy involves the mutability of digital environments and the freedom and confidence it fosters. Belshaw describes this confidence as "a more cavalier approach" to situations (2012, p. 210). A digitally literate individual is willing to explore and experiment in digital contexts. Students in Mr. Taft's classroom frequently ask questions during lectures but do not rely solely on the teacher to find answers. They may explore or dig deeper into a topic using their digital access. One example of this occurred during my second observation of Mr. Taft's class. During the discussion of World War II, the teacher mentions Ernest Hemmingway and other American ex-pats living in Paris. Mr. Taft connects the group's cynicism to a student with a similar perspective. The student begins exploring on his own which leads to further discussion later in class. After listening to the audio of this interaction, Mr. Taft describes his thinking and observations as well as the follow up discussion with the student.

Mr. Taft: Well he, I think that he is actually kind of a cynic, and so I want to bring up that this is where cynicism actually has a lot of its roots, this modernist authors like Hemingway. And so, I wanted to incorporate it, but I didn't want it to become a long discussion, so I just kind of mentioned it casually, and didn't make it a long discussion because we're going to have more time to talk about that next week.

Barbara: So, did you plan on doing that, or did that kind of come to you as you were...?

Mr. Taft: It came to me. Cause I didn't think, I always, I don't ever think about, "Okay if I say this in this class, they're going to have this reaction." And the reason I don't is because I can't think that way. And then I, or else I'm simply sculpting into the class, and it's not necessarily a good thing. When you're trying to give just general information.

Barbara: Okay. So, you thought about it while you were teaching because... what would

you say? Because he is a cynic, or...? Did you know you were going to talk about the cynicism?

Mr. Taft: I did know, but I didn't say, "Oh, I'm going to actually tell [student name] about that." Cause that's what he, that's the, and he likes being cynic...he takes pride in it, and that's why I mentioned it. That's why he went "Woooo!" So...

Barbara: Okay. So, did he know that before about this group?

Mr. Taft: No. No, he didn't, and I could tell he was already researching it.

Barbara: Oh, how did you know that?

Mr. Taft: Because he was typing furiously at his computer. That's why he kept talking to [student name] and his girlfriend.

Barbara: Is that when he came up and talked to you at your desk?

Mr. Taft: Yeah. He was asking me a couple things. He was asking me that and another thing. It was part of it.

Barbara: I didn't pick up any of it, so I couldn't mark it, I was curious.

Mr. Taft: That was part of it, yeah.

Barbara: So, you responded like you did because...?

Mr. Taft: Because, um, because I knew he would appreciate it. To pique his interest.

Barbara: So, to engage with him?

Mr. Taft: Um hmmm.

Barbara: Was he engaged from your viewpoint? I couldn't see because he was in the back.

Mr. Taft: Well, they both always like to sit there because they like having their backs to the wall. And it's typically why they sit there. And he, definitely, I think he benefits from having that ability to not feel like... yeah, I feel like he was engaged. Sorry, (yawning).

Barbara: Okay. Okay. That's good. Did any follow up interactions occur? Which would be, he brought it up later, during the video, right?

Mr. Taft: Yes.

Barbara: That was just one on one, right? So, is he asking you more about the people, or?

Mr. Taft: He was asking what a couple other author names were, and I told him, because he just wants to know every author, he just has to type in “modernist” and/or “Hemingway contemporaries”. But I told him Hemingway is the one you want to read. For sure. Or James Joyce.

Barbara: There were a lot. That was an interesting era.

Mr. Taft: There were a lot. For sure. But yeah. James Joyce, I told him, if you want to read James Joyce, you might just decide that you want to join up and fight in the Irish Republican Army. (chuckles) So, he was talking about that one, anyways....

The student explored his interest by “typing furiously at his computer” and then discussing what he found with the teacher. The teacher encouraged further exploration by suggesting other search phrases. This questioning, searching, and inquiry occurs often in Mr. Taft’s classroom.

In addition to fostering engagement, Mr. Taft encourages the confident element of digital literacy by using a variety of digital platforms, as mentioned previously, and by modeling an attitude of confidence and willingness to explore and try new things. He gives students options on how to present their learning. The communicative element excerpt listed previously, is also an example of the students’ confidence to approach the teacher about creating an audio presentation for their final. They came up with the idea themselves, asked permission, and then created a script and recorded the information. They displayed digital literacy by having the confidence to explore and experiment with a digital medium.

4.1.1.6 Creative

The creative element of digital literacy is closely related to the confident element. To do new things in new ways, student must have the confidence to try something new. The digitally

literate individual displays this element by “using technologies to perform tasks and achieve things that were previously either impossible or out-of-reach” (Belshaw, 2012, p. 212). In addition to allowing students a great deal of freedom in how they present their learning, Mr. Taft fosters or sets the stage for creativity by exposing students to ways technology is used in the real world. For example, Mr. Taft invited a parent to talk about what she does as a hydrologist for a private engineering company. As she explained the importance of water and water sources, she directed them to free online resources to detect geographic information. She explained how she uses some of these same tools for her work. She also spent a portion of her time explaining how technology has changed how data is gathered and how she does her job. Her visit reinforced the importance and impact of digital literacy in real life. These examples illustrate how Mr. Taft promotes creativity through his instructional choices and his openness to doing tasks in new ways.

The seventh and eighth essential elements of digital literacy “are particularly closely-linked with, and help explain the power of, the other elements” (Belshaw, 2012, p.212). A digitally literate individual reflects on the assumptions and power structures in digital contexts (critical) and then uses technology to enact change or equalize power (civic). Both elements are evident in the observation data from Mr. Taft’s classroom but in much more limited and less intentional ways.

4.1.1.7 Critical

Critical literacy considers how symbols, images, words, sounds, gestures include or exclude, assume, and give power to individuals. It is closely linked to the communicative element. Discussions involving issues of power and political struggle are evident in Mr. Taft’s

classroom data but are not always connected directly to literacy practices. For example, as the hydrologist spoke, Mr. Taft mentioned the political ramifications of water in Texas but did not provide opportunities for students to evaluate images, text, etc. to discover inherent power structures in this issue. This discussion occurred because of the speaker's presentation, which explains the unplanned nature of the discussion, yet it exemplifies how this element appears in the observations of Mr. Taft's classes. Another example illustrates how a planned lesson touched on the critical element yet lacked student engagement. During the second observation, Mr. Taft presented an overview of the social, political, and economic implications of World War I and their influences on World War II. Ultimately, Mr. Taft focuses on Ireland and the reasons it broke off from the British Empire. He explains how the words and actions of those in power disenfranchised the citizens of Ireland and Scotland and, ultimately, led to Ireland's fight for independence.

Mr. Taft: So, in 1915-1916 there was a huge contingent of Irish and Scottish troops that came from Ireland and Scotland that were part of the British Empire to join in the fighting. They had been part of, some of them had already been there. But this was a huge group along with Indian Dominion Troops that came from India, and some Australians. And they started attacking the Ottoman Empire and they started actually being involved. It was because of this involvement that these people started realizing just how little they mattered to the British. Because when it came time for major pushes to try to take German trenches, they often would send the Scots and Irish first. Now they claim it was because the Scots were so brave that they wanted to send them first. It also could be the fact that these guys were literally running at German tanks with kilts on and blew the German tanks up....

Student talking

Mr. Taft: ... So, they, the Scots and Irish, however, were always sent first, so they lost thousands of people. And the Irish had never really been loyal to the British. But they kind of had no choice. They were kind of made to come to war. Then the Irish, they didn't wear kilts like the Scots, but they did have certain colors and stuff that they did wear to distinguish them. And don't get me wrong: they were very brave men; they did what they were supposed to do. But it caused a lot of them to question and wonder,

“Was this really all, who was this for?” Was it to fight to defend Serbia? Was it to defend Belgium? Or was it because the British and French had big egos and didn’t want the Germans getting too powerful...But why did Ireland want to become independent? It was because of WWI. Because of four years of a dominating nation that treated them like they were nothing. It’s hard to really understand the Irish mentality because we don’t, unless you see yourself as a second-class citizen, you would never understand. Imagine, in your own country, you don’t even have the right to vote. Oh wait! We did that here.

Mr. Taft tells the students about the words and actions of those in power and the disenfranchisement of the Scots and Irish but does not provide ways for them to develop this element. Another instance, however, allows a different group of students the opportunity to hone the critical literacy element.

Mr. Taft uses the starter question, “How do you think we as individuals or a group can do something to help poverty around the world? Or at home?” to introduce the Poverty Project. After discussing their answers to the starter question, Mr. Taft directs them to the requirements of the Poverty Project on Google Classroom.

Mr. Taft: So, if you look on Classroom, you’ll see that I have a project, it’s called The Poverty Project. Now this project, we will discuss how it’s going to work. It’s very simple: you’re just going to make observations, fifteen observations about three different families. And you’re going to observe the differences between each family. For maybe observations of, “Wow, I didn’t realize they catch salt in a bag, or that salt was so important to them that they had a dedicated container for salt, even though we don’t realize that we have the same thing, except ours comes in portable... We buy saltshakers, however. We have salt. And we also don’t realize that salt is so cheap here in the United States. And we’re just like, love to buy salt for nothing, and it also helps that salts just down the road at Saline, in East Texas. So, that’s where Morton Salt is headquartered...So we just don’t ever think about all the things that we have access to, and sometimes we look at it that it makes us superior, and so I want you to kind of check, and look, at those different pictures and pick out those fifteen observations that you notice about, tell me what strikes you most. And just be honest. You don’t have to sugar coat it, you don’t have to, just tell me “Wow, it...”

Student talking

Mr. Taft: Yeah. I mean that’s one way to look at life. Well, you’d be surprised. And that’s

the thing; you're going to notice that the mid-range of the population typically lives in a pretty, what we would call a scuzzy, disgusting-looking area, and they have phones and modern stuff, but they're still not the same as the top. Now remember use Gap Minder, it's on there, linked below, with another link, and it will show you the different pictures that you can use to get a better sense of which groups I'm talking about. So, yeah. There's a lot of details that you might miss if you're casually just looking at it. That's why I want to give you time to look at it and actually say, "Hmmm, that's a really interesting difference." Or "That's something that I never expected people to have to do." Anybody ever, anybody ever really thought what it would have been like to be born in another country, and...

Students talking

In this activity, students exercised their critical literacy skill by evaluating images of families from other countries. The starter question situated the images within the context of poverty. Students compared the images with each other as well as with their own lives. This and other data suggest the critical element of digital literacy is evident in Mr. Taft's instructional data in less frequent and more unintentional ways than the previous elements.

4.1.1.8 Civic

Civic literacy is the ability to use new technologies and tools to support societal change in both positive and negative ways. It is linked to the confident element. Like the critical element, this element is less evident in the observation data from Mr. Taft's classes. One instance, however, involves the Poverty Project assignment just mentioned. By asking students to think of ways to address poverty individually and collectively, Mr. Taft encourages this element of digital literacy. He also mentions organizations and possible ways they can support efforts to diminish poverty.

Mr. Taft: Totally. Okay. So, somebody give me an idea. What is something we can do at home to help alleviate poverty?

Student talking

Mr. Taft: Jobs? Okay. How do you help by offering jobs?

Student talking

Mr. Taft: Okay, let's say that you have a job and you have a family, how do you help people in poverty in your neighborhood?

Student talking

Mr. Taft: Give them leftover money?

Student: Teach them to rob their rich neighbors.

Mr. Taft: Well, some people do that. Okay, let's not do that. Let's think about it, though. If you or somebody who has extra money, and you can pay somebody to mow your lawn, have you thought about maybe finding a neighbor who can do that? Who's maybe down on their luck? Sometimes it takes the little action of, "Hey, I've got a job you can do, and I'll pay you money." Sure, you may not be able to pay them a whole lot, but you may have spared them having to try to come up with money for an electric bill. Or trying to come up with money for something simple like a water bill. You have to look at it as, you do one little thing here or there, eventually it spirals into better things. What's another way, maybe as a group, say that we at [charter school] wanted to help people in our community who have greater poverty? Maybe we do things like we did with Sixth Stone Ministries, people who can't take care of themselves, we fix their houses.

Student talking

Mr. Taft: Very good. Like the food can drive, where we helped sort all of these different canned goods, and made sure that people were able to eat, or at least have access to. Or maybe one day we'll do Meals on Wheels. Getting involved doesn't require that much effort, other than an investment of time. You don't even have to spend money; you can just be a volunteer and help people. Sometimes just having a friendly face is important. I've considered volunteering at one of the, one of the homeless groups here in town, by being someone who teaches, they actually asked me last year about it because I'm a teacher, I already have skills that I can transfer to people and educate them about basic things. And so maybe I could use that skill that I already have to help them be better, you know, be better prepared for an interview, to help them get clothes, sometimes if you have old clothes donated, there's some of these little things that you can do to help somebody. But you have to look at it too, that the bigger picture about world poverty, is not something that individuals can tackle on their own, unless you're Bill Gates. And I say this jokingly, but I also mean it serious, because Bill and Melinda Gates, his wife, they made a foundation. And it was something that they both wanted to do, is Bill and Melinda Gates Foundation has worked all over the world, and they target things professionally. They say, "Okay, is this business in Namibia, Africa

going to succeed? Are they to the point where they really just need money to get started?" And they'll go, and they'll give them Angel Investment. Angel Investment means no interest or no control of the company or anything like that, of a couple million dollars to get them started. And if they succeed, then they'll give them more to help them, to get them, and things started. Or they'll go, or they'll host engineering fairs, engineering fairs will help build new things, like a toilet that doesn't require any water. That then you can then take and drink water from it, it's clean, because it doesn't require water, it's using the water that it gets and cleans it and makes it clean water. And then it also creates fertilizer, because it takes that dry waste and then converts, and you can use as fertilizer and stuff for cattle, and for (unintelligible) and stuff. So, you have to look at...

Student talking

Mr. Taft: So, I want you to write down your ideas in Classroom, and I want you to really think about it, 'cause next year I'm working, I'm still working to get with my friend who (unintelligible), she works in Kenya. She's got a Dallas office that's actually her headquarters, and she's supposed to be (unintelligible), and that she does, and she said she's going to try and make a visit to our school and talk about what she does. And that would be really amazing if she could do that because you would be really impressed by what she does, and how she helps empower people, children, and everything in Kenya. To be able to have their own businesses and everything. It's really great, but also, just how she's literally one or two years older than I am, and she's already accomplished this much. And it's something that I want all of you to realize, that you can do that as well. That she was just average person growing up in Texas, and now she's the head of this group that is worldwide, internationally known. It's pretty awesome.

Mr. Taft fosters the civic element of digital literacy by presenting students with images and allowing them time to consider practical ways they can connect with others to support change. The discussion also touches on ways others have used resources to address poverty.

In summary, the observational data indicates all eight of Belshaw's elements are evident in Mr. Taft's instruction. Some elements are more evident than others and often appear in conjunction with one or more of the other elements. This supports Belshaw's idea that the elements are interrelated or overlap in many ways.

4.1.2 Interactive Decision Making

To better understand the nature of a teacher's interactive decision making, it is important to consider the findings Shavelson and Stern gleaned from their review of research on teachers' pedagogical thoughts, judgments, and decisions (1981). In addition to the model of teachers' decision making during interactive teaching (MTDMDIT), Shavelson and Stern suggest teachers create a mental script of how a lesson is to proceed when they plan the lesson. This script provides the framework for smooth implementation and minimizes decision making during instruction. A teacher's primary concern is to keep the activity flow going, so she is reluctant to change the script. Any interruptions to the flow or deviations from the mental script increase the cognitive demands of the teacher and increase classroom management problems. This classroom teaching routine is the initial action in the MTDMDIT and often consists of patterns or established ways of presenting content information and handling unacceptable or unexpected behavior. As the teacher proceeds through the mental script (teaches), she observes a multitude of primarily visual and auditory cues from the students and the environment. These observation cues lead to the first decision point in the MTDMDIT, "Is the cue in tolerance?" In tolerance means the cue does not interfere with the teacher's mental script. If it is in tolerance, the teacher continues teaching. If it is not, the teacher moves to the next decision, "Is immediate action necessary?" If the cue requires immediate action, the teacher determines if she has a routine established for addressing the issue. If so, she uses the routine. If not, she responds in some way, usually reactive. If the teacher decides immediate action is not necessary, she must decide if delayed action is needed and remember to take the action later. If delayed action is unnecessary, the teacher must decide to remember the

information for future use or disregard it and continue teaching. The first decision point occurs repeatedly with each cue observation. The other decisions in the MTDMDIT only occur if the cue is not in tolerance. Data from classroom observations and stimulated recall interviews were analyzed using this model.

Analysis of the dilemmas observed in Mr. Taft's classes and the explanations he provided during the stimulated recall interviews suggests the actions and decision points of the MTDMDIT accurately describe the pattern of his interactive decision making. For example, during the first observation, Mr. Taft talks about the impact of Kennedy's assassination on the nation. When a student asked a question about the Illuminati, Mr. Taft tells the student it will be talked about later.

Mr. Taft: ... And when he was assassinated, suddenly it sent shock waves throughout the young generation at that time. And suddenly, now, had a president that they loved and then he was assassinated. Just dead. Just killed by somebody who wanted to kill him. And it made the majesty and the mortality of the president of the United States fickle. They took away the magic of (unintelligible). Yes.

Student: [mentions Illuminati]

Mr. Taft: We'll talk about that later. My point in talking about it, though, is that we just often times don't think about, in our time, assassination being a big impact that it was...

Mr. Taft explains his thinking about this dilemma after listening to the interchange in a stimulated recall interview.

Barbara: The first one you picked out was the fourth one, I may have to adjust this so you can hear.

Audio playing

Mr. Taft: (laughing)

Barbara: Okay, so what was the dilemma as you perceived it?

Mr. Taft: The dilemma is that there's always a perception of somebody, a higher group or something, is conspiring to control us, which is a narrative that is throughout history, and even in education just in general. Some people just tend to cling on to that idea, and so I was a little frustrated, but that's why I sighed. Because it's not the, it's like the millionth time he's said "the Illuminati confirmed" in class.

Barbara: So, this student says that a lot?

Mr. Taft: Yeah, I think he does it mainly to mess with me. But at the same time, I also think that he might think that it's real, so I try to offer, I try to just ignore it and move on.

Barbara: Okay. Which goes to the next one: What did you consider as you negotiated, decided what to do?

Mr. Taft: Just, had to move on, and just kind of said, later on I would acknowledge conspiracies, but I did it from a very more, a practical sense, instead of just "the Illuminati" or something.

Barbara: So, you knew during part of the lesson to come that this would come up more, so you kind of passed at that time.

Mr. Taft: Oh yeah. I knew it was going to possibly happen, and that...

Barbara: And that kind of goes with why you responded, so, what factors you thought about. You kind of mentioned before his previous history of doing that. So, does he do that with about every lesson?

Mr. Taft: Not every lesson. He most of the time, it's usually if it has to do with something mysterious. He just naturally goes to that.

Barbara: And you thought about time as well, that you knew later on it would...

Mr. Taft: Yeah. For sure.

Barbara: So, you chose to do that because you knew you'd address it later on. Did any follow up interactions occur?

Mr. Taft: Uh yeah. There was several...

Barbara: Tell me about that.

Mr. Taft: Like during the lesson? Yeah. There were a couple of times he did ask other questions that weren't related to it. But then he also did, still would randomly say

“Illuminati” – I could hear him just say “Illuminati”. Cause sometimes if I know he’s going to say something, he usually has this face, so I’m like, okay, I just need to ignore him and keep to the, keep doing what I’m doing.

Barbara: Okay, which is that face is why you think he does it to mess with you?

Mr. Taft: Probably, yeah. He does it because he knows he can, because he knows I’m not mad about it; it’s just he’s known me for a while and so he just likes to mess with me.

Barbara: Okay. So, I’m sure, well I would guess you’ve had conversations about this, well in general, people like to sensationalize, or whatever?

Mr. Taft: Yes. Yes.

The primary Cue Observation in this interchange was the student’s question about the Illuminati. During the stimulated recall interview, Mr. Taft also mentions observing the student’s face and knowing the student was “just messing with me”. These cues combined with prior experiences lead Mr. Taft to decide that the cues are not in tolerance and immediate action is necessary. His routine is to acknowledge the student and continue teaching. This is often how Mr. Taft handles comments students make during his lectures.

Repeated analysis of the data from the dilemma incidents in Mr. Taft’s classroom provides a richer description of the nature of his interactive decision making. The information he considers when making decisions and the reasons he chooses to ignore or engage when confronted with a cue provide insight into his teaching and his thinking. When asked why he responded as he did to the dilemmas discussed, Mr. Taft mentioned: student history, student needs, a desire to engage the student, the importance of the assignment, the appropriateness of the comment, and the time available in class. His reasons for ignoring observed cues include: the frequency of the comment, the lack of control he has over the issue, and if the cue interrupts or distracts others. Mr. Taft chooses to address cues to: clarify or add to student

understanding, assure students he is listening to them, address tech issues, provide alternatives, stop repeated behaviors, acknowledge input for later elaboration, make connections, foster critical thinking, prevent undesirable behavior, remove distractions so the lesson can proceed, intervene if a student is not working, address relevant questions, and solve a problem in the classroom.

These reasons suggest Mr. Taft's primary focus is his students. Two examples of this occur during the first and third stimulated recall interviews:

[1st] Well, honestly, because I don't want students to feel like I'm ignoring their questions, is really why. Cause if they feel like I'm just going to put it off to the next day, then it's just, it seems like I don't know what I'm talking about partly, but then it also seems like to them that I'm just not interested in what they're asking. And so, I try to answer every question that I can. Sometimes that can get me a little bit, over, too much into questions, but it's hard because they just ask questions, and I'd rather answer.

[3rd] Yeah. She, Yeah. That's why I kept going with it, because, since she was interested in it, I wanted to kind of pull her in a little more. Cause I know she'd been quiet. She always is, and she just has a lot on her mind a lot of time these days. She started working, so that's why.

Mr. Taft shows he is interested in his students by listening to their questions and fostering engagement. This focus also provides him with information to make decisions that best meet the needs of his students.

Mr. Taft's reasoning also focuses on the mental script he has prepared. This focus is evident when he mentions available class time and how he addresses inappropriate comments that could derail the lesson. He also makes decisions about how much time to spend on a student's question based on the relevance to the content being covered. The following excerpt from a stimulated recall interview illustrates this characteristic.

Well, I love when he asks questions, but sometimes it does throw me off a bit; but at the same time, I'd rather be thrown off about a relevant topic, because then I want to go

down that rabbit hole, because sometimes that, it perks the students' interest. And then I have to pull myself away, which is what I do later on. But I did go down kind of a rabbit hole, with oil and all that kind of stuff. So that's where I felt like, I got his interaction, and I wanted to harness that.

This example exemplifies Mr. Taft's cognitive desire to keep the flow of the lesson going and engage students.

The overall nature of Mr. Taft's interactive decision making is consistent with his decision making during digital literacy instruction. He seeks to engage students and proceed smoothly through the lesson. The digital nature of this school requires working technology with a consistent Internet connection. During every one of the four observation sessions, Mr. Taft had to deal with at least one technology problem. During the first session, the YouTube video the students were supposed to watch was restricted by Google Classroom or Wi-Fi. Mr. Taft describes his thinking when confronted with this problem:

So, I started getting into, like, a more computer minded, like, okay I need to figure out how to fix this. Then I came back, it was like, Okay, I've got to put that on hold. I've got to get them the video. So, I gave one of the students my iPad and said, "Plug it into the TV." Here's the video, I pulled it up and let them watch it. So, they could have the video anyways and answer the questions.

When he is confronted with the video being restricted, his initial focus is to fix the restriction problem. He wants to get the lesson back on track. He then realizes figuring out a way for the students to watch the video is the immediate action needed. Figuring out the restriction problem becomes a delayed action for him to address later.

Other dilemmas involving technology present in Mr. Taft's classroom include students without a working laptop, no or weak Internet connection, no battery power and/or charger, and students distracted by other technology platforms on their laptops or their phones. These issues happen so often that Mr. Taft has developed routines for technology issues. He will lend

students his personal laptop or iPad or send them to borrow one from Dr. Kraus. He works to get students connected to the Internet or has them use their phone to do the task. He redirects students back on task when they are distracted or has them put their phones away. Even with these routines, Mr. Taft expressed his and the students' frustration at the frequency of technology related dilemmas.

Along with observational and interview data, analysis of the nature of Mr. Taft's interactive decision making includes his responses on the General Decision Making Style Questionnaire and comments during the initial interview. His responses on the questionnaire indicate his highest score of 23 for the rational decision-making style with a slightly lower score of 20 for the intuitive style. His scores are lowest in the dependent, 15, spontaneous, 13, and avoidant styles, 9. During the initial interview when asked to select which of five styles best describe his typical teaching behavior, he answers,

I feel like a lot of it is intuitive, honestly. I don't always know everything 100% and I always encourage them to look it up themselves if I don't know something. A lot of things I do just know off the top of my head, but things I don't, I always give them impressions and hunches, and my guess of why things probably work... Rational, sometimes, only when it comes to a really, a lesson that I just know or get...

Both the survey and Mr. Taft identify the rational and intuitive decision making styles as most prominent. When considered with the other data, it seems Mr. Taft makes rational decisions when focusing on the lesson, his mental script, and intuitive decisions when focusing on student questions and his desire to engage students in learning.

Some observational data does support occasional decisions in line with the dependent, spontaneous, and avoidant styles, which aligns with the survey results. Mr. Taft displayed spontaneous decisions when faced with a broken desk and persistent, defiant behavior from a

student unwilling to put up his phone. In the first instance he immediately acts on his thought of replacing some desks with tables. The other event takes place in the third observation session. Mr. Taft enforces the school policy of putting cell phones away during class. He decides to do this after Dr. Kraus's directive to "hammer down on it at the end of the year" and to make sure students are paying attention when he explains the final project. He decides to do this based on her request, which illustrates a more dependent style, and his need to have them focus on his directions, a rational approach. The way he decides to enforce it, however, is more in line with the spontaneous style of decision making. He starts the class by telling the students to put their phones in the caddy. It does not seem that he has thought about how the students may react to this change, especially since he admits, "I don't do it every day where I take the phones up, even though it's on the board, even though Dr. [Kraus] has told them many times that they're supposed to just put them in the caddy..." As he explains his decisions and choices about this dilemma, he also exhibits some of the avoidant decision-making style. When Mr. Taft realizes several students do not have computers, he does not act to remedy the situation.

The final thing is that I figured out what was wrong and so I just kind of dropped it with the computer, because I know Dr. [Kraus] hasn't given it to him or the others, so I don't know what to say to him after that. It's like, "I don't know."

As mentioned previously, his routine is to send the students to get a loaner computer, to loan them his personal device, or allow them to use their phones. The enforcement of the rule to put away phones and his awareness of Dr. Kraus's response interfere with this routine, but he did not offer his personal device or seek other options. His final response, after he tells the boys to stop talking six separate times, is to get upset.

I feel like, that's the main reason I got kind of upset. I wanted to make sure they knew I was upset. Which is the only time when I get my voice louder, is because I'm upset, and

so I want them to understand that I am upset. So, it's never like a "in the face" kind of thing, it's just a general, "I'm upset. Okay. Let's stop what you're doing" kind of thing.

Rather than rationally find a solution to the lack of computers and ongoing inappropriate student behaviors, Mr. Taft reacts spontaneously by expressing his frustration. This does not happen often during the observations, but it does support some tendencies for this style of decision making.

In summary, the nature of Mr. Taft's interactive decision making corresponds with the MTDMDIT. When confronted with dilemmas, he uses his knowledge of students and the mental script of the lesson to determine the most beneficial action to take. The excerpts provided exemplify his focus on students and maintaining lesson flow. The nature of his decision making style can also be characterized as mostly rational and intuitive, with some evidence of other styles.

4.1.3 Teaching Expertise

In addition to digital literacy instruction and interactive decision making, this study also considers each participant's level of teaching expertise. As previously mentioned, Berliner's stages of teaching expertise was used to analyze each teacher's instructional practices, attitudes, and behaviors (2004).

Analysis of the data gathered from the teacher survey and during observations and interviews indicates Mr. Taft is at the competent level of teaching expertise and exhibits some of the characteristics of the proficient level. Table 4.1 summarizes the following reasons for this classification. At the time of the study, he was at the end of his third year of teaching experience. His actions and responses during the stimulated recall interviews indicate he is

aware of his decision making, accepts full responsibility for his classroom, and makes good decisions about instruction. The following example illustrates all three of these qualities of competent teachers.

[A loud noise comes from the desk at the back of the room]

Mr. Taft: Okay. Okay. Pick it up. Off the floor please. Okay, if it's broken then let's set it in the hallway.

[Teacher goes to the desk and takes it to the hallway – mentions a screw in the leg is missing and the custodian will fix it.]

Students talking

Mr. Taft: I'm thinking about getting just three more tables just like that.

Students talking

Mr. Taft: Hey, get up for a second. Won't you all to do me a favor, get up for a second. Stand up (unintelligible). So, take these desks and put them against the wall over there.

[Teacher goes to back of room– moves the desks and students – puts a table up for student to sit at and places desks against the wall.]

As students were working on their assignment, they became distracted by a broken desk. Mr. Taft removed the desk to eliminate the distraction. After removing the desk from his classroom, he mentions his idea of placing tables in the room. He then acts on this idea by getting tables and moving desks against the wall. He eliminated the distraction and positioned students to facilitate instruction.

Data also suggests Mr. Taft sets priorities and rational goals for student achievement. For example, Mr. Taft mentions purposefully planning assignments so students must do more than search for answers.

But also, whenever I give the students, say, a video, I also usually follow up with questions. And so, they actively have to go back and watch the video, probably twice or

three times before they get all the questions. Because sometimes they'll go, like, okay he's asking this question and this video says this, but it's not the exact, they don't match up exactly. I do that intentionally because I want them to think about it a little more. Because if I just matched it with all the videos, that's lazy, and it's like, they're just doing a seek-and-find. And I don't want them to do a seek-and-find. Like, you know, especially the high schoolers.

This characteristic was also apparent when Mr. Taft describes his thinking when students approached him about a final research project. He knew the students were overwhelmed with other work, so he offered an alternative final assessment.

Well, and it was funny you mention that, because there were two students that, I think they tried their hardest, they just could not get it done because they had Mr. [Teacher name]'s assignment as well, and they just, they were so used to focusing on that. So, they asked if there was another option; but they both came to me independently, without anybody else, and said, "Is there another option?" I said, "Yes, I can give you an oral examination." And I said, "You tell me what subject, and I will make up ten questions. And if you're able to answer all of those questions, at least satisfactorily, you'll get the grade." And both of them did. And they both, they both picked a subject that they were really interested in. And they, it surprised me how much they actually said, "Well I learned this this year." You know, it's like, I didn't think they were listening sometimes. You know? But, one of them said, "Yeah, remember you told us that story about this and that." The way they remembered was very, like, orally, you know? And so, like, okay, well, in the future I'll know for them, they need more, that option, like, I would happily do that for them. For certain things, you know, and they were the ones, they didn't want a test, they didn't want a paper. They just wanted to go home. And so, it's like, that's because we usually just offer those two things, and so, I felt like, okay, this is the only two that asked me, and nobody, they didn't tell anybody else what they did, 'cause they came, like, independently and did it. So, like nobody else knew they were doing that. So, I feel like they kind of enjoyed that, little bit like, okay, he's giving me a chance, that privilege. But they didn't have to do it in front of everybody, so that made them feel better about it too.

This excerpt also illustrates his ability to determine accurate targets or goals for learning. The purpose of the assignment was to demonstrate what they had learned throughout the year.

Less competent teachers may have insisted on a final exam with essays or multiple-choice questions covering all the concepts. Mr. Taft allowed the students to choose how to demonstrate their achievement.

Another quality of a competent teacher is the ability to determine what to attend to and what to ignore. One example of this is evident in the excerpt previously noted where a student mentions the Illuminati. Based on previous experience, Mr. Taft is not surprised when the student makes the comment and makes sure he knows they will talk about conspiracies later. When the student continues to “mess with him”, Mr. Taft sighs heavily and continues with the lesson. This sighing routine is evident throughout the four observation sessions when Mr. Taft wants to acknowledge the student but continue the lesson.

In addition to these qualities, Mr. Taft occasionally demonstrated some of the characteristics of a proficient teacher. He was able to predict some classroom events, especially as they related to student interests and needs. He also mentions relying on intuition as he teaches.

I feel like a lot of it is intuitive, honestly. I don't always know everything 100%, and I always encourage them to look it up themselves if I don't know something. A lot of things I do just know off the top of my head, but things I don't. I always give them impressions and hunches, and... my guess of why things probably work. But that's also part of Social Studies is that some of it we don't know for sure.

This comment also exemplifies Mr. Taft's introspective and flexible attitude. He admits when he does not know something. He also specifically mentions his flexibility during the initial interview when asked what qualities, skills, and characteristics make him qualified to teach in this environment.

I'd have to say just my willingness to change. I feel like that is something that is tough for teachers to do, and sometimes I've discovered it is tough for me too; I'm not saying I'm perfect on it. But I'm very flexible. In this environment you need a lot of flexibility because the world is not going to stay the way you want it every day.

As mentioned previously, Mr. Taft is very student-focused, empathetic and relationship-oriented. When asked to describe the qualities of his favorite teachers, Mr. Taft replied, “The

way they were is the way I try to be". Other patterns evident in Mr. Taft's teaching are his flexibility and desire to give students choices whenever possible. He also described a difficult experience during his first year of teaching that led him to leave teaching and work on a graduate degree. Ultimately, the experience helped him recognize his limitations and love for teaching.

Mr. Taft: I had a half a year where I was at [another high school], and the reason it was a half a year was because I almost quit teaching because of it. The first year was just not what I was expecting.

Barbara: And what grade level was that?

Mr. Taft: I taught 9 – 12th, yeah. I had all four...

Barbara: And it was Ag again?

Mr. Taft: Yeah, Ag again. Yeah. But the school environment was very different; it was a much larger school, and most of the students were just placed there in the class, they weren't actually interested. So, our chapter, our FAA chapter was really small, but we had a huge number of students. Which they wanted, because of course you get more money for CT. I went from, at [city name], I went from a class size of 20 to a class size of 35; and that just got too much for me. Especially freshman. I had one freshman class and the rest of the classes were junior-senior. One sophomore-ish level.

Barbara: So, you left there after the first semester. Then what did you do?

Mr. Taft: I went back and finished my Masters. I tried to kind of pivot it, to get out of teaching, but then I discovered that was not going to happen. Cause I just kept being drawn back to teaching.

His negative experience did not keep him from teaching.

During the final interview, I gave Mr. Taft the summary of Berliner's stages and asked him to identify his level of teaching expertise. He agrees with my assessment of his level of teaching expertise and provides unexpected insight into his professional growth.

Barbara: So. The first one, if you move along there, based on your years of experience, where would you put yourself, just by that quality alone?

Mr. Taft: Hmm. Well, I would say, it's hard to say because I'd say I'm definitely, finally, down to the competent area. Because even though, I'd say I've had at least, I've had two years here, and I've had at least a year, year and a half elsewhere. It's been different every time, but I feel like I'm finally competent; like after this year I feel like I'm competent in what I'm doing. So, I'm not exactly like, I'm not, you know I'd say at the beginning of the year I'd consider myself, absolutely, "advanced beginner". Absolutely, 'cause I felt like I don't know what I'm doing, really. Then for some reason, this year I think clicked. And suddenly I just knew what I was doing, and what I was gonna do, and I handled it the way I wanted to handle it and it was just like that (snaps fingers).

His comment authentically describes his on-going transition from one stage to the next.

In summary, Mr. Taft exhibits characteristics most in line with the competent level of teaching expertise with some behaviors in the proficient category. He is aware of his decision making, responsible for his classroom, makes good instructional decisions and sets accurate goals, priorities, and targets for learning. He knows when to address and when to ignore cues and predicts events in the classroom. He is introspective, flexible, intuitive, and relationship oriented. He is student-focused and seeks to maintain the flow of the lesson. These priorities are the mental script he seeks to maintain during interactive decision making and the ultimate reason he engages or ignores cues. His dominant decision making styles are rational and intuitive. His teaching exhibits all eight elements of digital literacy in varying degrees of frequency. He expresses consistent frustration with the frequency of dilemmas related to technology.

Table 4.1

Classification of Mr. Taft's Stage of Teaching Expertise

Novice	Advanced Beginner	Competent	Proficient	Expert
No experience or limited experience	Some experience, 2 or 3 years (at the end of his 3rd year of teaching)	Approximately 3 to 4 years of experience	Approximately 5 to 7 years of experience	More than 5 to 7 years of experience
Deliberate	Insightful	Rational (most dominant decision making style)	Intuitive	Arational
Understands common classroom terms and conditions and acts based on context-free rules	Building episodic and case knowledge to use for present situations	Make conscious choices about what they are going to do – set priorities and rational goals with sensible ways to achieve them (stimulated recall interviews indicate he is aware of his decisions - excerpt of table breaking; statement about creating questions that require thinking)	Intuition or know-how becomes obvious (mentions doing things off the top of his head, hunches)	Have an intuitive understanding of situations and sense the most appropriate way to respond
Behavior is usually rational, relatively inflexible, and usually conforms to learned rules	Developing strategic knowledge - when to follow or break the rules they have learned. (ex. Inconsistent enforcement of school phone rule led to conflict with students)	Determine what is and what is not important as they teach (choices to ignore or address student misbehaviors and comments)	Experiential knowledge allows for more precise prediction of events (predicts student would mention conspiracy theory related to JFK assassination)	Have fluid and seemingly effortless performance

(table continues)

Novice	Advanced Beginner	Competent	Proficient	Expert
Often fail to take full responsibility for their actions, lack personal agency	Context begins to guide behavior but may lack a sense of what is important	Learn to make curriculum and instruction decisions -when to stay on topic and when to move on and feel more responsible for what happens in their classrooms (choices to ignore or foster student interest when students comment – ex. Illuminati comment)	Still likely to be logical and intentional in response decisions	Unconscious of choosing what to address and how to respond
	Often fail to take full responsibility for their actions, lack personal agency	Behaviors are not yet fast, fluid, or flexible (somewhat fluid instruction, less flexible or fluid with dilemmas)		Do things that usually work

4.2 The Case of Ms. Vaughan

Ms. Vaughan is a 45-year-old, white female. She holds an associate degree in early childhood development, a bachelor's degree in business administration, and a master's degree in psychology. She has also completed approximately 30 hours of coursework in Instructional Design for Online Learning. Ms. Vaughan worked for four years in enrollment management at a local college before quitting to finish her master's degree. She does not hold any teaching certifications, is the math teacher for 8th – 11th grade, and is in her first year of teaching. She also teaches one college and career class and will be the college and career counselor next year at TAL. The math courses at TAL use Kahn Academy. It provides individualized instruction online, and students work through a list of tasks each day. Ms. Vaughan monitors their progress and proficiency in each concept and provides direct instruction as needed.

Ms. Vaughan describes herself as a “statistical anomaly” because of her early educational experience. She dropped out of high school halfway through her junior year, earned her graduate equivalency diploma (GED), and enrolled in college. During the initial interview she describes this time in her life, “I went and got a GED and promptly enrolled myself into college, fell in love with it, and never left. I hated high school. Hated it, hated it, hated it.”

When asked about her experiences with students outside of the classroom, Ms. Vaughan describes her life as always being surrounded by children and teens. She has been actively involved in raising her nieces and nephews and has a daughter in 7th grade at TAL. Her work at the college level involved interactions with a variety of enrollees; traditional, veteran, transfer, international, and high school dual credit students.

Ms. Vaughan's experience with technology includes both personal and academic use. Her master's and bachelor's degrees were all online. She stated, "I understand the issues surrounding online learning very well." She also sees herself as a "voracious reader" who loves finding information. At the time of the initial interview, she had read seven books on her Kindle that week.

Ms. Vaughan's classroom is in the bottom floor of TAL and is like every other classroom; an outside wall of windows, a door from the hallway on the opposite wall, and a closet on the wall at one end. The teacher's desk is at the end of the room opposite the doorway, and students sit at desks or tables positioned around the walls facing inward. As mentioned previously, her students receive online, individualized instruction through Kahn Academy. Ms. Vaughan begins each class by greeting the students and either directing them to their online work or providing instruction for a new or troublesome concept. Ms. Vaughan structures each class with timed periods for work and then a break period. She does this because, "... we have an hour and fifteen minutes, nobody wants to do an hour and fifteen minutes of math. I like math, but I don't want to do that. So, I tend to chunk it, 20-minute work sessions with 10-minute breaks." The work and break periods are shorter for some classes, depending on student behavior and needs. During the first work period, Ms. Vaughan checks each student's progress and performance. She uses this information to monitor overall progress, to provide feedback on grades, and to work one-on-one with students who are having problems with a skill or concept.

4.2.1 Digital Literacy Instruction

As previously mentioned, Ms. Vaughan has unique experiences with digital instruction.

Her experience earning two degrees entirely online provides a perspective that translates to her teaching. She sees the value of being “able to find ways to teach yourself” and considers this “huge”. It also means she is familiar with a variety of online instructional techniques. This is evident when she refers students to online resources and when she models ways to find appropriate examples to help struggling students. Her knowledge has been further enhanced by her course work in Instructional Design for Online Learning. One example of this is in her use of discussion questions with her college and career students. The strategy of students posting and responding to others’ posts is common in online learning. Her experiences and knowledge, however, are restricted by the structure of math classes at TAL. Students primarily receive instruction through Khan Academy. Ms. Vaughan provides feedback and direction, but her instruction is limited to concepts with which students struggle. Students are progressing and even exceeding grade level expectations, so this does not mean the structure is inadequate. It does, however, limit the findings derived from the analysis of Ms. Vaughan’s digital literacy instructional data.

Analysis of the observational data from Ms. Vaughan’s classroom, though limited, shows evidence of four of the 8 Elements of Digital Literacies. Instruction related to the Constructive, Creative, Critical, and Civic elements was not apparent in the observational data. It is possible that these elements appear in the Khan Academy curriculum, but that is beyond the focus of this study. The findings from Ms. Vaughan’s interviews and classroom observations are indicative of the cultural, cognitive, communicative, and confident elements.

4.2.1.1 Cultural

As mentioned previously, this element involves an understanding of a variety of digital

contexts and is best learned through exposure to an assortment of digital environments.

Students in Ms. Vaughan's classroom are exposed primarily to Khan Academy. According to the Khan academy website, typical instructional formats within Khan Academy include lessons with videos, articles, and/or exercises followed by quizzes over several lessons and a cumulative test at the end of each unit. In addition to the variety of environments within Khan Academy, Ms. Vaughan directs students to outside resources for additional practice or clarification. She uses Google Classroom to organize educational communication and work. She frequently directs students to Purple Math, as she explains in the following excerpt from one of the stimulated recall interviews:

I use Purple Math a great deal because it will not only give them step by step, but in many cases it's animated. So, it will literally take the numbers and move them where they go, from where they were. So, you can see where that number came from and why it's going in that spot.

She mentions this resource frequently during the observations and shares that most students have it bookmarked in their browser.

Another resource Ms. Vaughan uses is the Mesa Community College website. This resource is especially useful for students in upper level math courses. These different resources and Ms. Vaughan's propensity to search for additional help for difficult content areas is evidence that the cultural element of digital literary instruction is addressed in Ms. Vaughan's classroom.

4.2.1.2 Cognitive

The cognitive element is another aspect of digital literacy addressed in Ms. Vaughan's classroom. Whereas the cultural element focuses on *exposure* to different digital contexts, the

cognitive element focuses on the *use* of various resources. These resources offer information in ways that require the user to think and process in diverse ways. The cognitive demands of watching and taking notes from a video in Khan Academy differ from the more interactive nature of Purple Math demonstrations, which differ from reading an article or an explanation of a math problem using colored text on the Mesa Community College website. Ms. Vaughan not only exposes students to assorted digital contexts, she models and encourages students to “teach themselves”.

An example of this occurs during the first observation in Ms. Vaughan’s classroom. At the beginning of class, Ms. Vaughan asks the students if anyone has gotten to direct and inverse variations. When she realizes only one student is at that point, she begins working with him at her desk. She provides a general overview of the concept, and then the student brings up his laptop and shows her a master challenge question in Khan Academy. He explains his confusion when the direct variations do not look like others. The student works through problems as Ms. Vaughan looks on, helping as needed.

Student: That gives me these options, and I have to show which one shows direct variation. Sometimes they don’t always follow what it looks like on here. And when that happens...

Ms. Vaughan: Confusing, yes.

Student: The direct is $Y=KX$

Ms. Vaughan: That’s one. Well, let’s look at some of these, and it might kind of clear it up for you. This gives some really good examples and how to solve them. So, these are only direct. That’s all you’re looking at here. Uh, but it gives a really nice explanation for how to determine it, so write the correct equation again. Use the information given in the problem to find the value of K, in this case, you need to find it when X is 9 and Y is 6. Okay, so you’ve done that. Okay. That was a fairly simple one, but now they’re getting a little bit more difficult with it, and some of these might look a little bit different, but they’re the same thing. They’re all still direct. Do you need paper? You’ve got it, okay.

So, I think the biggest thing is to understand that it pretty much has to be in this form for it to be direct. Um, but the form can get a little bit confusing when you start adding square roots next on it. But it's still gonna be the same. Always gonna be $Y=KX$. Let's look up the same thing for indirect. I mean inverse. You have the same thing for the inverse. Okay, so. And both of these are at this MesaCommunityCollege.edu, is where you can find those examples. I am willing to bet that they've got, uh, the joint variations as well, if we go look it up. But to look at some of these other examples of what it can look like with the X component, square root, and it always has the same form if it's inverse.

Student: Yes ma'am.

Ms. Vaughan: It's always going to be definition-problem. So that helps. Now, one thing that might be giving you a little fit about this is the whole idea of the constant. Uh, let me see if I can... I think I'm going to look for it on Purple Math.

Student: Yes ma'am.

Ms. Vaughan: Purple Math always has such lovely explanations. Hmmm. I was really hoping that would show a better example of, uh, the constant proportionality. Although, that's interesting too, use variation equation word problems. Cause it's now showing you where you can be using some of these, you know, in real life. In this case with electrical resistance.

Student: (unintelligible)

Ms. Vaughan: Oh. And that's dealing with both of them. But inevitably, what you're trying to do is solve the value of that concept.

Student: Yes ma'am.

Ms. Vaughan: I think that you need to really look up some of this stuff on Purple Math, and familiarize yourself with it a little bit better, and then it's gonna start coalescing and making more sense to you.

Student: Yes ma'am.

Interactions like this are evident throughout the observational data and are typical of Ms.

Vaughan's digital literacy instruction.

4.2.1.3 Communicative

The communicative element of digital literacy is especially important to Ms. Vaughan.

During the initial interview, she explains her view of digital communication.

I think she [Dr. Kraus] understood that I saw what the issues really were and what skills these kids need to be able to do it effectively. The biggest one for me is communication. Their communication styles are gonna have to conform to that. One of the things that I'm looking at is starting younger with the 5th and the 6th and the 7th, so that when they get to 9th, 10th, and 11th they're able to communicate on that level a little bit better.

This characteristic of digital literacy is most apparent in Ms. Vaughan's use of Google Classroom with some students and the interactive features of Khan Academy with most math students.

This component of digital literacy involves understanding and using digital environments to communicate. In Khan Academy, students work on assignments and receive feedback and direction based on their answers. This type of communication, although not with a human directly, is a common format used in digital networks, especially those providing individualized feedback. Teachers are also able to see students' progress and areas of misunderstanding. This real-time data guides the direct instruction Ms. Vaughan provides to one student, a small group, or the entire class.

Another tool used to foster the communicative aspect of digital literacy is Google Classroom. Ms. Vaughan primarily uses this tool with students in her College and Career class. As explained previously, a regular assignment for these students is a weekly discussion question. They respond to the question and then respond to two peers. Students must understand how to post and then respond in Google Classroom. This routine is common in digital discussions, and Ms. Vaughan's students practice this skill most weeks. The following excerpt from the fourth observation suggests the students are familiar with this digital routine,

even if they may forget to do it. It also illustrates the teacher's ability to see who has not posted, which prompts her reminder.

Ms. Vaughan: ... All right. So, where are we at with our discussion questions? Have you guys got those done?

Student: Oh, we have discussion questions this week?

Ms. Vaughan: I believe that we had one that was due this week, and I have not put one up for next week yet, although I'm going to. Yeah. I've got one that was due today.

Students talking

Ms. Vaughan: Did you respond to two peers?

Students talking

Ms. Vaughan: But yeah. I'm still waiting on several responses on that.

Ms. Vaughan also uses Google Classroom with one of her math students. During the second observation, a female student approaches Ms. Vaughan asking about her grade. Ms. Vaughan provides further details about this student in the follow up interview, including her use of Google Classroom rather than Khan Academy.

Ms. Vaughan: Yes. She has turned it around. At the end of last term, she had a meltdown in parent conference. So, we altered a few things, and we gave her some other options as far as, uh, getting in some handwritten work, and that seemed to do the trick. She's doing fantastic now.

Barbara: Well, good. So, because we're talking about digital literacy, what does that mean?

Ms. Vaughan: This particular student just doesn't have any interest in the digital part. And when that happens, what you're left with is creating a situation where maybe you're at partial. So, I put things up on her Google Classroom, and she will write her answers out on paper.

Barbara: Okay. So, did she turn those papers in to you?

Ms. Vaughan: Uh hmm

Barbara: All right. So, she's still using Google Classroom to initiate the problems and everything, and then she just does it on paper?

Ms. Vaughan: Right. And then she does them on paper.

Barbara: So that's still... the input is still digital, right?

Ms. Vaughan: Yes.

Even though this student struggled with understanding and working in Khan Academy, she is still exposed to some digital communication through Google Classroom. This and the other examples demonstrate Ms. Vaughan's inclusion of the communicative element of digital literacy in her classroom instruction.

4.2.1.4 Confident

The confident element of digital literacy instruction comes from the understanding that digital environments are more tolerant of users' attempts to solve problems or try new ideas. This knowledge fosters problem solving and creates a more spontaneous approach to learning. Ms. Vaughan demonstrates and encourages this attitude when she models the use of outside sources for learning. The previous excerpt about the student struggling with direct and inverse variations is one example of this. She encourages him to keep exploring problems on the Mesa Community College website or the Purple Math website.

Another example of this quality is evident in the following excerpt from Ms. Vaughan's interaction with another student working to create mathematical expressions. Ms. Vaughan describes this episode during the follow up interview for observation three.

Barbara: Okay, the first one, ... you already mentioned it, that the student that was sitting next to you was having a problem, so the dilemma was he wasn't understanding it. Do you remember what it was?

Ms. Vaughan: Yes. He was trying to figure out how to write an equation that expresses what the problem was. He was trying to solve it, and he didn't, he was having trouble with that concept.

Barbara: Okay. Has he had trouble with that before?

Ms. Vaughan: Well, he, on and off. He, uh, he, once he gets concepts he does pretty well, but in this case, he wasn't understanding really that all you're trying to write is a true sentence about what that said. It had nothing to do with actually solving anything.

Barbara: Okay. So, he was trying to solve it?

Ms. Vaughan: He was thinking he needed to solve it. So, I was directing him to several different sites, and showing him some stuff that I had on my desk to show him what we were trying to accomplish... *Quotient* seemed to be a sticking point with him, he wasn't remembering what *quotient* was. So, I said the first thing we'll do is go look up the meaning of *quotient*. What are we talking about when we say *quotient*? So, I showed him the website where he could look up the different signs and symbols associated with the math that he was working with. And what we were talking about when dealing with quotients, which it turns out, he figured out that that is strictly for division. So that was an indicator word of what he was trying to determine would look like, you know, we're obviously working with division, much like when we say *sum* we're working with addition.

Barbara: Right. So, what did that do for him solving the problem?

Ms. Vaughan: Well, he understood what the meaning was, and he could equate that into an algebraic expression. Uh, so that's what I was trying to get him to, oh, if this means this, then we must be dealing with division, so we're going to have to divide something along here somewhere.

Barbara: So, he tried it, I think if I remember correctly, and then, even on, he still wasn't getting it. Was he checking it?

Ms. Vaughan: He was checking it; he was going back through and trying to determine what the whole thing should say, and I would let him go and kind of research and see what he could figure out on his own, and I'd check back with him and say, "Okay, where you at with it?" But the whole point is for him to figure it out for himself. I'm just kind of saying, okay you need to go to step one, problem solving: what do we need to solve first? We need to figure out what this means and then go on.

Barbara: So, you were guiding him through it.

Ms. Vaughan: Right.

Audio playing

Barbara: I might have just caught you saying, “Awesome”. (chuckles) But that’s when you...

Ms. Vaughan: Basically, he had gotten it correct. He had figured it out on his own, with just a little bit of me going, “okay look over here, and look over here” and “now put it all together.”

In this example, the student does not hesitate to use the digital resource to work through his misunderstanding. Ms. Vaughan provides the guided instruction he needs to get started and confidently sends him off to do the work. Her understanding of the fluidity of digital environments along with the students’ constant use of online resources fosters digital confidence.

Despite the limitations of Khan Academy on Ms. Vaughan’s instruction, four of the 8 Essential Elements of Digital Literacy are evident in her instructional practices. These four elements (cultural, cognitive, communicative, and confident) are inherent in the basic instructional structure of her classes.

4.2.2 Interactive Decision Making

As described earlier, Shavelson and Stern’s (1981) model of teachers’ decision making during interactive teaching (MTDMDIT) provides the framework for the analysis of each teacher’s interactive decisions, decisions made by a teacher during instruction. As the teacher enacts the mental script of a lesson, he strives for smooth implementation in order to minimize the need for decision making. Any deviations from this script increase the cognitive demands placed on the teacher and increase classroom management problems. Classroom Teaching Routines or patterns of instruction and classroom management enhance smooth

implementation. The cues a teacher receives during instruction prompt a decision of tolerance. If the cue interrupts the mental script, is not in tolerance, the teacher must decide if immediate action is necessary. If action is necessary, he chooses an established routine for dealing with the issue. If no routine is available, his action is more reactive and less likely to solve the issue. This framework provides the basis for the analysis of the data gathered from Ms. Vaughan's classroom observations and stimulated interviews.

Even though much of the instructional content in Ms. Vaughan's classroom occurs through the Khan Academy platform, data from the observations and stimulated recall interviews indicate patterns of decision making in line with Shavelson and Stern's model. Ms. Vaughan begins each class by taking attendance and greeting the students. Most students come into class and log on to Khan Academy right away. As described earlier, Ms. Vaughan structures class time into work periods lasting 15 to 20 minutes and break periods of 5 to 10 minutes. After prompting students to start working, Ms. Vaughan checks student progress and determines if any direct instruction is needed. When direct instruction is needed, the student sits at the teacher's desk, and Ms. Vaughan uses resources and examples from online websites, manipulatives, or printed documents to clarify concepts. Throughout the study, different students received one-on-one direct instruction. The only direct whole class instruction occurred in Ms. Vaughan's College and Career class. The structure of this lesson involved taking attendance followed by teacher-led class discussion. Only part of one observation session included this class, so it is not possible to generalize a pattern of instruction for this course.

Analysis of the data from Ms. Vaughan's math classes suggests this routine of work periods and break periods is the mental script Ms. Vaughan seeks to maintain. This is

exemplified by the following excerpt.

Ms. Vaughan: Okay. Before we get started on a work session today, I wanted to kind of go over a couple of things with you guys on direct and inverse variations. Who's gotten to that besides [Student name]? Anybody? No? All right. So, I guess for this one I'll just go over it with [Student name] and you guys keep working. All right. [Student name], you want to come over and we'll go over some of this.

(later)

Ms. Vaughan: All right, you guys can have a 10-minute break.

(later)

Ms. Vaughan: Okay. We'll get our other 20 minutes in.

The length of the work sessions and breaks may vary, but this pattern is evident in each of Ms. Vaughan's math classes.

Common deviations from this structure are issues with technology (no laptop, low battery, broken device, no access), student behavior, and student-initiated questions. Less common cues involve environmental issues, such as ants in the classroom. During the stimulated recall interviews, Ms. Vaughan's responses indicate she considers a student's history of behavior, academic progress, developmental needs, and personality before deciding how to respond to disruptions in the routine. When faced with cues that are not in tolerance, Ms. Vaughan ignores cues because "nothing works" and to stop engaging with students who are misbehaving. She also states that she may ignore responses to encourage students to find the needed information themselves. Her reasons for addressing a disruption to the class routine include: to diminish the impact on other students, to redirect students who are off task, to encourage a student, to promote progress in Khan, and to expose students to others' perspectives. The following excerpt from Ms. Vaughan's eighth grade math class illustrates

several of these characteristics.

Ms. Vaughan: Come on, guys. Chromebooks. Out. Goin'. NOW! [Student name]. [Student name]. Let's get goin'. Okay, then you'll need to be quiet so others can.

Student: Yes ma'am.

Ms. Vaughan: Good morning, [Student name]. Uh, no [Student name] today?

Student: No, he's sick.

Ms. Vaughan: Okay.

Students talking loudly

Ms. Vaughan: All right. Let's get our first fifteen minutes goin'.

Students talking

Ms. Vaughan: Guys! [more forcefully] [Student name]. Where's your Chromebook? [Student name], do you have yours out? How 'bout doing that. Okay. Well, I'm very sorry guys, but you're going to have to be quiet and let those who do have Chromebooks work. [Student name], do you have yours? Okay.

Student: No, I don't have mine.

Ms. Vaughan: Well, it's going to be a very quiet class period, where you don't talk 'cause you don't have Chromebooks.

Students: Yes, ma'am. Oh yes. [One boy sarcastically – "yes, ma'am" repeatedly]

Students talking

Ms. Vaughan: Guys! [louder and more forceful]

Student: Yes, ma'am.

Ms. Vaughan: Or, you can spend the day in silent lunch.

Student: Oh no, ma'am. No, no.

Students talking

Ms. Vaughan: There's also Saturday school if you can't stay quiet.

Ms. Vaughan encourages students to begin working and, when faced with the dilemma of students talking and not working, makes it very clear that she will not allow their behavior to distract other students. She explains this in the follow up stimulated recall interview:

Barbara: Okay. All right the next one is with the next class...

Ms. Vaughan: Eighth grade.

Barbara: Yes. And this was telling them to be quiet. And if I remember, this was a progressive thing with them, and this is the point where you ramped it up, I would say, and this is the part where... Okay.

Ms. Vaughan: Yeah.

Barbara: Okay, so that, again. I didn't do the whole time, but the whole, basically. So, what were you thinking about that made you say the option?

Ms. Vaughan: Well, because these kids that are doing this are repeat, repeat offenders. That's what they do, they disrupt class every day. So, we're constantly trying to corral them and get them under some sort of control.

Barbara: Okay.

Ms. Vaughan: In fact, the next day she [Dr. Kraus] just removed them from the class, so we could test.

Barbara: Okay.

Ms. Vaughan: 'Cause there was no other way that we were going to get anything done.

Barbara: Okay. Um, so saying the Saturday school, what was behind that?

Ms. Vaughan: Because [Dr. Kraus] has said, if they don't settle down, let them know they'll be here on Saturday.

Barbara: Okay. Does that work?

Ms. Vaughan: Um. I don't know of anything that really works with those guys. They're just, both students have got the whole issues and they can't sit still, they can't stay quiet, they're actually not capable. So, it's more just about keeping it down to a reasonable minimum, than it is about stopping it altogether.

Barbara: Okay. And any follow up interactions? Did they go to Saturday school?

Ms. Vaughan: Um, no, and the reason was they were supposed to go to the quiet room but then they couldn't do that because the quiet room got taken up. I was foiled.

The primary focus of Ms. Vaughan's classes is to maintain student progress and achievement in Khan Academy or the day's lesson. As the previous excerpts illustrate, Ms. Vaughan ignores or addresses dilemmas with this goal in mind. If the issue is related to technology, she provides alternative devices or power cords. When a student she is helping notices ants on her desk, she begins clearing her desk and killing the ants. If the student needs content help, she encourages independent problem solving and/or provides additional resources to illustrate a concept. Overall, the greatest threat to this routine occurs when students are talking and distracting others. This does not happen in every class, but Ms. Vaughan's routine for addressing this dilemma is consistent each time. Her typical response is to ignore the talking until it becomes loud enough to distract others. Then she looks up and eventually makes a comment such as, "settle down" or "knock it off", often addressing the student(s) by name. If the students do not stop talking, her comments become louder, more forceful, and sterner. She may also move to the students or move students away from each other. In the previous example, she threatens silent lunch or Saturday School. At the end of the fourth observation period, Ms. Vaughan is discussing financial literacy with the College and Career class. As the discussion continues, students are less engaged and making off topic comments. Ms. Vaughan offers the students an incentive of going outside for the remainder of the class period if they complete the online discussion questions. The following excerpts related to this encounter highlight the progression of Ms. Vaughan's routine for addressing student behaviors not in tolerance.

Students laughing

Ms. Vaughan: Guys! Another way to save some money is when you start having your own cell phone plan. You want to look at those data plans and really see what you're using. If you can shrink it, do so. Another way to save some money, and also earmark it for certain things, gift cards. Often, they'll give you a discount for using a gift card at a certain place. I know HEB used to do this a lot if you used their gas cards, if you use their gift card to buy gas, you got like 10 cents off your gas per gallon. So, it actually is not a bad idea to purchase gift cards that you're planning to use yourself. It can save some money and it can also kind of give you that idea of how much you are using every month.

Classroom noise

Ms. Vaughan: Oh, did this fall off or something?

Student talking

Ms. Vaughan: Everything okay? Okay. [Laughter]

Students talking

Ms. Vaughan: Now he needs a partner 'cause his friend just split and he doesn't have anybody to do it with. Okay. So, does anybody have any questions about all of that financial stuff that we talked about yesterday? Nobody's curious about any of it?

Student: What did you say?

Ms. Vaughan: Any questions about the financial stuff that we talked about yesterday?

Student talking

Ms. Vaughan: Well, it's not necessarily new, but it may have been presented to you in a different way.

Student talking

Ms. Vaughan: Okay [Student name]. I'm not going to argue that point. You are honest. All right. So. Where are we at with our discussion questions? Have you guys got those done?

Student: Oh, we have discussion questions this week?

Ms. Vaughan: I believe that we had one that was due this week, and I have not put one up for next week yet, although I'm going to. Yeah. I've got one that was due today.

Students talking

Ms. Vaughan: Did you respond to two peers?

Students talking

Ms. Vaughan: But yeah. I'm still waiting on several responses on that.

Student: It's cold in this room.

Ms. Vaughan: It is a little bit. [Student name], can you reach up and turn the air off?

Students talking [one asks if they can go outside]

Ms. Vaughan: Well, because we couldn't, because we had other stuff going on, I was thinking we could go tomorrow. It's Friday.

Student: Okay.

Ms. Vaughan: Depending on the heat. If it's a 100, I don't want to go out there.

Student: It would be good to go today, like in a little bit. Cause it's not that hot.

Ms. Vaughan: We'll see. Maybe the last twenty minutes. 'Cause I can see you guys are antsy... All right. I'm fixing to put another question up there. [Student name], see if your Chromebook has charged sufficiently.

Students talking

Ms. Vaughan: All right. You guys have another discussion question up. 'Cause I'm mean... All right. I'm going to give you guys about 15 minutes to look at those discussion questions and finish them up, and then we'll go outside for a little bit.

[Most students are working, but two boys continue talking and at one point begin using inappropriate language.]

Ms. Vaughan: Oh yeah! Truly, I enjoyed it. Guys! Watch the language. STOP! Yes, I do.

Students talking

[One student throws a pen, then a stick of gum]

Ms. Vaughan: Easy, guys!

Students talking and laughing

Ms. Vaughan: [Student name]! Can we just like, totally, ditch this conversation? No! Why are you insulted? You don't have a doctorate in anything. Then we need to call the police 'cause you should not be here. We just had a guy in Dallas do that, so yeah, that's not allowed. Huh? This is not a weird TV show, it doesn't work that way.

Students talking

Ms. Vaughan: Okay. Where are you going with this?

Student: I'll change the subject. Does anyone have Musically?

Ms. Vaughan: [Student name], while I applaud your imagination, please keep it at home.

Students talking

Ms. Vaughan: Really?! Can we stop saying that over and over again? You guys are terrible, awful children.

Students talking...

Ms. Vaughan: Have you guys finished your discussion questions?

Students talking and laughing...

Ms. Vaughan: [Student name]! Language!

Student: My language is English...

Ms. Vaughan: All right. One more word out of you guys and we will NOT be going outside. I don't want to hear any more. Okay. Stop! Enough! Stop!

Students quieting

Student: Okay. I answered it...

Ms. Vaughan: All right. Let's go sit out in the breezeway for a little bit.

Students leaving

During the stimulated recall interview after this observation, Ms. Vaughan explains her

thinking during this interchange:

Audio playing

Barbara: So, you share this, and I didn't capture, but earlier one of them suggested going outside. So, you've done that before? Yes. So, you're putting up the question. What were you thinking about before you gave the whole response?

Ms. Vaughan: Um, I was thinking maybe I could get them to finish these up and then we could go out... I was going for bribery! No doubt about it.

Barbara: Okay. So, you responded as you did to get them to work. And did any follow up interactions occur?

Ms. Vaughan: No. But I did get a lot of those discussion questions answered.

In both excerpts it is apparent that Ms. Vaughan responds to dilemmas in order to promote student achievement and progress. This is her focus during all instruction, whether it be digital literacy instruction in Khan Academy or an online discussion forum in Google Classroom. Dilemmas include problems with technology that hinder that goal and student behaviors that disrupt individual and whole class progress. She addresses technology issues by fixing or replacing the device. If she cannot solve the issue, she enforces a quiet learning environment for the other students. Ms. Vaughan's routine for addressing behavioral issues consists of verbal reprimands of increasing intensity and external consequences or incentives for ongoing behavior. She considers student history, abilities, and the general developmental characteristics and interests of teens when making interactive decisions. These behaviors align with the MTDMDIT.

Analysis of the nature of Ms. Vaughan's interactive decision making also includes her decision making style. During the initial interview she identified most with the rational, intuitive and dependent styles.

[long pause as she reads the descriptions] Probably the first three are the three that I'm biggest on, the other two, not real big... on avoidant or spontaneous. It has happened, but it is very rare. Because I'm a new teacher I obviously rely on direction and support of others. But most of the time I just go with my logical reasoning. If I have a particular feeling about a particular student, I might act on that. But for the most part, I tend to stick to the rational. It's my favorite.

Her answer corresponds with her scores on the General Decision Making Style Questionnaire.

Her choices generate scores of 22 for the intuitive and rational styles with one point lower for the dependent style. Her scores for the spontaneous and avoidant decision making styles are considerably lower, 12 and 11 respectively. These scores and her evaluation of her decision making style line up with her actions during classroom observations. As she suggests in her comment, she recognizes her reliance on others because of her status as a new teacher. She relies on the Khan Academy structure created by Dr. Kraus and outside resources for her math classes. In the earlier excerpt, she mentions her dependence on Dr. Kraus to remove repeatedly talkative students during testing. Ms. Vaughan also notes that it was Dr. Kraus's idea to send repeat offenders to Saturday School. Most of her decisions during observations follow this structure and the routine of work and break periods. When faced with dilemmas, she bases decisions about student behavior on her impressions and knowledge of students.

Her comment also acknowledges the presence of avoidant and spontaneous decisions in her actions. As noted previously, she often ignores inappropriate student behaviors, indicative of the avoidant decision making style. If the behavior persists, she responds repeatedly with comments that are more spontaneous, sterner, and louder.

The nature of Ms. Vaughan's interactive decision making includes a focus on following the work and break routine and promoting student progress in Khan Academy. Her prominent decision making styles are rational, intuitive, and dependent. These are evident in her focus and

reflect her status as a new teacher. She employs her knowledge of students when making decisions about instruction and undesirable behavior. Her actions follow the MTDMDIT.

4.2.3 Teaching Expertise

As with the other two areas of focus in this study, digital literacy instruction and interactive decision making, the unique structure of Ms. Vaughan's classroom impacts the analysis of her level of teaching expertise. Her lack of formal pedagogical training and teaching experience suggests classification at the novice level of Berliner's Stages of Teaching Expertise, yet the data aligns with the advanced beginner and competent levels.

Four characteristics typical of Berliner's advanced beginner level of teaching expertise are evident in the data from Ms. Vaughan's classroom observations and interviews. Her four months of formal experience at TAL is limited, but her description of her four years of work experience at the college level fits with the description of advanced beginners having "some experience". The following excerpt from her initial interview explains the nature of her work.

Barbara: You also say you worked for a college...for 4 years, and you said different roles, so I'd like to expand on that... Tell me the role, describe it briefly, and then how many years you did that role.

Ms. Vaughan: Yes. 4 years. Okay, so 4 years, I handled...my actual title was Enrollment Management. But I was the academics appeals liaison, I was a graduation coordinator...

Barbara: All as part of the one role?

Ms. Vaughan: Yes – these were all my, I was the only graduation coordinator; I did academic advising, I did all of the...we had two of us actually, she did Hillsdale and I did Cleaver, but I was the VA rep. I handled international students, um, I also did all of the transfer credit requests for Hill. So, if they brought classes from other schools, I would determine whether or not they could get credit...Let's see, what else did I do for Hill?
Oh!

Barbara: And how long did you do that?

Ms. Vaughan: For 4 years.

Barbara: Okay, so your title of Enrollment Management was for 4 years, and these were all the things you did under them.

Ms. Vaughan: Right. I developed a program at Hill called The Rebel Success program, which was an early alert system for at risk for failure students. So, I would bring them in and basically, "Hey what's going on? And what do you need to be doin'?" So, I did that, I also cross trained in both financial aid and Concurrent, so I would go out to the high schools with our Concurrent director and work with those kids, getting them into their classes, and...

Barbara: Dual credit?

Ms. Vaughan: TSI, all that, yeah. I handled all of that. I think that pretty well...

Barbara: You're a Jack-of-all-Trades!

Ms. Vaughan: Yeah, pretty much, if nobody....

Barbara: Sounds like they give you a big title, and you're left to do it!

Ms. Vaughan: Yeah, here you go; and I also handled, briefly for 1 year, I handled the sports stuff, as far as getting them qualified to play. Based on their grades. I did that for one year cause I refused to do it again after that. *[laughter]* NOOO!

Barbara: So, you dealt with high school, junior, senior through all parts of, all levels of college.

Ms. Vaughan: Yeah! All levels. Um-hmmm.

Her work in this position, although not in a formal class setting, provided her with some experience and practical knowledge of student behaviors and learning outside of teaching a specific subject-matter. She has acquired what Berliner describes as "conditional and strategic knowledge about when to follow or break the rules". This knowledge is developed by reflecting on experiences with students, another quality of an advanced beginner. Both these qualities are evident in the way she encourages and holds students accountable, as indicated in this

excerpt from the second observation. When the student returns from the restroom, she calls him to her desk to talk about his grade.

Ms. Vaughan: Hey, [Student name]. I want to show you what I was doing here. You had had one week, I don't know what the deal was, but it was low – anyway – uh, what I did was, because you had killed it in this other week, I just gave you double there. But the point, I mean cause you hit like 200 minutes or something like that.

Student: Awesome! Yeah, I was really trying to bump up my grade.

Ms. Vaughan: Yeah. And you did, uh, - you guys can break now – 'cause we brought it up a little bit. Even after the fact on that, and I can't remember if you did any of the extra credit or not...

Student: No, no I didn't.

Ms. Vaughan: But I'm just going to count that as an extra credit grade.

Student: All right. Awesome. Thanks, I really appreciate it.

Ms. Vaughan: Uh huh. I saw what you were doin'.

Ms. Vaughan explains this interaction in the follow up interview after this observation period.

Ms. Vaughan: Yes. Right. Well, because I wanted to show him that I saw what he had done. [Student name] is one of these students who is always interested in his grade, and he's always concerned about it. He also typically does way above and beyond what any of the other students do, and I didn't want him worried about one week that he had kind of fallen a little bit behind. 'Cause I typically ask for a hundred minutes on Khan from each of the students. This young man will do 200 in a heartbeat. He had one low week, and I said, "[Student name], I'm not going to hold that against you, given that it was STAAR [*state testing*] and everything else." So, I went ahead and gave it to him as an extra credit grade.

Barbara: Okay. So that's what prompted you. So, you apparently saw that he had done less that week, and it was unusual. Okay. And you responded because you knew his history, I guess is the best way to summarize that?

Ms. Vaughan: Yes. Knowing his history, knowing how hard he works, and all of that, I was willing to go ahead and give him the benefit of the doubt on all of that. Especially since he had actually done the work. Just not in the week allotted.

Ms. Vaughan has only been teaching for four months; yet, she already knows the needs and

typical behaviors of this student. She monitors his progress and adjusts his grades to reflect his efforts. She is willing to “break the rules” of her established grading structure because she knows this student. This flexibility and practical knowledge of student behaviors does not align with the inflexible, rule-following stance of novice teachers and clearly places her in the advanced beginner level.

In addition to these qualities, Ms. Vaughan also displays some characteristics of Berliner’s competent level of teaching expertise. One characteristic is connected to the structure of Kahn Academy and her purposeful routine of work periods and break periods. The goals and means for achieving those goals are inherent in the Kahn Academy structure, but Ms. Vaughan’s understanding of online learning and teenagers led to her plan for break times. As mentioned previously, she recognizes it is difficult for the students to remain on task for the entire class period, so she provides shorter break times within the class period. Her knowledge is also evident in the grading component of 100 minutes on Kahn per week (described in a previous excerpt). Her first-hand knowledge of the needs and demands of online instruction help her make better decisions for her students. Competent teachers are conscious or deliberate in their decision making, more flexible than novice or advanced beginners, yet not acting in fast, fluid, instinctive ways characteristic of expert teachers. Ms. Vaughan’s comments during the first stimulated recall interview illustrate her conscious decision making. After listening to the audio from the class observation, she describes her thinking about the episode.

Barbara: So, a lot’s going on in there. There’s several different decision points wrapped up in that. So, in general, what’s the dilemma for that?

Ms. Vaughan: Well, the dilemma is that I’ve noticed through their work that a number of students are having difficulty with classifying numbers. So, as a whole class I’ve decided that we need to talk about this and get this ironed out for them. Um, in the process I

have a number of students that either, although they don't know it either, but they don't want to be quiet while other students are listening. And you can hear the other students in the background saying, "Yeah that's the problem we're having. That's what I'm not understanding." So, I'm explaining to this one student why he can't be loud and play, while I'm explaining to the other students what they're doing, and I give him a set of options. You can do this, this, or this. None of those included talking and cutting up. So...

Barbara: So, what did you think about?

Ms. Vaughan: Well, I was thinking about how I could quickly get him to stop doing what he was doing, so the other students could hear what I have to say.

Barbara: Did he really need help?

Ms. Vaughan: No.

Barbara: So, he was legitimate in, that he understood it?

Ms. Vaughan: No, he probably didn't understand it, but he wasn't going to listen either. This is a student that chooses not to learn, on purpose. We're working on him, diligently, trying to find a hook for him, but I haven't found one yet.

Barbara: Okay. So, you responded because...

Ms. Vaughan: I knew that he was going to keep going. And it needed to stop because it was interfering with other students' ability to hear and learn. Which is what most of my issues are. Most of my dilemma in that particular class is keeping these under control while trying to teach them all.

The student's behavior is keeping other students from focusing on their learning and successfully progressing in the curriculum. Ms. Vaughan's goals and routines are disrupted. Instead of instinctively acting and responding quickly and fluidly as an expert teacher would do, Ms. Vaughan is "thinking about how I could quickly get him to stop doing what he was doing". She has routines for attendance, missing work, helping students, grading, and class time schedule, but does not have an effective routine in her repertoire to deal with this dilemma. She does manage to diminish the issue, but not quickly or with long term effectiveness. This is

very typical of teachers at the competent level of Berliner's stages.

Another quality of competent teachers is the ability to decide when to attend to a cue and when to ignore it. This is evident in Ms. Vaughan's normal routine for dealing with inappropriate student behaviors. She often ignores initial noises or talking, and it stops. If the talking does not stop and interferes with students' learning or is profane or vulgar, Ms. Vaughan is quick to respond. The following excerpt from classroom observation four and the related stimulated recall interview is typical of this characteristic.

Observation:

Student: What would you do if I unplug this router?

Ms. Vaughan: Write you up.

Student: Really?

Ms. Vaughan: Probably. I'm using it. How irritated are you when you're watching TV, and somebody comes up and turns it off?

Student: Probably not, because I'm probably not watching it....

Ms. Vaughan: Okay. You can be argumentative if you want, [Student name], but it's still not going to change the fact: don't touch that WIFI.

Stimulated Recall Interview:

Barbara: Okay, the next one is the next class and a student, they're discussing as you said, they're kind of out of it, or not on task is a good way of saying it. So, in this incidence, just out of the blue, the student asks you a question.

Audio playing

Barbara: Okay. Basically, that was it. So, he asked you a question. That's what prompted it. So, what were you thinking about as you're going through this...?

Ms. Vaughan: Well as I'm thinking about it, [Student name] just likes to ask questions and be as argumentative and, as he can. That's his mode of operation. He likes to, uh,

ask something that he already knows the answer to and then find ways and arguments to make his side okay. And I just don't let him.

Barbara: Okay. So, you responded as you did because you just don't let him.

Ms. Vaughan: Umhmm.

Barbara: Okay. So, it involved addressing, this is what I would do, and as he proposed those things you just basically ignored him. Didn't engage.

Ms. Vaughan: Yeah.

This example illustrates that Ms. Vaughan determined the student's comment was important to attend to because she was using the Wi-Fi. She, however, knew not to engage any more than necessary based on the student's argumentative demeanor. This same incident also illustrates why Ms. Vaughan does not exhibit higher levels of teach expertise. Simply stated, her routine for addressing unacceptable student behavior does not stop the behavior. Expert teachers make decisions that work. In this example, the student stopped engaging at that time but continued making noise and similar comments for the rest of the class period. Ms. Vaughan's routine of getting louder, more forceful and sterner did not stop the behavior.

Despite the unusual nature of Ms. Vaughan's classes, study data suggest her level of teaching expertise as advanced beginner and competent. Table 4.2 summarizes her expertise classification based on these examples. She consistently displays characteristics from both levels but exhibits few or no characteristics from the novice, proficient or expert levels.

To summarize, Ms. Vaughan displays qualities and behaviors consistent with the advanced beginner and competent stage of teaching expertise. She is flexible and practical and uses her contextual knowledge of student behaviors to make decisions in the best interest of students. She has established routines that complement those inherent in Khan Academy's

structure. Her decision making is deliberate, but not yet fluid. This is especially true of interactive decisions about student behaviors outside the class routine. Rational, intuitive, and dependent are her dominant decision making styles. Ms. Vaughan considers the history, needs, and personality of her students and encourages independent thinking. Her lack of expertise is most evident in her inability to stop ongoing behaviors. Some of her responses are effective, but her comment that, “nothing works,” highlights the long-term ineffectiveness of her responses and the reason she ignores some student behaviors. Data from Ms. Vaughan’s classroom observations also indicate instruction involving four of the eight elements of digital literacy. The absence of the other elements may be due to the use of Khan Academy as the primary instructional platform.

Table 4.2

Classification of Ms. Vaughan's Stage of Teaching Expertise

Novice	Advanced Beginner	Competent	Proficient	Expert
No experience or limited experience (1st year teaching)	Some experience, 2 or 3 years	Approximately 3 to 4 years of experience	Approximately 5 to 7 years of experience	More than 5 to 7 years of experience
Deliberate	Insightful	Rational (most dominant decision making style)	Intuitive	Arational
Understands common classroom terms and conditions and acts based on context-free rules	Building episodic and case knowledge to use for present situations (mentions previous student behaviors and typical behavior of teens as reason for actions)	Make conscious choices about what they are going to do – set priorities and rational goals with sensible ways to achieve them (stimulated recall interviews – knows reasons for actions)	Intuition or know-how becomes obvious	Have an intuitive understanding of situations and sense the most appropriate way to respond
Behavior is usually rational, relatively inflexible, and usually conforms to learned rules	Developing strategic knowledge - when to follow or break the rules they have learned.	Determine what is and what is not important as they teach	Experiential knowledge allows for more precise prediction of events	Have fluid and seemingly effortless performance
Often fail to take full responsibility for their actions, lack personal agency (comments of not knowing what to do; just the way a student is)	Context begins to guide behavior but may lack a sense of what is important (decisions of what to address and what to ignore, acts after escalation of misbehaviors, no suggestions for remedying lack of digital tools)	Learn to make curriculum and instruction decisions -when to stay on topic and when to move on and feel more responsible for what happens in their classrooms	Still likely to be logical and intentional in response decisions	Unconscious of choosing what to address and how to respond
	Often fail to take full responsibility for their actions, lack personal agency	Behaviors are not yet fast, fluid, or flexible		Do things that usually work

4.3 The Case of Mr. Fuller

Mr. Fuller is a 29-year-old white male who teaches physical education, health, and music at TAL. He earned a bachelor's degree in Music Education and holds a Texas teaching certificate for music, early childhood to 12th grade. His first formal position as a music teacher lasted for less than a year at another school. He categorizes the experience as being "burned professionally" due to his resignation after a lack of administrative support for his actions during a student fight. Following this experience, he questioned his career as a teacher. He was offered his current position at TAL after interviewing administrators for a blog story about charter schools. He is nearing his first full year of classroom teaching.

Although Mr. Fuller's formal teaching experience is limited, he has consistently worked with children and teens for more than 10 years in a variety of settings and positions. His first experiences with children began when he was 12 or 13 years old. He remembers helping his mother care for children at their church when she served as the childcare director. He also helped with Vacation Bible School and was active with the youth. During his time at university and beyond, Mr. Fuller worked for one week each summer at a band camp. He instructed various sized groups for six to seven years in this capacity. He also worked as a private tutor, marching band technician, and/or color guard teacher for several high schools. In addition to these experiences, Mr. Fuller earned a scholarship to work with his college peers to start a color guard for the university. After completing his degree program, he served as the director of music for elementary and youth worship and as a youth leader at his local church. At the time of the study, he was working with youth at his church and serving as a mentor to young men (14 to 20 years old).

As previously stated, Mr. Fuller teaches music, physical education, and health at TAL. His music and physical education classes involve little or no use of technology, so the observational data for this study includes only his health classes. His classroom, located on the third floor, is like other classrooms at TAL. The door is positioned near one end of the rectangular room with windows spanning the opposite wall. The desks are arranged around the perimeter of the room, facing the walls. The teacher's desk is in the center of the room with six student desks pushed against it to create a large table-like space. Every wall, other than the wall with windows, contains a board of some sort. In total, there are two whiteboards, one chalkboard, and three bulletin boards. The walls are not decorated with anything other than the classroom rules. This classroom is the only one without a projector. Mr. Fuller posts the day's schedule on a whiteboard to the right of the door. This board serves as the primary focal point for instruction.

4.3.1 Digital Literacy Instruction

Mr. Fuller considers his personal use of technology to be balanced. He noted on the initial survey, "I rely on my tech to learn and stay updated." He describes himself as a big reader with tons of audio books. He uses YouTube for tutorials and Google for research. His personal devices include an iPhone with a headset, a personal laptop, and a Bluetooth speaker box. He monitors his exposure and use of technology to limit being "too plugged in".

Observational data from Mr. Fuller's digital literacy instruction indicates the presence of all eight elements of digital literacy. During the initial interview, he describes his understanding of digital literacy.

Barbara: Tell me what you know about digital literacy.

Mr. Fuller: Digital literacy. Not a whole lot, except like talking to you. In terms of, like, literacy, literacy, okay, and then adding a digital component. How are we learning, how do we form a world view, how do we form schema from an ever rapidly evolving technology? Yeah, sure, awesome. Sounds great. >laughter< Yeah, I guess just how we use it. What are the implications, is this a good thing, is it a bad thing? I don't know if it's related to literacy, but I'm reading a book right now called *Glow*, and it's about how technology may have hacked young peoples' brains and made them, you know, not able to process information and not focus, which I would assume was the opposite of digital literacy. If you're being distracted, you're not being literate at all. You're just, again you know, it's that click, funnel of down, down, down, down, and you're not really having any learning.

Mr. Fuller's comments about digital literacy are broad and spontaneous, yet he alludes to six of the eight elements of digital literacy. He mentions forming a world view, which is tied to the civic element. He describes the formation of a schema in an ever-changing climate, one aspect of the culture of digital literacy. He also includes the use of digital tools and the implications. These ideas are inherent in the constructive, creative, and critical elements. Finally, he describes the opposite of the cognitive element when a user's clicking lacks focus and learning. He believes he does not know "a whole lot", but his comments suggest he has a broader grasp of the term than he thinks. Findings from the analysis of his classroom instruction also indicate a more thorough understanding of digital literacy.

4.3.1.1 Cultural

As previously mentioned, the cultural element of digital literacy involves understanding the possible digital situations and frameworks available to users. The acceptable and productive ways of operating within digital contexts are learned through exposure. Students in Mr. Fuller's health classes use Google Classroom as their primary instructional program for receiving assignments and materials, submitting completed work, and viewing grades. Students also use Google Docs, Google Slides, Google Drive, and Google Notes to complete assignments. Mr.

Fuller also mentions using the website kidshealth.org as a source for much of his curriculum, although it was not observed firsthand during the classroom recordings. Other digital tools mentioned during the observations include Pinterest, Snapchat, Instagram, Vine, Facebook, Netflix, Musically, Twitter, YouTube, and iTunes. Based on classroom discussions such as the following, most students are familiar with these digital platforms. This excerpt is taken from the beginning of classroom observation one when Mr. Fuller is explaining various parts of the day's bell ringer questions.

Mr. Fuller: ... Today we are talking about, we're learning about our world view, and we're going to define what a world view is and how we shape our perception of, this is all (unintelligible). So, we're going to start, we have some discussion questions that we have, that's your bell ringer, it's going to be about 15 minutes. So, you have from now until 9:45-ish to get these four questions done. Okay. You need to start by defining this word. You're going to start by defining this word, okay? After that you have some opinion questions about hey where do we see these, or what do we see in media that shapes what we think, do, and believe about this? And then you're going to tell me a story, hey this is one time when I encountered this, and this is what I did, or this is the action, and this was the consequence. All right. And then finally, your last question is going to be, hey what are some things that is promoted to us in media? So, media could be what? What are some examples of media? Instagram, okay, so social media. What are some other social media? Facebook, Twitter; what else? Snapchat. Musically.

Students talking

Mr. Fuller: All right. Are those the only sources of media that we have?

Students: You Tube.

Mr. Fuller: YouTube! Big one! YouTube. Excellent job. All right...

When Mr. Fuller asks for examples of media, students quickly call out several examples. He also models the use of various media as instructional resources. I observed him use the *YouTube* video "Why I Don't Have a 'Face Reveal'" of a girl sharing her world view and how she changed it by overcoming her negative experiences. He also uses Disney movie clips and

requires students to add visuals (pics, gifs, memes) to a storyboard assignment. In addition to direct instruction, Mr. Fuller refers to the video game *Fortnite* and popular movies such as *Star Wars* to illustrate or enhance student understanding of lesson objectives or skills. Students are exposed to these digital environments and platforms inside and outside the classroom, and Mr. Fuller acknowledges them and uses them to foster the cultural element of digital literacy.

4.3.1.2 Cognitive

The cognitive element of digital literacy is most evident in Mr. Fuller's classroom in the freedom students have to produce unique products using the digital tools available. Mr. Fuller expects students to use the criteria he provides but does not impose a strict way of completing assignments. He describes his perspective in the follow up interview after the third observation. At this point, I asked him about a student with an injured wrist using paper rather than digital tools to do an assignment.

Barbara: So, it was... I did have a question about this, because you let her do it on paper. What's the story with that?

Mr. Fuller: Right now, she has an injury on her wrist, and it sucks. It's like carpal tunnel, and it's also like, you know, so like sometimes she will switch, and she is very much so a, like an artist, she is very much like a tactile person, and so you know we don't have an application, or a stylus that she can, you know. So sometimes she likes to go analogue and kind of like get the outline and then she will just simply transpose that into her document. Or maybe like take her screen and like take a photo of it and submit it, but...

Barbara: And you don't care either way?

Mr. Fuller: No. No. As long as it is in the assignment field somehow. I try not to harp too much, that's why I provide frameworks, I provide structure, and say, hey you need to have these elements present however your product looks. Because some of them, they're like, in the case of [Student name], she's a writer. She'll write an entire novel. So, she chose the Google docs, and then puts some pictures in it. Then there are ones like [Student name] and [Student name], and they like comic books and anime', so they did it in like a story board format. I'm okay with hybrids, you know if you want to mix

and match different parts; however, you need to get the product done, though. 'Cause it highlights their natural strengths. And then, typically, what happens, everyone works in their strengths, and if someone needs a partner or a reference, or needs to know how to do something, I'm like you go talk to that person. And you get that peer/peer. So I did, I learned the first semester, or the first nine weeks of saying your product needs to look this exact way, was not gonna work for me, because they are all over the place in terms of where they're at in grade level, you know, absent all the 504, IEP, all that stuff, it's all over the place. And so, you have to be sensitive to that so here's the criteria, here's what I need to see. And then it's really awesome because they engage in that creativity and it creates a lot of that feedback, like, well is this okay? Well, let's process that. The criteria says you need x, y, z, x, y, z. Does this represent x, y, z, x, y, z? No, I'm missing x. That's right, you are missing x. How can you get x? Oh, I can do this. You're right. Now you're good. Now you've met criteria. Now you can...

Barbara: So, the content is more important than the format.

Mr. Fuller: Yes. Yeah. Like, can you hit this formula, can you do it? Yeah. Like formatting? Things change. Things evolve.

This excerpt illustrates Mr. Fuller's focus on having students think of ways to meet the criteria of the assignment using the tools available in ways most comfortable to them. For this assignment and others, Mr. Fuller does not impose his definition or understanding on the students. He frequently tells them to: "Look it up!"; "Google it!"; "Find a solution."; "Use your mind." He is there to provide help, but he fosters and encourages students to think in new ways. This is the foundation of the cognitive element of digital literacy.

4.3.1.3 Constructive

Mr. Fuller's practice of fostering student choice and allowing classwork in varied formats is closely tied to the constructive element of digital literacy. When students are given the freedom to create something new, they learn how to use content in original ways. Mr. Fuller also speaks to the appropriateness of using certain materials, as in the following discussion with a student during the first classroom observation. Mr. Fuller is moving around the room checking

student work and making sure each one is working on the bell ringer questions. One student is having trouble answering the first question, which requires the students to define a word.

What do you need help with? Okay, thank you for telling me your problem. That's your problem. You need a solution. This is the only website you can use? Okay, what if we did this? Not, Urban Dictionary is not a credible source. Um yes. We (unintelligible). Just no. What number are you on? Here. In your own words. Go. It's right there! In your own words. In your own words...

The student wants help finding the definition. Mr. Fuller asks questions, redirects him from an inappropriate source, and reminds him to use his own words. Similarly, he fosters the reuse of visual images and requires this as part of the storyboard assignment. These instructional strategies foster the constructive element. Mr. Fuller also models this element in his use of resources. He uses Disney movies, not to entertain, but to illustrate character transformation when faced with a problem. His instructional practices work together to strengthen the constructive element of his students' digital literacy.

4.3.1.4 Communicative

The communicative element of digital literacy is apparent throughout each classroom observation in Mr. Fuller's classroom. Google Classroom is his primary digital tool for communicating with students. Students must understand how to access content, use it, save it, and submit it for assessment. Often, as is apparent in the following excerpt, Mr. Fuller evaluates submissions and sends work back to students for editing. Many times, this involves renaming documents, attaching, and sending work in approved ways.

Mr. Fuller: Thank you. Okay. So right now, on world view questions, who I'm missing: [calls several student names]. That's who I'm missing. I already got [Student name]. So, if you wanted somewhere to start, I'd start on...

Student answering

Mr. Fuller: Yeah, when I open it up, you submitted it, but I am showing right here that you have no attachments. Which means that it is blank. So, if you did it, well if you did it, then it's in your Google drive, so you should be able to just attach it and send it in. But right now, it says that you have no attachments. It doesn't have an attachment; it means I don't have anything.

Student talking

Mr. Fuller: Okay, so I would say this has your name. World view – dash- your name, and then when you add that, you should be able to find it easier. So, if you want to rename it, or (unintelligible), that would help you out a lot. That way you can actually know what it's titled, and you can add it. So, now go to your assignment page. Yeah. Open that up and open the assignment. Now you're going to want to add "world view – your name", then turn it in.

Student: But not email it.

Mr. Fuller: No! No email. That just makes more work for you and for me. Let's streamline this process.

This back and forth type of digital communication occurs often in every observation. As this excerpt illustrates, all students have not mastered every aspect of this process, yet they are aware of it and are developing the skill. The student's question about emailing her work indicates she is familiar with this process yet still needs reinforcement. Mr. Fuller's use of a variety of tools also ensures students are exposed to different formats and rhetorics. Students must understand how to access, use, and send information within each of these platforms, the basic components of communication in any environment. Mr. Fuller's frequent and consistent use of these tools develops understanding and knowledge of the communicative skills of digital literacy.

4.3.1.5 Confident

Another component of digital literacy evident throughout every observation of Mr. Fuller's classroom is the confident element. Over and over, students present Mr. Fuller with a

problem related to digital literacy, and his response encourages students to figure it out on their own. He may provide choices or options but leaves it up to the student to decide what to do or what works best. The following examples illustrate Mr. Fuller's method of promoting student confidence and problem-solving.

During the second observation several students do not have laptops. After explaining the assignment, Mr. Fuller states, "If you do not have a Chromebook, if you do not have a Chromebook, you will need to find a solution somehow." He moves around the room from student to student offering options to some but providing solutions to less motivated students. For example, he suggests that students download the Google app and use their phones to complete the work. Another student has a laptop that needs charging, so he chose to do the work on paper. Mr. Fuller notices this and asks to borrow a charger from another student. The student prefers to keep working on paper, so Mr. Fuller allows him to do that while his laptop charges. In most cases Mr. Fuller expects the students to figure out a solution, however, two students who are behind and making no effort to find a solution are not given the opportunity to problem-solve.

Another example of the way Mr. Fuller promotes digital confidence occurs during observation three. The lesson requires students to watch videos and identify problems the characters encounter. As occurs frequently, some students do not have the tools they need to do their work or have trouble staying connected to the network. Mr. Fuller allows one student to use his laptop, asks another teacher for a laptop, and pairs students together to watch the videos. Mr. Fuller often turns the problems back to the student to solve and, in this case, the students offer a solution of how to answer the questions together.

Mr. Fuller: ... What are you doing to make sure you can find a solution? So, what, you're having social time? Okay. Looks like [Student name] is watching his videos, so maybe you could, [Student name], do you feel like sharing? Could you at least watch them together and then he could do, like, a response on a piece of paper? Could you let him borrow one bud, and let him at least listen? Both...there's your solution. [Student name], you're with [Student name].

Students talking

Mr. Fuller: Okay. Uh, that's very good. (Talking quietly, unintelligible.) Uh, [Student name]. Your answers will be in a color of your choice, and yours are going to be in a different color of choice.

Mr. Fuller suggests the students watch the videos together, sharing ear buds, and one of the boys answer the questions on paper. The boys come up with a better idea of both answering digitally by using different font colors. Mr. Fuller praises their solution and even suggests it to another pair working together a few minutes later. By modeling and encouraging the students to own their own problems, Mr. Fuller fosters an environment where the changing nature of digital literacies requires students to think and experiment with solutions.

4.3.1.6 Creative

The creative element of digital literacy is especially evident in Mr. Fuller's digital instruction. The previous excerpt, when students suggested using two different colors for their responses, also illustrates the creative element. Mr. Fuller suggested one of the boys use paper, which would have served as a substitute for an electronic response and not enhanced digital literacy. The boys, however, use their knowledge of digital tools to create a different way to respond in one document. Student creativity is valued and encouraged because of Mr. Fuller's mindset. Even though he was thinking of a substitution, the students were more creative in this

instance. Mr. Fuller's instructional methods, as mentioned previously to illustrate the cognitive element, have fostered this creative element in his students:

I provide frameworks, I provide structure, and say, hey you need to have these elements present, however your product looks.... I'm okay with hybrids, you know if you want to mix and match different parts; however, you need to get the product done, though.

This mindset is also apparent in the assignment described in the first observation session.

Students are required to create a storyboard with specific elements using the format(s) of their choosing: docs, notes, slides, Gifs, memes, clipboard, etc. Mr. Fuller presents concepts and lessons that illustrate his own creativity and encourages students to develop this element through class assignments.

4.3.1.7 Critical

One of the characteristics of the critical element of digital literacy is the ability to reflect upon and explain the influence of the other elements. The four observations in Mr. Fuller's classrooms take place as students explore the meaning and effects of various world views. After defining world view, students examine the way media influences actions, beliefs and thoughts. Mr. Fuller's lessons include examining how they are influenced, how others are influenced, and how real life and fictional characters transform their world views. Students create a story of transformation and identify the sources of conflict and the solutions in scenes from Disney movies. Mr. Fuller's assignment framework requires students to think critically yet allows freedom for individual creativity. The following excerpt illustrates one such critical discussion between Mr. Fuller and a student working on his storyboard during observation two.

Mr. Fuller: Okay. So, in the first little bit we went, hey, we have a problem, we know the characters. And for me, I would say that just lookin' at this a little bit, what do you think the problem is gonna be? Who are my players?

Student answering (unintelligible)

Mr. Fuller: Yes. Yeah. And who else? Yeah. Okay. So, it's gonna be a battle of classes. We have people who think they're better and don't have to work versus people who know they have to work, but basically, they don't have any supplies. So, they're going to have to reconcile what each think about each other to make that work. So, you're going to create a story and a character who wants to, what is the alternative world view? ...

The story the student is creating shows awareness of power structures and assumptions, important parts of this element of digital literacy. Conversations like this took place often over the course of these lessons and illustrate how Mr. Fuller's instruction develops this skill.

4.3.1.8 Civic

As previously stated, the civic element of digital literacy is less apparent in classroom observations. Digital connections, a mechanism for civic development and change, however, are inherent in many activities. Mr. Fuller's lessons on world view began with a focus on media and how the messages conveyed by others impact our views of ourselves and others. It was not difficult for students to consider this influence because they have been exposed to so many different social platforms, as illustrated in the following excerpt from observation one.

The next one, uh, the next one is an opinion. It's asking you to describe or tell me a story about a time in your life when you have observed or viewed something, seen something, and it has influenced you to act, or to believe, or to think a certain way. I can think of, like, twenty off the top of my head right now. One of them is (laughter). So, think like that, stuff like that. *Fortnight, Fortnight*, yeah that's cool. Awesome. Yeah. So, tell me a story is number 2, of when you have seen any type, it says media, okay. What's media? Like what, give me examples. What's a media you have on you right now? Snapchat, okay. What are some other ones? Okay, Snap, Insta, Pinterest, uh, whatever, Vine.

The students named different types of media and began typing their individual answers immediately. They understand how media connects people and are learning how it influences

society. Mr. Fuller is aware that technology can be good and bad and highlights the importance of usage, “I guess for me, it comes down to stewardship, like how we’re using the technology. Is it something that is edifying the students and the environment?... does it make the world better?” His awareness of this aspect of digital literacy is evident in his instruction and his discussions with students. Students, however, did not engage or connect in digital ways to promote societal change. The lesson on world view exposed them to the influence of digital media on society but did not encourage students to think or act in global ways.

Each element of digital literacy is evident in the Mr. Fuller’s instruction. The observed learning tasks and class routines incorporate many, but the civic element is less prominent for lack of specific student action. Mr. Fuller’s inherent understanding of the elements before the study aligns with his digital literacy instructional practices.

4.3.2 Interactive Decision Making

As stated in the previous two cases, the key points of Shavelson and Stern’s (1981) model of teachers’ decision making during interactive teaching (MTDMDIT) include the maintenance of a mental script to minimize teacher decisions and cognitive demands. Observed cues require decisions based on levels of tolerance and the need for action. If action is necessary, a teacher acts using established routines or reacts if no routine is available. This model is apparent in Mr. Fuller’s classroom instruction. After sharing the MTDMDIT with Mr. Fuller during the final interview, he responded:

Barbara: Okay. What about interactive decision making?

Mr. Fuller: What are my thoughts on interactive decision making?

Barbara: What have you learned?

Mr. Fuller: What have I learned? I've learned that it's a process and that it's something that, just like any skill, it can be learned, and since it can be learned, it can be taught. It's eye opening to me, just personally, to have someone else get a read on me and say, hey this is who you are, this is what you're about. And pretty much nail it. I mean, yeah. That's me. That's the way that I think. It's just weird, like, how accurate and how closely my following of the mental model, like, pretty much describes me. Like, yeah. That's me. Yeah. So, I don't know.... It's interesting. I think it's really fascinating.

When presented with Shavelson and Sterns model, Mr. Fuller realized on his own how closely his thinking and actions align with it. Data suggest his primary foci include keeping students on task, fostering skill sets necessary for academic achievement and responsible citizenship, and showing care for his students. These foci correlate with his decisions to respond or ignore each dilemma.

Analysis of classroom data indicate the class routine and physical arrangement of Mr. Fuller's classroom promote academic achievement and accountability. Each class period begins with students logging in to Google Classroom and checking their dashboards for new, completed, and missing assignments. Mr. Fuller reminds them to check their progress and explains the day's tasks. Comments like the following occur at the beginning of every class session observed.

Mr. Fuller: All right. So, here's what we're doing first. We have three objectives. We're still working on world view, so on the board you're going to see a list, okay. So, I'm going to be working on this list. If you want to stay in front of me, if you want to stay ahead of me, what you should do is you should travel to your "about" page. Go to your work. And that will tell you what I'm about to tell you. Basically, here's what we're doing, if you are not happy with your progress grade, I will be writing up on the board, and some of you all I did talk to about, hey these are things that I'm missing. These are the things that I do not have from you. So, if you see your name in red on this side of the board, that means that I do not have this assignment from you. All the instructions are in the assignment field. I'll come by individually if you need help. But if you are not current in anything in red, meaning if you see your name up here in red, you need to get that handled, and you need to get that handled today, preferably. Just to help you out. After that, there is a new assignment in your Dashboard in the assignment field.

In this instance, Mr. Fuller goes on to explain the assignment to create a worldview problem story. He fosters accountability and academic progress by directing them to their assignments and ensures he can view student screens by turning most student desks toward the walls. Typically, the beginning routine includes issues with technology and students talking or not working. As Mr. Fuller moves from student to student, he answers questions and redirects students to remain on task. This routine promotes academic and personal skills. Part of Mr. Fuller's classroom script also includes concluding remarks at the end of each class period. He typically mentions that time is almost up and asks for their attention by saying, "Screens down" and "Eyes and ears." He then summarizes what they should have completed and what they will be doing next. This script is evident in each class period in all four observation sessions.

During observations in Mr. Fuller's classes, common cues that require interactive decision making include technology issues, student behaviors and questions, and environmental needs. Mr. Fuller responds in some way to almost every cue, even if it is only to affirm or acknowledge a student. For example, during two different observations, a student randomly starts singing while students are working independently. Mr. Fuller acknowledges both cues. He says, "Excellent!" to one student and then keeps moving from student to student. When a boy in the corner starts singing during observation two, Mr. Fuller looks at him, the boy stops singing, and Mr. Fuller mouths, "Thank you." In both instances, the students stop the behavior and continue working. His responses show his desire to care for his students' needs and are evident throughout the data as exemplified in his comments during the third stimulated recall interview.

Barbara: Okay. So that was basically it. The student is asking you for a tissue. What were you thinking about?

Mr. Fuller: They need a tissue. They have an injury, they're wounded, they're hurt, whatever, they need a tissue.

Barbara: Why'd you respond as you did?

Mr. Fuller: Because I love my students. And if they're hurt, or they need something, and I can provide it, they're gonna get it. Granted, if they're on point, and you know. In a situation like that when it comes like, personal care or hygiene, like, they need, yeah, you know, they need to get that handled. I didn't have a tissue. I had a paper towel though. But, yeah, I want to see that my students are cared for.

In contrast to most other responses to classroom dilemmas, one of the few times Mr. Fuller chooses to ignore an observed dilemma takes place toward the end of the final observation session. A student rolls his chair over to two other students working in the corner, then rolls back to his seat, spins, and keeps working. When asked about this, Mr. Fuller explains his thinking.

Barbara: Okay the next one is the boy rolling the chair, so you may not hear, you hear a little bit of background, and you can hear a little bit of you talking to [Student name], but that's what's...

Audio playing

Barbara: Okay. Did you even notice?

Mr. Fuller: Oh, I noticed.

Barbara: Okay, All right. So.

Mr. Fuller: It was [Student name].

Barbara: You had to make a decision. What was the dilemma?

Mr. Fuller: Yes. It's kind of like a similar thing with [Student name], the previous one, like again, they know how to manage. I say they know how to manage time; they should be managing their time effectively. Um, am I gonna stop my instruction to go give a student a rebuke, and then come back and finish a thought, or am I going to stay present with the student who is giving me her presence? I don't know, there's a lot of things going on there for me. Number one, it's a respect thing, so she's, I think I said in the last tape that, like, if a student is asking for help, they're gonna get the help. Um, number two,

uh, is that, they know their expectations that they're on task, that they should be accountable, they're on the clock, they're on the calendar, they're getting stuff done. And then also, like I said earlier, knowing how to manage your time. So, in that moment, he is choosing to have a great, a very fun break. And that's fine, and sometimes the follow up is, yeah that break is showing up in this product score. Like, that's when the feedback comes. I don't really talk about it. We'll talk about it later when, what do you mean I got a, you know, how come I only got, like, an 80 on this assignment? Well, you didn't meet all the criteria. Yes, I did. No, you didn't. You know, you left some things out. But I, you know, I was working on it. Yeah, I know that you were working on it, you know what else I saw? And then that's when I can open up the conversation for the reason that this product is the way that it is, it is that you're missing some criteria, you're missing criteria, and you say you're working on it but, real talk, I think that you could probably leverage and manage your time better.

Barbara: Okay. So, you didn't respond to him, primarily because...?

Mr. Fuller: I have not yet.

Barbara: Yet. Okay. So, not yet.

Mr. Fuller: I mean, it will either show up, and uh, you know, it doesn't and it's a good product, good for him. Um, I don't know, I...

Barbara: So, it's almost like you stored the information away, to remind him if he does it. So, at the time you didn't respond...

Mr. Fuller: Oh, it's there though. It's here.

Barbara: Yeah. Okay. So, you didn't respond to him primarily because, tell me if I'm correct, because you were working with the girl and you wanted to focus the attention...

Mr. Fuller: Yeah. I'm working with [Student name]; I'm working with someone who's getting the attention. And his time was not right then. That's not his time. Not right then. His time will be later. Assuming that, you know, if needed. And if not, then okay. All right. But I didn't think that it really merited me stopping giving my presence to a student to go over there. That's gonna put him in a place, you know, and I don't know. The judgement call for me was I'm staying with [Student name]. I did see it. Do I want to make it a thing or would the better solution be, have this conversation later when they're struggling with, or with a cognitive dissonance of "what's up with this grade on this assignment?"

Barbara: It sounds like you're giving him a chance to see the effects of his decision at that time.

Mr. Fuller: Oh yeah. Totally.

In this instance, Mr. Fuller saw the boy rolling across the room but decided it was more important to continue his discussion with another student. He defers any corrective comments to a future time. Interestingly, that time comes sooner than he expects when the window air conditioner stops working, and Mr. Fuller is faced with another dilemma.

Barbara: Okay. All right. Okay. The last one is when the air conditioning went out.

Audio playing

Barbara: Okay, basically that's it.

Mr. Fuller: So, when you were rolling in the chair earlier? You actually hit the power cord. So, this is the follow up. (Laughter)

Barbara: So, it goes out. What are you thinking about? 'Cause usually you don't say anything. So, what are you thinking through the whole process?

Mr. Fuller: They're already hot. I know that most of them are already uncomfortable. Just, you know, enjoy it. Laugh with them in the moment. It's not the most ideal thing. We know this. We can finish out strong, and my thinking is, sorry this thing is not working, sorry you're here in this hot room, and go check on it and see if there's anything to be done. Nope, dead. All right then. I mean that's just a real-life thing. I really don't know what to say about this one. It just kind of happened...

Barbara: And that's what you displayed: this is just life, so keep working.

Mr. Fuller: Yeah, okay. So, the ac is not working? You can be an American without air conditioner, it's not going to kill you, and you can still get your work done. You'll be fine.

This dilemma creates an opportunity to follow up with the previous chair rolling cue and highlights the consistency of Mr. Fuller's focus on academic and personal skills.

In addition to issues with technology, one of the most frequent dilemmas observed in Mr. Fuller's classes is students talking while he is explaining the tasks for the day. He addresses

these dilemmas in different ways, but the goal is always to get the student on task. One example takes place at the beginning of the first classroom observation.

Mr. Fuller: Oh. Thank you. You're so kind. Which school? Let's take a pause. Let's take a pause, really quickly, okay. All right. So, today, or this week I should say, and this week I know that we are reorienting, [Student name]. All right, so I know we're reorienting, being out of this environment for two weeks, so want to move through these discussion questions. I understand, okay. (Unintelligible) you were responsible also – Hey. Stop talking to each other.

Students talking (unintelligible)

Mr. Fuller: I'm trying to talk. You're interrupting me. You create a lot of problems for yourself when you're not listening. All right! So, we're talking about our world view.

When mentioning the student's name does not stop the behavior, Mr. Fuller reminds him of a social expectation to not interrupt others and points out the effects of not listening to instructions.

Comments focusing on personal and academic expectations are evident in each dilemma of this type, however, Mr. Fuller's response varies depending on the student's history and attitude at the time. During the second observation two students are not working and focused on their phones. Based on previous encounters and the students' progress, he moves one to the hallway and attempts to move the other student to another classroom. Neither student wants to be separated from the class, but Mr. Fuller has learned that they work better in less stimulated settings without an audience to distract or entertain. One student complies, but the other student is more obstinate. Mr. Fuller allows him to stay with the understanding that he will be checking his progress more frequently. During the following up interview, Mr. Fuller explains his reasoning for both students.

Barbara: Okay. All right. The next one is right after that. You've got them all started, and you direct (Student 1) to the classroom.

Mr. Fuller: So, he has a...

Barbara: Let me play it for you, just in case.

Mr. Fuller: Okay sure.

Audio playing

Barbara: Can't hear completely, but the dilemma was...

Mr. Fuller: Him not doing his assignment, or like even trying, or I don't have my tools, so that means that I'm exempt from doing any type of work, or putting forth any type of effort, which is false. Um, things that have worked in the past is that he can be very loud and boisterous, so we usually put him in another room or somewhere that's less stimulating, even though sometimes he is the stimuli (laughter) in the classroom. He is that. But at least removing the audience and typically he will focus up because, he no longer has an audience because he's gonna, his volume will increase. Um, and so for me, twofold, number one, it's like a two birds with one stone: I get to kind of like eliminate from the classroom, that stimuli, I get to remove him from that environment and put him in an environment where he's gonna be not having that, as many opportunities to defer his behavior because someone is watching him, or because he gets distracted 'cause it's just him and his computer. So, I don't really like to, I mean, we sometimes don't like to say that word, but as a consequence, but I'm like, you are behind, these are factual things, you are missing some assignments, you are sitting here, you do have solutions, you're not following up, so now you get my option for you.

Barbara: So, did you talk about those in the hallway? 'Cause I couldn't hear that. What was the discussion? Did he care?

Mr. Fuller: I mean, like, it was informal. Just basically walking to the hall, and it was like, you have four missing assignments, you're doing these things, and just state the facts. You know, like, I see that you're sitting down, I see that you're listening to music, or you're talking about *Fort Night*, or you and (Student 2) are kind of cutting up, and the both of you really can't afford that right now. Like, I'm not trying to be mean, I'm just saying, this is where you are.

Barbara: Did he give you any kind of feedback, or was he...?

Mr. Fuller: He did, he was really upset about being removed from the class. He got his, he was deflated, and he's like, well I just don't have a Chromebook, I don't know how you want me to get this work done when I don't have a tool, and I'm like okay, so like here's the deal, so if it's coming to your cell phone and you're playing a video game, and you don't have what you need, you will borrow someone's cell phone, you will look on someone else's screen, and you know, you'll watch them play the game, and I said, so

you can find solutions, it's just that when it's put toward academics, you have extreme aversions to actually, you know, applying yourself at the same level you would if this was *Fort Night*. If this was...

Barbara: And you're saying all this to him in the hall?

Mr. Fuller: Yes. Talking, and if this was *Fort Night*, you would find a solution. And I was, like, right now you're not doing this in your academics, so don't tell me that you can't not do something, you can. You're leaving yourself an out. And since you're leaving yourself an out, you're taking it.

Barbara: Right. Okay. What about later on, like he eventually came back in, so the follow up interaction would be what?

Mr. Fuller: Oh, I just, you know, um, I just was noticing, you're coming back into class and I wanted to check to see if he had actually completed anything. And he was missing the latest assignment and I said, "What is that?" and he's like "oh, well I'm thinking about it and I'm brainstorming" and I'm like, "well good" like I'm glad that you're taking some steps done, and don't worry about this cause we're gonna, you know it's the end of the class period, but you need to be putting your mind in this frame of mind for Thursday as we get this done tomorrow.

Barbara: So, he got everything done that he was missing, except for today's work.

Mr. Fuller: Uh, I'd have to double check. I want to say maybe there was, like, two more that he, but there was some volume that got in.

Barbara: So, he did work.

Mr. Fuller: Yes.

Barbara: Okay. All right. Good. The next one you circled is similar, continued to work on, and I'm glad you circled this because I didn't know what happened with it. You're calling to (Student 2) because you have a laptop for him now. So, let me play that one.

Audio playing

Barbara: Okay, that's basically it. Do you remember enough of it from that?

Mr. Fuller: Oh yeah. Like, he, you know, (Student 2) ...

Barbara: So, the dilemma was...

Mr. Fuller: He is not working, he is not making efforts, very similar to (Student 1). And, um, and then not liking the fact that I found him a solution. And when I give them a solution, and they're not about it, that they have, you know, now they're being singled out. Which, you know, sorry, too bad. (Laughter) Like, that's just kind of my opinion on it, but when he is in that state of deference at that level, and then for him, and his excuse is, "Well, I don't have a Chromebook." Well, now you have one. Well, I don't want to leave the room now. Why? Well because, again, it's that whole audience thing. Him not having an opportunity to defer, it's just him and his Chromebook and his thoughts. And so, um, he was...

Barbara: So, he stayed in the room. Tell me why you responded in that way.

Mr. Fuller: He wasn't gonna go. He wasn't havin' it. He wasn't going to compromise. And so,

Barbara: Where were you going to take him? Cause you wouldn't take him where (Student 1) was, right?

Mr. Fuller: No. That Chromebook came from [another teacher's] classroom, so I said, hey this Chromebook is hooked up on that network. That's why I told him, hey you're going to get better reception if you actually physically move your body, because this Chromebook belongs to a student who's in this other classroom. And he wasn't gonna do it, and so I just took a, and it was a risk for me because I didn't know how he was going to interact with it at all. But I said okay, at least now he can, he has a tool, he has the option to modify his behavior, and we will see whether or not it was a good call. And so, to combat that, I did spend a little more extra time with him, really following up with him. I was like, okay, like, let's work through these questions. And then to not really have an option to defer, cause he'll just sit there and be unresponsive, and I'm like, no. Answer the question. You have thoughts, you have opinions about lots of things. You can think. There's nothing wrong with your brain.

Barbara: So, the follow up interactions were, you, is it fair to say that because he didn't want to go, you said, okay I'll let him stay, but I'm going to be checking on him all the time?

Mr. Fuller: Oh, heck yeah. Oh yeah, yeah, yeah.

Barbara: So, each of those, the following interactions, were you checking on him?

Mr. Fuller: Oh yeah. Of course. Like, no. My desire was for him to go into this other room and to be not in that environment where he allows himself to be distracted.

Barbara: Okay.

Mr. Fuller: But if he's not going to be about it, and he's going to throw a tantrum about it, and be really obstinate, and making that option, then okay, fine. You can stay in here, but I'm going to be on you.

Barbara: Okay. When did you talk to the boy about the laptop? That's part of what I didn't get to see. How did you know that boy was going to show up at your door with that laptop?

Mr. Fuller: I was already thinking of this solution as I dropped (Student 1) off, because I know that bodies in the chair, like we have more bodies that are not doing work, or we have more students that do not have a tool of some kind, then who do, and I was already thinking, okay they're not going to be sharing Chromebooks, because then they're just kind of taught. So, on the way back I did kind of stop in, duck in, and just ask a real quick question, hey, I know you do your first fifteen, [other teacher name], in every period, but do you have anybody that's current that I could just add a user, so I can get a tool for a student so they can work?

Barbara: I thought that's probably what happened, but I wanted to get that...

Mr. Fuller: That's definitely what happened. So, I went and checked and said, "Look I got a student who is severely behind, they need an option, we don't have any more loaners." That's just kind of where we were at.

These dilemmas demonstrate Mr. Fuller's unwavering focus on instilling academic and personal skills with consideration to a student's individual history and needs. His responses adjust when needed to meet these goals.

Finally, it is important to note another of Mr. Fuller's frequent responses to students. Simply stated, he affirms and encourages students almost constantly. The frequency of positive feedback to students supports his claim of caring for his students and showcases his deliberate attempts to make sure students know that he cares for them. The classroom observations contain numerous statements, such as: "Good deal! All right, cool. I like that!"; "I like your response."; "Yes, I got you. Thank you."; "Wow, you nailed it."; "Awesome job!"

Mr. Fuller's attitude toward his students is also apparent in his considerations when faced with a dilemma. During the stimulated recall interviews, he mentions considering a

student's history of behavior, previous conversations, and needs. His responses also show a primary focus on completing the task and expecting students to take responsibility for their part of learning. He also considers the time a response will take and how one student's behavior impacts the learning of others. His response when asked why he paused from dealing with one student to address another illustrates this priority.

It's not fair that other students, I hate, I do not like, I despise, when someone's behavior interferes with somebody else's ability to move forward, who's not being a clown. That gets on my nerves. That's a pet peeve, that's a hot button for me. I don't like that. So, did I have a pause? Well, he's not responding, but I'm not going to let the other students, like, be impeded in progress because I have some students who are choosing to be a little ornery in the moment.

This response and the other data support Mr. Fuller's own observation that his decision making matches Shavelson and Sterns model of teachers' interactive decision making.

Understanding the nature of Mr. Fuller's interactive decision making is enhanced by analyzing his responses to the GDMSQ and his assessment of his decision making style. His responses on the GDMSQ produce the following scores: intuitive-23, rational-21, dependent-18, spontaneous-12, and avoidant-7. He identified right away with the rational style and later with the intuitive and dependent styles as he spent more time considering each one.

Mr. Fuller: I'd like to say that I'm rational. Probably not so much intuitive, ... Usually when I am giving some feedback, I guess it would be intuitive... (*reading from the handout*) "Dependent: reliance on the directions and support of others." I do use a resource called kidshealth.org, and so they have a lot of resources, a lot of videos, ...

Barbara: Okay, so you would say probably rational intuitive?

Mr. Fuller: Yeah.

Barbara: But, making decisions using resources is the dependent part.

Mr. Fuller: Yeah. Using the resources there, and then a lot of questioning. I let the students ask me tons of questions. Tons of questions. Can I do this? And I'm like let's

think about it. How is it related? Is it content related? How is it content related? “Well, cause of this.” Awesome, how about you go down that bunny trail. Sounds great. Sounds avoidant, no, definitely not. Not an option.

Barbara: Okay. How about spontaneous?

Mr. Fuller: Ummmm. Sometimes. Impulsive. And prone to... I mean, I like to have a plan, and I understand that sometimes plans don't work, or things change, and so there's value in being able to evolve...

Mr. Fuller's responses identify the same three prominent styles as the GDMSQ. Although he did not recognize the intuitive style at first, his thinking provides a glimpse into why the questionnaire may have indicated this style as his most dominant. As he considers each style, he realizes that he responds intuitively when giving feedback to students. He emphasizes the extent of this aspect of his instruction when he talks about how he fosters and receives student questions. He has created a learning environment that encourages questions and requires decisions made intuitively.

Observational data also indicates some moments of spontaneous decision making. As he states in the previous comment, he likes to have a plan but realizes he must adapt as unexpected events occur. Mr. Fuller's spontaneous decisions are evident when he makes funny or sarcastic comments in response to students who are off task or students who sing out in the middle of class. As noted earlier, Mr. Fuller responds in some way to almost every question or behavior in his classroom. This corresponds with his denial of an avoidant style characteristics in his comment. During the four observation sessions, I did not see Mr. Fuller avoid a decision. Even the previously noted incident of ignoring the student rolling in his chair was an intentional decision to delay a response in order to keep his attention on another student. This corroborates the low score on the GDMSQ.

In summary, the nature of Mr. Fuller's interactive decision making follows the MTDMDIT and aligns with the intuitive, rational, and dependent styles of decision making. He rationally follows the routines and plans he has established, focusing on task completion and student needs. When faced with unexpected behaviors or events, he considers previous student behavior and individual needs and acts intuitively and spontaneously. His responses and interactions with students are frequent and display his care for his students.

4.3.3 Teaching Expertise

Analysis of Mr. Fuller's actions during classroom observations using Berliner's Stages of Teaching Expertise indicates skills mostly within the proficient and expert stages. His experience, however, aligns with the advanced beginner or possibly the competent stage. As mentioned earlier, Mr. Fuller had one semester of classroom experience prior to this year at TAL and that experience was not positive. His total time in the classroom at the time of data collection was approximately 14 months. His experiences outside the classroom, however, are diverse and extensive. It is difficult to quantify these experiences, so accurate placement by this characteristic alone is tenuous and, like the previous two cases, necessitates a wholistic view of the data. Table 4.3 summarizes the findings that support classification at a higher level teaching expertise than suggested by his years of formal teaching experience.

At the end of the final interview, after presenting my preliminary findings, Mr. Fuller stated, "... I'm curious, if you'd have ran this study at the beginning of the year, if I would have the same result as now. And I don't think that I would. Because I was not aware." His insight into the changes he experienced during this school year suggest movement from one stage to another. The observational data support his perspective and suggest he is a teacher

transitioning from the competent stage, to the proficient stage, with some skills indicative of the expert stage.

Teachers in the competent stage of Berliner's theory are conscious of their decisions and make better decisions about instruction than teachers in the previous two stages. They accept responsibility for their classroom and usually display more confidence in their abilities, but they are not as flexible as proficient or expert teachers. Evidence of Mr. Fuller's movement out of this stage is found in his flexibility. Repeatedly, during observations and interviews, Mr. Fuller demonstrates his willingness to adapt and change if the objectives of the lesson are followed. As mentioned in previous excerpts, he allows students the freedom to complete work in ways that are best for them, "As long as it is in the assignment field somehow..." Another way he demonstrates skills indicative of movement from the competent stage is by his frequent comments to students about their responsibilities and his responsibilities. He understands what his responsibilities are regarding instruction but recognizes that students also have responsibilities. At some point in all four observation sessions, Mr. Fuller tells students to, "Handle your bit," or "You need to get that handled." He explains his thinking behind this behavior during the first stimulated recall interview:

I'm working with the students that are working, and uh, as they're starting to struggle, they're like, I don't know what to do, and I'm like, yeah, you don't know what to do; you're not handling your end of this arrangement. I mean, that's just my philosophy.

This quality is also an indicator of Mr. Fuller's focus on students rather than self. He notices student behavior and adjusts his response based on his personal knowledge of the student. For example, in the incident mentioned previously, Mr. Fuller notices a student seems tired and tells him to take a little break then get to work. He also observes and praises a female student

for being on task, an atypical behavior for her. Mr. Fuller rationally plans lessons, showing teaching competence, but he adjusts his script to accommodate students in ways that still achieve instructional goals.

In addition to the characteristics from the competent stage of teaching expertise, Mr. Fuller exhibits several qualities of proficient teachers. The most consistent of these is his ability to predict events within the classroom. Two examples of this from the first observation include:

For the first fifteen you do have about four questions about world view. They're basically, uh, you have two that are "Hey, you should look up this word," and then you have some that are opinion questions. Don't ask me. I don't know the answer. It's an opinion question. That means you have to think.

Then, later in the same class period when he is helping students with computer issues, "Hey [Student name], pal. Give me about 2 seconds and I'll have the solution for you, okay? And don't count one-two." His responses suggest he knows his students and anticipates what they will say and do. As presented in a previous excerpt, Mr. Fuller anticipates problems with students and proactively separates two students who frequently distract one another and others. He also borrows a laptop from another class so a student without one has no excuse to do the assignment. In each of these examples, and many others, his ability to predict events allows him to keep students on task and diminishes problem behaviors. His ability to recognize patterns of behavior and make intuitive and deliberate decisions enables him to predict problems and remedy them before they occur.

In addition to these qualities, Mr. Fuller displays moderate levels of confidence in his choices and instructional practices. Berliner notes, "...experts appear to be more confident about their abilities to succeed at instructional tasks than are novices," (1994, p. 61). His quick response to problems and explanation of his actions suggest confidence, yet his comments

during interviews reveal more hesitation. When listening to some incidents, he would note that he should have done something else and even asks me if he shouldn't have done something.

Barbara: Did anything else come up about it?

Mr. Fuller: Um, no but I'm hearing that I need to make my follow ups better. But also, at the same time, at the same time, that's what I hear! I'm like, no, I should follow that up!

Another example of him questioning his actions is in the second follow up interview.

Barbara: So why did you respond as you did? Because you could have done that, and said, "Dude, this is why you shouldn't talk at the beginning," but you didn't, so why did you choose not to respond that way, or any other way?

Mr. Fuller: I mean, [Student name] is finicky with reprimands. He'll typically shut down with a reprimand, and so, and I've had that dialogue with him before and I feel like at this point in the year, you know what you should be doing, and I shouldn't have to be saying that this is an expectation. And I probably should have, and you're right, I probably should have said, when...

Barbara: No, I'm not saying I'm right or wrong. I'm just asking.

Mr. Fuller: No, I think you are. I thought like, yeah, that's, um. See this is why you should have paid attention, because now we're having this conversation.

Barbara: But, as you said, that could have made him shut down.

Mr. Fuller: Yeah, and I think that it would have, and so I just felt that the more gracious thing to do, and the better solution would be, let's just break down this assignment so that we cannot have a dialogue in the future that you don't know what to do, or that we didn't at least talk about it.

During this brief dialogue he questions his decision but, when reminded of his prior statement, returns to his initial rationale for acting as he did. This is an example of some of the hesitancy evident in Mr. Fuller's behaviors. He also confirms this in the final interview, after I share my preliminary summary.

No, I think that's a pretty accurate, I would say, you know, assessment of how I think and feel, um, about the whole observations. I mean, I know that, I try to be sensitive to their needs and to their learning, so I agree with it. And I also agree with your statement

that I probably do care a lot about peoples' opinions, you know, I want to be, you know, everyone seeks that validation, "Am I doing a good job?" So yeah. I'm still there.

His confidence and hesitancy are qualities that indicate a transition between stages.

In addition to these behaviors indicating a proficient level of teaching expertise, Mr. Fuller occasionally demonstrates qualities in line with expert teachers. He generally moves and acts with ease in the classroom, yet his actions are not completely fluid. Berliner describes expert teachers as exhibiting *arational* behavior, being unconscious of the choices one is making and why one makes them. It does not mean these choices are irrational, just that they have happened so often one does not have to think about them. During the four stimulated recall interviews, Mr. Fuller knows why he made the choices he made and what he considered. This aligns with behavior in the competent or proficient stages. His actions in the classroom, however, show signs of the unconscious fluidity of experts.

Other characteristics of expertise evident in Mr. Fuller's behaviors are his adherence to the routines he has established and his understanding of the demands of a task. Both characteristics are illustrated when he acknowledges students need to get re-oriented after testing during the first observation session:

Let's take a pause. Let's take a pause really quickly, okay. All right, so. Today, or this week I should say, and this week I know that we are reorienting, [Student name]. All right, so I know we're reorienting, being out of this environment for two weeks, so I want to move through these discussion questions. I understand, okay.

He also displays these characteristics during a stimulated recall interview when he explains his question to a student and his reasoning for adjusted due dates.

Um, so in terms of asking him, will I get work today? I talk a lot about accountability and staying accountable, and I know that sometimes I'm not the best about having, you know, "When are these assignments due? And I used to, but it was creating a lot of pressure for the students to actually perform. They'd get stressed out and make

themselves sick, or they'd freak out, and so then, I then started doing, as long as you are staying accountable and you are at least on task, you are at least making progress. It gets done when it gets done...

Mr. Fuller expects students to complete the work but understands what the task requires.

Overall, the characteristic that most exemplifies Mr. Fuller's teaching aligns with Berliner's statement, "Experts do things that usually work," (Berliner, 1994, p. 17). His classes are not free of problems, yet what he decides to do to prevent or address each problem, usually keeps students on task and working. In each of the excerpts shared earlier, the decisions Mr. Fuller makes result in students working and adherence to his script for each class. Separating students to eliminate distractions, telling a tired student to rest for a few minutes, allowing students to adapt an assignment so both can answer in one document; each decision leads to students working.

Each of these characteristics support Mr. Fuller's classification as a teacher in transition. He demonstrates qualities of competent, proficient, and expert teachers, yet most frequently displays traits consistent with the proficient stage of teaching expertise.

In summary, Mr. Fuller demonstrates actions most in line with proficient teachers, but also exhibits characteristics of the competent and expert stages. His confidence in his abilities and his thinking fluctuate between the competent and proficient stages. His flexibility and accurate predictions of classroom events followed by decisive action place him firmly in the proficient stage. Some behaviors, however, indicate characteristics typical of expert teachers, especially since what he does usually produces the desired effect. Mr. Fuller's interactive decision making aligns with the MTDMDIT. He exhibits behaviors indicative of the intuitive, rational, and dependent styles of decision making. He focuses on maintaining established

routines that promote academic and personal skills in his students. He also makes decisions that demonstrate his care for his students. Common dilemmas in his classroom include technology problems, student behaviors and needs, and environmental issues. He responds in some way to most cues to affirm students, to maintain class routines, and to promote learning and personal responsibility. Observational data from Mr. Fuller's classes indicate instruction in all eight elements of digital literacy. His comments suggest a broad understanding of the skill, and his instructional practices match his knowledge. The civic element was evident in observational data, but in a more cursory way than the other seven elements.

Table 4.3

Classification of Mr. Fuller's Stage of Teaching Expertise

Novice	Advanced Beginner	Competent	Proficient	Expert
No experience or limited experience (14 months)	Some experience, 2 or 3 years	Approximately 3 to 4 years of experience	Approximately 5 to 7 years of experience	More than 5 to 7 years of experience
Deliberate	Insightful	Rational (lessons; description of actions)	Intuitive (most dominant decision making style)	Arational
Understands common classroom terms and conditions and acts based on context-free rules	Building episodic and case knowledge to use for present situations	Make conscious choices about what they are going to do – set priorities and rational goals with sensible ways to achieve them (adapts lessons but keeps objectives)	Intuition or know-how becomes obvious	Have an intuitive understanding of situations and sense the most appropriate way to respond
Behavior is usually rational, relatively inflexible, and usually conforms to learned rules	Developing strategic knowledge - when to follow or break the rules they have learned.	Determine what is and what is not important as they teach	Experiential knowledge allows for more precise prediction of events (predicts students' needs and behaviors)	Have fluid and seemingly effortless performance (overall, fluid and quick actions)
Often fail to take full responsibility for their actions, lack personal agency	Context begins to guide behavior but may lack a sense of what is important	Learn to make curriculum and instruction decisions -when to stay on topic and when to move on and feel more responsible for what happens in their classrooms (aware of what is his responsibility and what is student's responsibility)	Still likely to be logical and intentional in response decisions (expresses reasons for actions with some hesitancy)	Unconscious of choosing what to address and how to respond
	Often fail to take full responsibility for their actions, lack personal agency	Behaviors are not yet fast, fluid, or flexible		Do things that usually work (decisions and actions keep students on task and diminish behavioral problems)

4.4 The Case of Mr. Scott

Mr. Scott is a 51-year-old African American male. He earned a B.S. in Business Administration, a B.A. in English, a M.A. in English, and completed all his coursework toward a Ph.D. in English. He is alternatively certified by the state of Texas to teach English 7th-12th. He has 15 years of teaching experience, 12 years as an adjunct instructor at the university level and three years in secondary schools. He teaches 8th English and English I, II, and III. It is his second year at TAL. Before TAL he worked for one year at a big district high school as a dual credit instructor. During the initial interview he describes this year stating, “things didn’t go as well as I hoped.” This experience led him to a job fair where he met Dr. Kraus. He liked the school’s whole person vision and accepted the position, even though his home is 45 minutes to an hour from the school. His experiences outside the classroom include three years as a Sunday School teacher for late elementary to early high school students in his early 20s.

Mr. Scott’s classroom is on the third floor of the TAL building. Its structure is the same as the other classrooms, a wall of windows with some shelves beneath them across from the doorway. His desk is located on the same wall as the door but in the corner at the other end. The monitor is mounted on the other wall near his desk above a bulletin board. A folding table is set up below it. To the right of the table is a storage cabinet. Cushions and pillows are stored near the cabinet and bookcases. The closet is located directly across from the doorway with a cell phone pocket holder hanging from it. On the wall between the doorway and Mr. Scott’s desk are a whiteboard and a chalkboard with a dragon drawing. It is one type of the various pieces of student work displayed throughout the classroom. There are 15 student desks in the

room, each with a rolling chair. Desks are arranged in groups of two with one group of three desks in the center of the room.

4.4.1 Digital Literacy Instruction

Understanding Mr. Scott's digital literacy instruction includes identifying his personal use of technology. On the teacher survey he states, "I use technology constantly but primarily as an end user." The devices he specifically mentions are his cell phone, iPod, and Fitbit. He also gains most of his news through the Internet. One specific way he uses technology in a digital platform is as a moderator for a sports message board. He explains this in the initial interview.

Okay. I'm a sports fan, and so I started, I was a poster on the message board, and one of the gentlemen, well you have a rational way of responding to people, can you moderate, and these are the things you look for...all you do is post like normal, and then if someone uses too crude of language, or is overly – he gave me a standard of five or six things – move this post to here. And so, I've been doing that for a while. The Texans came into existence...probably 13-14 years. Yeah, and so I was...and so the use of technology...it's technology use in a social sense, but the manipulations are pretty standard, they're pretty easy and standard. Mostly I'm looking for, I'm looking at peoples' behavior. I'm mostly looking at behavior issues.

His role as a moderator and his frequent use of technology suggest a high level of familiarity that is also evident in his digital literacy instruction.

Analysis of Mr. Scott's classroom observation sessions and interviews suggest his instruction includes each of Belshaw's 8 Elements of Digital Literacy through direct and indirect ways. His comments during the initial interview and the final interview indicate he is unaware of an inherent understanding of the skill. From the initial interview:

Barbara: ...What do you know about digital literacy?

Mr. Scott: Digital literacy. Not very much in the sense of the term, but what I think of is not just learning through technology, but through, how do we responsibly use it? Not just learning to, this is how you go get this piece of information, but what's the sense of, when I make a post on yahoo messenger, do I just follow the template of people making fun of someone, or do I actually make a worthwhile point and try to change the tone of discussion, and those sorts of decisions...or what do I, how do I learn what to post and what not to... what can be seen. Can we teach the children what, you know, if you post that, people can misinterpret who you are?

He claims to have limited knowledge of the term, yet his description includes six of the eight elements: cultural, cognitive, constructive, communicative, critical and civic. His comments during the final interview specifically address this disconnect between his teaching and what he thinks he understands.

Barbara: What have you learned about digital literacy instruction and interactive decision making as a result of participating in this study? So, you can handle one, or both, or however you want to respond. What have you learned?

Mr. Scott: Let me attempt to do them separately. So the digital literacy, at least what I, especially from today's context, is, I've sort of largely viewed that what I do is use the online work largely as just a textbook, and you know, I simplify it and just say, "Well, this is just a, it's how I use it as a textbook, the online stuff." But it's been, through this I've been shown the areas that I'm using various, I'm doing more with it than I think, than I thought I was. I just sort of did it. And because I'm an end-user type, I'm not a, I don't really, I don't think of myself as being very competent in it. I just think of, well I know how to get to what I need to use, and...solve minor technical problems in the classroom, that's what I, and that's more than, and so outside that, I just think of it as a textbook and a tool more than that. And this has shown me that there's probably more going on than I think it is by my previous, by my, by thinking through.

His synopsis that more is going on than he thinks is supported by the findings and excerpts from the data for each of the eight elements.

4.4.1.1 Cultural

The cultural element of digital literacy involves understanding the ways of using and interacting in different digital contexts. This skill is attained through immersion in many, diverse

digital environments. Some of the digital environments within Mr. Scott's classroom are in place because of the TAL's one-to-one and digital textbook environment. Each student has access to the Internet through an assigned Chromebook and schoolwide Wi-Fi. Delivery and submission of assignments, online discussion, and communication occur within Google Classroom. Mr. Scott's students begin each class by logging in to Google Classroom to complete the 1st 15 assignment. Students read articles and/or answer questions posted there at the beginning of each class and frequently are asked to reply to others' responses. These tools are the basic framework for Mr. Scott's instruction.

During the observation sessions Mr. Scott and the students connect to a variety of online sites. Two sites, Newsela and Quizlet, are a regular part of his instruction. Mr. Scott frequently assigns students articles to read on Newsela, as illustrated in the third observation.

Your bigger assignment for today is to read "Do You Want Fake Fries with That?" Write a 124 word paragraph on what is the main idea in the article. In addition, answer the quiz question, to be pulled from the activities section. This is Newsela. Remember Newsela?

Later in the same observation, Mr. Scott assigns a test in Quizlet.

Vocabulary. Quizlet. Sign in. Complete test. Remember. And it's the second time. Remember to sign in, this is intentional. Because if you don't sign in, for those of you who haven't signed in before, what happens?

As indicated in both excerpts, students are familiar with the platforms and understand how to operate and work within both. During data collection students also completed online MAPP testing from the Northwest Evaluation Association (NWEA). This is another digital context with which the students are familiar.

Analysis of all observation sessions indicates frequent use of other online resources. These include videos, state tourism sites, Urban Dictionary, Wikipedia, and the Google search

engine. Students connect to these resources to complete assignments or to find out information related to class discussions. Other technology mentioned during class conversations include CDs, cassettes, Virtual Reality, movies and music.

Students in Mr. Scott's classroom are immersed in a variety of digital contexts. Their familiarity with each one and their frequency of use suggest a strong understanding of the similarities and differences between environments. This familiarity is evident in the following excerpt.

Couple things, so [Student name], your classmates remember that it's formal class 'cause they keep reminding you for me. (chuckle) You got it. So, no text language. So, no short... no shorthand, because apparently your classmates are very aware.

Students are aware of the differences between text language and formal language. One student uses the letter "Y" instead of the word "why" in his 1st 15 discussion post. Other students correct him before Mr. Scott has a chance to point it out. Another example occurs when Mr. Scott shows a video as part of a lesson. When he stops the video, a student reminds him to "like" the video. Both incidents demonstrate student understanding of the various ways to work and behave in digital contexts. These examples and the presence of a variety of digital environments indicate the cultural element of digital literacy to be a major part of Mr. Scott's digital instruction.

4.4.1.2 Cognitive

The cognitive element of digital literacy is closely aligned with the cultural element. It focuses on using different ways of thinking to broaden one's mind in digital spaces. Like the cultural element, this skill is fostered through exposure and interaction in a variety of digital contexts. Since students in Mr. Scott's classes operate in many different platforms, it is more

likely that this element is also present. The cognitive element is not “taught”, however, unless instruction encourages and requires students to think freely. Mr. Scott does this through the questions he poses and the tasks he assigns. For example, the focus of many of the lessons during the observation sessions is argument. The 1st 15 questions, whole class discussions, and activities all lead to students writing an argument essay. He varies the activities for some classes, but each lesson and class discussion introduces or expands the students’ way of understanding an argument. The following excerpt from the first observation occurs when English III students finish writing about a family disagreement and share their responses with the class.

Student talking (sharing a family disagreement about a vacuum)

Mr. Scott: Your grandma’s vacuum? (chuckles) It’s a good vacuum.

Student talking

Mr. Scott: Okay, so it smells like a dead rat. Does it make the house smell like a dead rat, or...

Student: I would say yes. You’re supposed to clean it once you’re done.

Mr. Scott: That could be problematic! And is there any solution to the smell problem? Cause...

Student: It only smells, when you’re vacuuming it doesn’t smell, it only smells when you open it (unintelligible). If you let it sit for a while (unintelligible).

Mr. Scott: Okay. Okay, good. Any other problem, solutions, disagreements? I’m sorry, I forgot the last part. Was there a resolution? So, the resolution was, Mother pulled Mother-card? (laughter) So, it was Mother said, “No.” Okay. So, there wasn’t, it was a minor debate.

(other students share)

Mr. Scott: Okay. So, one of the things when we disagree, we generally have a problem, multiple points of view, and then some form of discussion. And discussion can be in

quotes, 'cause it may or may not be discussion. And then in some way we resolve it. In some kind of way, we have a resolution. Um, and so that's gonna be the format. ...So, what we're gonna do today is start thinking about how we transition from ... what do we do in the real world, looks like what we do in writing, versus what we do in an academic sense.

The questions Mr. Scott asks when students share their examples during the class discussion encourage them to think and to connect their thinking to the format of an argument. His response also acknowledges different lenses or ways of thinking about an argument: real world, writing, academic.

Another example occurs with the English II class during Mr. Scott's final observation session. It relates to the argument focus they have been working on, but it expands their thinking to a real world situation. Students must research their assigned state and write a proposal explaining why Mr. Scott and his wife should visit that state. The following dialogue illustrates Mr. Scott's instruction related to the cognitive element.

Mr. Scott: ... You can go first though. So, Florida, tell me, what do you have, [Student name]?

Student talking (seems to be reading a list that focuses on his experiences in Florida)

Mr. Scott: Go. Okay. Go. You got an alligator head. So, so, I have a question. So, is that the reason 5, I could get an alligator head, or is that... Oh okay. Go on. Go on.

Student talking

Mr. Scott: Better than here? That's not my experience but okay. So, for those of you who didn't get the hint: on the door, I graduated from Florida A&M University, so I've lived in Florida. Northern Florida, Tallahassee, which is almost South Georgia, but we're being more specific than that. So, that's why I hinted to him, so that's why he got one. So, research would know this, but I would argue that if we are doing actual research, your things, while good, didn't reflect research. These were like, Oh! Everybody likes Universal Studios. Oh! Everybody likes Disney World. You've already been there. These are, and none of these reasons, in the idea of argument, none of these are bad argument things, but they don't reflect the idea of research. Our

experience could be research, but if it's your ONLY, so when you write a research paper or if you're doing research, if your ONLY argument for something is your experience then, um, it falls apart. Yes. But it's still experience versus other stuff. 'Cause Florida is a big state. And the Mexican food, I'm gonna be, it might be a lot of Spanish-influence food, especially Cuban. So, that may be, I don't know if you are or not, but... so they may have one great Mexican restaurant in Florida, it's a big state. Okay. So, but this is, while I'm picking on [Student name], this is something that does happen in research. When people do research, whenever their experience is allowed, they ... only use their experience.

Mr. Scott challenges the student's focus only on personal experiences in Florida and explains why it does not provide strong support for an argument. The students are encouraged to expand their thinking by gathering research that advances their argument.

Both examples illustrate how Mr. Scott teaches students to use digital places to think and interact in ways that broaden their thinking. He provides a structure to guide thinking and creates tasks that allow students to freely explore the concepts and nuances of various contexts. His instruction fosters the cognitive element of digital literacy.

4.4.1.3 Constructive

The constructive element of digital literacy involves using content from digital sources to create something original. To do so, one must know how, why, and when the information can be used. Like the cultural and cognitive elements, it requires access to a variety of digital content. Instruction that promotes this element should include concepts that guide choice and use of information. Mr. Scott mentions this idea in his description of digital literacy presented earlier, "...but what I think of is not just learning through technology, but through, how do we responsibly use it?" His understanding and inclusion of this element is apparent in the data from his classroom instruction.

Findings from the analysis of the classroom observations and interviews suggest Mr. Scott cultivates the constructive element by requiring the use of digital information for assignments. For the state proposal paragraph mentioned earlier, students had to search online for information about their state. He discussed one concept to guide their choices when he explained the lack of value in personal experiences alone. In another class doing the same state research assignment, he reminds students to evaluate their sources.

No, be prepared to have your sources and research method questioned. So, this is basically, so the academic context is, my thought is, that research in general is something that we do often, and you're about to do your research. We're going to walk you through a research paper for the last two and half weeks of class. This is the idea that we use research and then how do we start to determine sources and what's useful information for us individually? So, that's sort of the practice that I want to engage in.

He mentions searching for sources that are relevant and useful, two important concepts to consider when evaluating a source. He also mentions a crucial aspect of using information, documentation.

Mr. Scott: Okay. Thank you. I have to ask very quickly. You had lots of information; where did you go for information?

Student talking (states that he got most information from a state tourism site)

Mr. Scott: Okay. Okay. So, yes. You probably would have had to; I would ask you to quote.

He elaborates on this interaction during the stimulated recall interview.

Oh, I was thinking that, although that, well actually both those students who wrote the really flowery, they're both capable of writing something close to that, but at some point, my mind went, "they didn't purely write that." ...I wanted to make sure to note that, if we were doing this for "real", ... you would have to acknowledge, that even paraphrasing ...you have to acknowledge even if you paraphrase.

Mr. Scott recognizes that the student was using content that needed to be cited and reminds him of that rule, even though he was just beginning his research.

In addition to creating assignments that require students to find and use other information, Mr. Scott also models the constructive element by using a variety of sources in original ways during lessons. For example, one of the 1st 15 discussion posts required students to justify the murder of an elderly woman based on a scenario from Dostoevsky's *Crime and Punishment*. He paraphrased the situation but gave credit to the original author. He also models this when he incorporates articles and videos into lessons, using only what is relevant.

These examples from the data illustrate the ways Mr. Scott encourages the constructive element of digital literacy. He requires students to use and evaluate sources for assignments and gives guidance on how, why, and when the information should be used. He also models the appropriate reuse of content in his lessons.

4.4.1.4 Confident

The confident element of digital literacy is apparent in the way a student approaches any digital environment. Digital content is ever changing and easily corrected, which allows the user to try with little fear of failure. This element is apparent in Mr. Scott's classes in the way students quickly search for information, work independently on assignments, and try to remedy problems with technology. During one session, the topic of college tuition came up. Several students began searching for average college costs.

Mr. Scott: Let's back up, how much is enough for 4 or 5 years of college? Let's go 5 years, be generous, and let you have a bad semester.

Student: 10 billion dollars

Students: Depends on which college you're going to.

Mr. Scott: Sure. But let's just say generically go to mid-level college, say...

Students talking

Mr. Scott: Yes. Yes. So, mid-level UTA-ish. Let's be nice.

Students talking

Student: It's about 35,000

Student: (unintelligible)

Mr. Scott: Let's take that number. Let's round it up, let's be generous, say \$100,000.

Student: A 4-year private is \$94,000

The students do not need to be told how to search or where to search, they just act.

That is the approach most often displayed when students are given an assignment in Mr. Scott's classroom. They did not ask where to look, or what to look for, they just try something. They do not act bothered when redirected to better sources and do not stop working when faced with a problem. The same, "Let's try..." attitude is also apparent when Mr. Scott or a student face a problem with technology.

Student: Well, considering I can't edit my response...

Mr. Scott: I'm sure that can be fixed in 30 seconds. You can time it.

Student: Okay good, 'cause I have a lot of grammar mistakes.

Mr. Scott: Yes.

Students talking

Mr. Scott: So, try again. That wasn't even 30 seconds. Okay.

Students talking

Mr. Scott: It should... be (unintelligible). You said you refreshed? It's saying yes. Let's see. Oh! This log in. Okay, I can still give you that. Yeah. I got you.

The student is not able to edit his work in Google docs, so Mr. Scott confidently says he can fix

it quickly, tries, and then tries again. Neither he nor the student express frustration or seem bothered by the issue. These behaviors suggest the confident element is being taught in Mr. Scott's classes.

4.4.1.5 Creative

The creative element of digital literacy is like the confident element in that both require a willingness to take a risk. In order to do new things in new ways, one must be willing to redefine and use technology to accomplish tasks typically seen as impossible. Of the eight elements, this one is the least apparent in Mr. Scott's instruction. The lack of occurrences may be related to Mr. Scott's own weaknesses in this area. After playing the video about argument essays, one student asks Mr. Scott to put the two frameworks side by side.

Mr. Scott: There is that, there, cause it's real easy to look, but it's not, the structure of your assignment follows this larger piece, this larger "why" piece that you just saw, right? Or do I need to, do we need to see them side by side?

Student: Can you put them up, side by side?

Mr. Scott: I don't know. That's a technical thing. But, I can, it would be easier if I do it in writing. I can write for you. How about, let me do that. (teacher moves to whiteboard and begins writing the two frameworks)

Mr. Scott decides to use the whiteboard instead of a digital tool to compare the two formats.

The student imagines the value in seeing the two examples side by side digitally, but Mr. Scott reverts to writing because it is easier for him. Later, during a follow up interview about a different event, Mr. Scott admits to not being comfortable with some aspects of technology.

...the decision was to, to not try to mess with the overhead, cause that's not my strength. My strength was doing it the way I did it, playing it, using it there and moving from it.

His hesitancy in both instances suggests a lack of understanding or familiarity for this aspect of

digital literacy.

One incident that does illustrate this skill occurs in the English II class as students are working on an assignment. Mr. Scott moves throughout the room checking students' progress. He comes to one student who is watching a movie instead of doing his work.

Student: I'm working on movie skills. I'm staying quiet.

Mr. Scott: Movie skills. Yes, you are. But is that, movies can be a text... but are you writing an argument paper over this....

Student: Now I will.

Mr. Scott: Now you will. Now that you've been... So, let me just take this at face value. What movie are you watching?

Student: *Dead Pool*.

Mr. Scott: *Dead Pool*. So what argument are you going to make about *Dead Pool*?

Student: So, in this movie, people can be considered a hero, even because some people would argue he is a villain, even though, in reality, he is an anti-hero, but...

Mr. Scott explains his thinking during this encounter in the stimulated recall interview.

Mr. Scott: Okay. That this is not unusual behavior for this student. And, trying to think, it's sort of "what can I turn this into?" Cause, and one of the other things, is this student, while very verbal, does struggle writing, does struggle taking that same verbal that he gave me, and putting it into this. And at some point, it became, "I can jump" and, as he said he was going to write about it, I think I can, I can jump this back to where, someplace I can go for the class at whole.

Barbara: So, you responded as you did because you could turn it into the lesson, you could use it.

Mr. Scott: Yeah. Yeah, but that was probably when I was into it at first, it was just acknowledging, "Ok, you know you're not supposed to be doing that." But then he turned it into an English discussion, I was able to, "Okay, we can continue down this road if you're going to..."

In this incident, Mr. Scott displays the flexibility needed to develop the creative element, yet

this is initiated by the student who can see how to use the movie to complete the assignment. Mr. Scott notes that he is following the student to improve his writing, even though it deviates from his original plan for the assignment. Mr. Scott plans lessons that foster many of the other elements yet does not require students to think outside the box. This suggests less emphasis on this element of digital literacy in his instruction.

4.4.1.6 Critical

The critical element of digital literacy is related to the communicative element in that it involves the words and symbols used to communicate. It examines the more implicit meanings and messages within digital sources and questions the power structures and assumptions within the text. Analysis of the data shows no specific activities when students are taught to critically examine digital text in Mr. Scott's classes; however, related concepts appear often. This occurs most frequently as a result of the questions and assignments Mr. Scott creates. Sometimes student-initiated comments lead to discussions about the implicit meaning of text. These incidents suggest Mr. Scott's instruction includes the critical element.

Evidence of the critical element in Mr. Scott's digital literacy instruction is seen in the thinking that occurs as a result of his assignments. During the second observation Mr. Scott assigns an argument essay to the English I class. The students must use the research they gathered about an animal for their Science class as support for their position. While describing the assignment, Mr. Scott mentions writing to your audience.

Your audience is teens, in other words your peers. So, that means if you are writing something, and you're tempted to write a bunch of high end scientific words, please don't. Use some to show knowledge, but if you write a paper that has "osmosis" is a good word. But if you write a paper that has, oh, in the first paragraph, has 12 words, 15 letters each, you are probably over writing for your audience. We will talk about

audience, we haven't talked much about audience, we'll talk more about it as you go.
How do you write for your audience?

The identification and understanding of audience in text is an important component of the critical lens. For this assignment, students must select facts that appeal to teens and that support their argument. They must also think about the words they use, as Mr. Scott specifically mentions. Mr. Scott also includes the concept of audience in the English III class as he discusses the state proposal assignment. He does not use the term, but he makes it part of the purpose for the proposal.

Using whatever research method you would like, write a paragraph linked proposal which highlights at least 5 reasons why [Mr. Scott] and his wife should visit this state. So, besides the fact that I want to stay in all 50 states, give me a reason... be prepared to have your sources and research method questioned. So, this is basically, so the academic context is, my thought is, that research in general is something that we do often, and you're about to do your research. We're going to walk you through a research paper for the last two and half weeks of class. This is the idea that we use research and then how do we start to determine sources and what's useful information for us individually?

As students search for information about their assigned state, they will critically evaluate words and symbols to determine what should be included in their proposal for Mr. Scott and his wife. The audience for this assignment influences the usefulness of information.

In addition to audience, other concepts related to the critical evaluation of text mentioned in Mr. Scott's classes include bias, power and censorship. Each term comes up during a class assignment, either directly in the assignment or indirectly in the discussion. During the first observation session, as students discuss their responses to the family disagreement prompt, various opposing views are mentioned. At one point a student brings up cat vs. dog and Mr. Scott uses this to point out speaker bias.

See, as a cat owner, I would argue that they're very interactive with you. ... So, you have inherent biases of what you like in animals. So, anytime we have a discussion with you, we have to consider you have a bias.

This discussion is not related to written text, yet it, like audience, is an important consideration when exercising a critical view in oral and written communication.

Toward the end of the same observation session, Mr. Scott mentions an assignment the students did not complete. This assignment directly addresses the power of those in authority and the assumptions made about written text.

Mr. Scott: On Friday I assigned the summary, write a 200 word summary response on the attached article, which is on censorship, specifically in high school papers. We don't, currently don't have a paper here, but when it returns at some point, Yeah, go on.

Student: We are actually working on that (unintelligible).

Mr. Scott: Okay. So, now we had about, the argument here of course is that certain topics and subjects are not appropriate for school. So, like in many schools, the idea that you would take, actually critique education, you know, in a classroom within a school, would be barred. Like what we just did, in some schools, would be considered inappropriate. For us to go, to question something, how the school's being ran.

Mr. Scott uses the article to teach students about the possible effects of power and judgement over others. This concept is mentioned again in the second observation. The same English II class is discussing their responses to the *Crime and Punishment* scenario. As students present reasons for murdering the old lady because she has no value to society, Mr. Scott asks who gets to determine if someone is useless to society.

Mr. Scott: ...Who's going to determine who's useless to society? Are you, individually, allowed to determine that?

Student: Society will. The ones in power.

Mr. Scott: Okay. So, but here an individual decided, right? He decided this old, isn't worth anything, I want to go to college.

Students talking

Mr. Scott: Why is murder morally wrong? We kind, directly, 'cause we've been around it. Why is murder morally, why is it wrong?

Student: 'Cause you're not supposed to kill people!

Student: Because we believe that people are valuable, no matter who they are, and shouldn't be killed.

Mr. Scott: So, people have value and

Student: What about someone (describes someone in a coma)

Mr. Scott: So, we, yeah. So, we can take, I want to avoid taking every situation cause there's rational and irrational extremes. There's a, we can take it to an irrational extreme, yes. ... Questions, comments? Before we go to taking, so one of the things that happened here is there was one argument made that it's okay to kill a person...

Students talking

Mr. Scott: Go on, yes but...

Student: (unintelligible)

Mr. Scott: The "but" part you're leaving out is the "yes, but" is the part that's going to fill in your paper; the part that you're not expressing now. So, I want you to be in the habit of expressing those. I want you to be in practice of expressing in that way. This is the idea of where you're going as students, now you're going from ability to just having an opinion to being able to elaborate on how you got to the opinion. That's literally, sort of, what this argument stuff is about. Like, literally, that's where we're headed.

Student: I think this, and that's it!

Students talking

Mr. Scott: Well, if you want to be relevant...do we have politicians who do what you're talking about though? But they're relevant because they set rules, we were just talking about, and they're part of the people who justify why we spend money, so they have some relevance, right? So, let me... Yeah, go on.

Student: The difference between them and us is they have power.

Mr. Scott: Why do that have power though?

Student: 'Cause people thought they should. People elected them and gave them power.

The discussion of power and power structures occur as a result of Mr. Scott's assignments.

These examples illustrate how the critical element of literacy is present directly and indirectly in Mr. Scott's instruction, even though students are not dealing directly with digital text in most situations.

4.4.1.7 Civic

The civic element of digital literacy uses the skills of the other elements to solve problems in society. One may acquire skills related to the communicative, confident, and critical elements but not use them to promote civic change. Digital literacy instruction that fosters this element requires a focus beyond personal problems and on ways technology can be used to influence change. Like the critical element, concepts related to the civic element are apparent in Mr. Scott's instruction, specifically the focus on problems or positions for the argument essay. Students, however, are not directly tasked with using digital tools to promote societal change.

Analysis of observational data indicates Mr. Scott incorporates concepts related to the civic element when asks students to identify a problem or present an argument and share solutions or support for a position. For example, during observation one, he reminds students to think beyond their personal views as they discuss the length of TAL's school day and school year.

Student: Because we're already losing a lot of our summer, plus I'll be stressed out. 'Cause one time we went to Utah and we're still gonna be, it's still gonna be during the school year. So we had to stress out and kind of do my work, and I won't be able to really have a lot of fun things to do, because I'm already not going to be able to do

anything at all, so I mean I'd like to be able to do something earlier, before I have to (unintelligible).

Mr. Scott: Okay. Okay. So, when we make an argument, even though we have personal, when we want to make an argument and we have a personal thing, cause a lot of you mention "I like", "I like", "I like". So, what about, can we make it a "we" problem and not just an "I" problem? Can we make it a problem of...?

Another example is evident in the *Crime and Punishment* scenario previously presented for the critical element. The students discuss global issues related to crime, punishment, power, and morality. Students recognize that those in power are elected by citizens, but do not move to ways they can influence society to remedy these problems. Mr. Scott's instruction encourages students to think beyond themselves and to identify problems in the school and the nation; however, data does not indicate instructional behaviors that require students to use technology to solve the problems they identify.

Overall, each of the eight elements of digital literacy are evident in Mr. Scott's classes through direct instruction or in more secondary ways as a result of the tasks he presents. Students are immersed in a variety of digital tools and platforms and encouraged to think, construct, and communicate in digital contexts. Student behaviors display little hesitancy to attempt tasks using digital tools. Data analysis produces less direct evidence for the creative, critical and civic elements. Concepts related to these areas appear incidentally.

4.4.2 Interactive Decision Making

Shavelson and Stern's (1981) model of teachers' decision making during interactive teaching (MTDMDIT) is used to analyze Mr. Scott's decisions during classroom instruction. Important components of the model include teacher routines, cues or dilemmas, teacher

responses, and teacher considerations for decisions. Results indicate these components are evident in Mr. Scott's classroom decisions.

A foundational part of the MTDMDIT are the teaching routines an instructor creates and uses. Mr. Scott begins every class with a 1st 15 question posted in Google Classroom. As students enter the classroom, they automatically log in and begin the activity. He directs students to the site and usually reads the prompt aloud as the students follow along on their laptops. As the students work, he checks their progress on his laptop and makes comments to individual students. When students finish, he asks students to share their responses as part of a class discussion related to the topic. Mr. Scott builds on the discussion and uses it to transition to the lesson. When he is confident the students understand the concept, he directs them to an assignment that they work on for the remainder of the class period. When the class period is almost over, he asks for, "Questions, comments, concerns?" and then dismisses students, often with a reminder to put chairs with desks, "One desk, one chair." This is the routine or mental script Mr. Scott seeks to maintain in his classes.

Events that disrupt Mr. Scott's script primarily involve students' questions, comments, actions, or facial expressions. Discussions are a consistent part of Mr. Scott's teaching routine, and students frequently ask questions or make comments that begin to veer away from the lesson's focus. Sometimes they continue to talk while Mr. Scott tries to provide instruction or direction for an assignment. Mr. Scott is also aware of students' facial expressions, "You have a thought, [Student name]? Your eyes are telling thought..." His explanation from the follow up interview provides more detail about the cues he observes.

Mr. Scott: The dilemma was we were having a general discussion. [Student name] is someone I like to try to bring into discussion cause he's a smart kid, but he's

disconnected. He's really disconnected from school right now. And so, in that moment, and he has moments like this where it's pretty obvious his brain is going, but he, I was hoping this was a day he felt like sharing.

Barbara: So, was, you saw a look. I mean you actually said you did. Describe that to me.

Mr. Scott: Well, you know, he had, the eyes were turned one direction or another, and there was some pondering going on. There was specifically, whether it was on topic thinking or not, he was in legit thought... It's obvious something is moving, is circling around, and I wanted to, and I was hoping to engage him.

Mr. Scott observes the student thinking and decides to ask for a response. He mentions seeing something in a student's eyes or expression as his reason for five different responses.

In addition to student dilemmas, other frequent cues involve problems with technology. Students may not have a device or may have issues logging in or connecting to the Internet. Mr. Scott addresses problems quickly as exemplified by this comment during observation one, "... Your computer doesn't like you. I'm going to sign you all the way out. Sometimes that helps. We'll try it." Technology issues are frequent, yet they do not disrupt the lesson. The other students work on assignments while Mr. Scott fixes the problem. During this class observation and others, students enter the classroom and immediately connect their laptops to an extension cord hanging from an outlet high on the wall. These behaviors suggest Mr. Scott has a routine for dealing with technology issues. He provides an extension cord, so students know what they need to do if their batteries are low. During the 1st 15 segment of the class routine, they share their issues and wait for his help. Technology issues are another frequent dilemma in his classes.

Other less frequent dilemmas involve environmental influences. One such dilemma occurs when a student notices a spider near him in the classroom, "... Okay. What do you, um, a

spider or spiders? Big, tiny? Is it...it's on the pillow? But it isn't, I need to send everybody out?

It's probably not a brown recluse." When the student mentions the spider, Mr. Scott responds.

Mr. Scott: The dilemma was the student was distracted by the spider.

Barbara: So, what were you thinking about as you were trying to figure out in that split moment, when you were trying to decide how to respond? The factors that you thought about.

Mr. Scott: Well, a couple things. If I didn't respond that particular student would fixate on it a lot, the whole class. Too much. So, it's better to address it and get it addressed... and I did want to make sure it wasn't an actual big enough spider to be a distraction to the other part of class. But my biggest, fixation was, with this student, if I just kind of blow off, "Don't worry about it, it's a spider," he's gonna worry about it. So, it's better to take a minute addressing it, whatever time frame that was."

Mr. Scott sees and hears the student focusing on the spider and decides to respond. These are some of the common events that disrupt the class routine and require a decision of tolerance.

In addition to routines and dilemmas, another part of the MTDMDIT is a teacher's response to cues. Mr. Scott's behaviors during observations and his explanations for those actions suggest he responds in ways that prioritize his students and learning. Both priorities are apparent during class discussions. He shares, "Generally, I like students, if students bring up something I'm not expecting, I'd rather hear it than not." He allows comments that may not be on topic because he values students and their thoughts, yet he will not allow them to go on and on. As students share, he often hurries them along and gets them back on topic by connecting their words with lesson terms. One incident that follows this pattern occurs in the first observation session. As part of the lesson, Mr. Scott asks the students if TAL has a lunch problem. The students' responses go in an unexpected way and take up more of the class period than Mr. Scott wants. Mr. Scott's comments during this discussion illustrate a typical response.

Mr. Scott: Okay. All right. Very quickly. Yes.

[The student continues talking in detail]

Mr. Scott: ...So, big picture, very good cause. One of the things we had, that may not occur when we write, is this idea of, we had continual back and forth of issues when someone made a counter proposal...So, you have multiple points of view, and you're able to list out, in this case, why cater lunch from outside. There were multiple reasons given, ... so that, we had a problem, and here are at least two points of view. And then for us in writing, discussion will be you...we have to anticipate the discussion, the discussion here anticipates, um, the problems. Expense, that's one that could probably be, expense. And yours was, publicity. ... So, you have to anticipate what the other side, and you can do that either with experience with the argument or just things that make common sense.... And then the last thing is, your resolution will be what you propose, proposed by you... So, this is the start. So, we see how easily this is done, right? This idea of argument paper in, this is how easily it's done.

Mr. Scott allows the discussion to continue but hurries it along and eventually connects it to the lesson topic. This response pattern is apparent during each observed class session.

Other responses evident in the data center around unacceptable student behavior.

Frequently, students continue talking when he is teaching or make inappropriate comments.

His way of responding to these situations is like his response when a student enters the classroom with a hamster mask on his head. Mr. Scott sees the mask but ignores it. When the student draws it to his attention, he acknowledges it but continues with the lesson. As class continues, Mr. Scott mentions it in different ways but does not ask the student to take it off.

Eventually, the student takes the mask off so he can work and share a comment. During his description of this incident, Mr. Scott explains his typical response to inappropriate student behavior.

Yeah. Just generally... I'm just trying to not make the mask the central issue of the class. So, by the first acknowledgement, okay, I've seen that you're doing it, thank you, let's go. The second one, acknowledging, calling him something else, yes, I'm still acknowledging it, and it's probably time to move on from it. And then the third, he's actually trying to actually engage in class... He can't be heard clearly, and so at that point

it's a more direct. And I would argue this is probably, when I think of my way of classroom, this is generally, especially things I want to acknowledge, but I don't want to slow class down and talk about the inappropriateness of masks for 10 minutes. ... So, the first, this would be a normal method for me, light hint. Second, joking/more serious hint like, okay you got the attention, let's... And the third, more directly, okay, this is interfering with class. And if it was truly bothering me, there would be a fourth, take the mask off, give it to me. We've had fun with it. This would generally, this was process of something that ilk. Where I'm trying to, "yeah, yeah, you're having fun with it" and I'm trying not to make this the central issue of class.

As he describes his thinking during this incident, Mr. Scott recognizes the typical steps he follows when responding to inappropriate student behavior. His responses become more direct until the behavior changes. This pattern of response, like his typical way of responding during class discussions, prioritizes students and learning.

Closely connected to Mr. Scott's responses to dilemmas are the factors he considers when making interactive decisions. These, too, focus on students and his mental script, the lesson. During stimulated recall interviews, he mentions student ability, needs, strengths, weaknesses, engagement, ideas, history, interest, personality, and previous behavior. The knowledge he has of his students impacts his decisions when faced with each dilemma. He also considers what he is trying to teach. He mentions the importance of the concept, the big picture, and time as reasons for addressing various cues that interrupt the lesson. For example, he addresses facial expressions to engage students and make connections. He does not directly confront the boy with a hamster mask on his head because he does not want to make it the central issue of the class and waste valuable time. When faced with a dilemma, he considers the individual needs of his students and their collective need to learn English content and concepts.

These examples from the data suggest common routines, cues, responses, and

considerations are evident in Mr. Scott's classes and are in line with the MTDMDIT. During the final interview we discuss what he has learned about interactive decision making. He points out that the study has increased his awareness of the number of decisions he makes each day. He refers to the MTDMDIT as a "loop chart" and describes his classes as a "constant loop". His plan to use this knowledge in the future is evident in his final comment about the model.

Right. Right. And so, that's a, the awareness of the amount of decisions that are made has been interesting to me just because it's, I don't know if it's helping slow down my mind, but it just makes me aware of decisions. Or, as I'm starting to plan for next year, of how many decisions, and in a good way, how many decisions can I pre-make. (Laughter.) How many of them can I pre-make? To have a more conscious idea that I can pre-make so that, when I do have to deal with things, you know, I'm not having to decide. Certain things I'm not having to decide.

What he describes is the underlying premise of the MTDMDIT. If teachers have established classroom routines and ways of handling issues, they exert less effort. His understanding of the concept has expanded and prompted him to add more routines to his instruction.

Analysis of the data regarding Mr. Scott's interactive decision making also includes his decision making style. Scoring of his responses on the GDMSQ yields the following: intuitive-25, rational-20, dependent-18, spontaneous-13, and avoidant-11. He describes himself as mostly intuitive with some rational hunches. He does not identify with the dependent or avoidant styles and relates to spontaneous decision making when he is frustrated. His highest score on the questionnaire, intuitive, is the maximum score and fits with his self-description. His actions within the classroom support these findings. During the stimulated recall interviews, he often pauses to stop and think about why he acted as he did. When he does, he typically has rational reasons, what he calls hunches, for his response. His actions seems to be by instinct, as it was during the incident with the boy wearing a hamster mask shared previously. He sees the mask,

acknowledges it in various ways without making it the center of focus, and the student ultimately takes it off on his own. Mr. Scott's actions often appear natural and support a strong intuitive decision making style.

In summary, Mr. Scott's interactive decision making style supports the MTDMDIT. His responses and considerations suggest students and his instructional plan to be his highest priority. He has established classroom instructional routines and response routines for addressing a variety of dilemmas. His strong intuitive style of decision making and these established routines produce decisions that appear fluid and natural.

4.4.3 Teaching Expertise

Further analysis of Mr. Scott's instructional practices, attitudes, and behavior using Berliner's (2004) stages of teaching expertise suggests he is an expert teacher with one occasional proficient characteristic. He has 15 years of teaching experience. The ease and fluidity of his instructional behaviors indicate an instinctive understanding of students and his content area. His responses are appropriate and solve the problem or answer the question. He is aware of his students' involvement in the lesson and their current needs. As mentioned previously, he notices their eyes, facial expressions, and behaviors. Mr. Scott operates in what Berliner describes as *arational* ways based on years of experience and a holistic view of teaching and learning.

Barbara: What are your beliefs about teaching and learning? You kind of hinted at some of them already, anything else?

Mr. Scott: My beliefs are that our goal is to, when we say prepare a student for life, is that we prepare the whole person, not that we just prepare them to go to another school. Because we find out that even someone who is a successful student in high school, we find out some of them get to college and that's not their thing, and then

some students who hate school in high school, as soon as they go to college they're like "I didn't know!" And it's because there's things that interfere, so we want to prepare them for this idea of both of them happening. And you can be successful even if the tracks look predictable, that you're not, school's not, was never your thing, there's still things that all of us have to face that we want to have the student's ready to face.

Barbara: So, what does that look like, as far as teaching; how do those things translate into your teaching from day to day?

Mr. Scott: What I hope happens is that if I bring up a subject, let's say if we're doing a research paper, which is a very "you're going to college and maybe graduate school" driven assignment, but how do I present, so what do I do for the students who think that they never want to go to college, ever? Is that "woah, you gonna buy a car one day, and guess what; you're going to use these same sorts of skills to go "this is a good car, this is a bad car". Or these are things that I've, like, you're gonna – I can trust this site, can't trust this site cause it's – you know – you looking at the site, you're doing the same sorts of things, you're just not writing it down on paper in some formulaic way. You're going through the same mental exercises.

His view of teaching and learning is holistic. It is more than instructing students about content.

The example he shares includes a content skill, but he views that skill as a life skill, beneficial to anyone.

Mr. Scott also demonstrates other qualities of an expert teacher. His instruction is student centered yet integrated with instructional goals. He connects student ideas and comments with lesson concepts. His willingness to follow student thinking also demonstrates his flexibility and adaptability to unplanned events. He also has established instructional routines and routines for handling inappropriate student behaviors. He takes attendance while students are working on the assignment. He calls each one by name and says, "Hello." He also has one word cues to address problems, such as, "phone" when he sees a student using a phone. His class structure is the same for every class period. These routines foster automaticity and contribute to the fluidity of his instruction. Each of these qualities support the description of Mr. Scott as an expert teacher.

In addition to these qualities, Mr. Scott occasionally displays one trait that falls more in the proficient stage of teaching expertise. Expert teachers act with ease and do not appear to be thinking as they act. The effectiveness of their actions and their years of experience foster self-confidence. It is apparent during the initial classroom observation that Mr. Scott is nervous. This decreases over time yet indicates a lower level of confidence than that of expert teachers. Some of Mr. Scott's comments also reveal a level of confidence more in line with proficient teachers. For example, during the third stimulated recall interview, he explains his thoughts and actions during a dilemma. He tells the class they will have time to work after he reviews safety procedures for a school shooter scenario. The students keep talking, and talking, so he goes to the corner and silently waits for them to stop. His priority is to review the procedures, so allowing time to pass affects the students' work time, not him. He makes the following comment at the end of our discussion.

Thank you for seeing through that, by the way. Cause I think it's one of those things, it makes sense to me when I'm doing it or in action, but I don't think, when I've been watched by other people, they didn't... well, you've seen me multiple times, though. When my other employers, when I walked in, if they would've seen me do something like that, I would have been not disciplining the classroom versus... Not here, but...

His comment suggests that his previous employers questioned his classroom management ability. As noted earlier, that teaching year was not positive and preceded his employment at TAL. His comment and initial nervousness suggest less confidence than that displayed by expert teachers, possibly due to this negative experience. Most of his actions and attitudes, however, align with those of an expert teacher and support his placement in that stage of teaching expertise. Table 4.4 summarizes these actions and his placement in the expert stage of teaching expertise.

Table 4.4

Classification of Mr. Scott's Stage of Teaching Expertise

Novice	Advanced Beginner	Competent	Proficient	Expert
No experience or limited experience	Some experience, 2 or 3 years	Approximately 3 to 4 years of experience	Approximately 5 to 7 years of experience	More than 5 to 7 years of experience (15 years)
Deliberate	Insightful	Rational	Intuitive (most prominent decision making style)	Arational (stops and thinks about why he acted as he did during stimulated recall interviews)
Understands common classroom terms and conditions and acts based on context-free rules	Building episodic and case knowledge to use for present situations	Make conscious choices about what they are going to do – set priorities and rational goals with sensible ways to achieve them	Intuition or know-how becomes obvious	Have an intuitive understanding of situations and sense the most appropriate way to respond (ex. student with mask; shy student)
Behavior is usually rational, relatively inflexible, and usually conforms to learned rules	Developing strategic knowledge - when to follow or break the rules they have learned.	Determine what is and what is not important as they teach	Experiential knowledge allows for more precise prediction of events	Have fluid and seemingly effortless performance (class structure, actions, routines)
Often fail to take full responsibility for their actions, lack personal agency	Context begins to guide behavior but may lack a sense of what is important	Learn to make curriculum and instruction decisions -when to stay on topic and when to move on and feel more responsible for what happens in their classrooms	Still likely to be logical and intentional in response decisions (initial nervousness and hesitancy to act during observations – statement of past criticisms)	Unconscious of choosing what to address and how to respond
	Often fail to take full responsibility for their actions, lack personal agency	Behaviors are not yet fast, fluid, or flexible		Do things that usually work (decisions and actions keep students on task and foster engagement in lesson)

Overall, Mr. Scott is an experienced teacher who displays characteristics suggestive of the expert stage of teaching. His confidence in his abilities, however, aligns more with the proficient stage. His focus on students and the lesson are evident in his responses to classroom dilemmas and what he considers when making decisions. His instructional routines enhance the flow of his instruction making it seem effortless. Each of the eight elements of digital literacy are apparent in Mr. Scott's instruction. The creative, critical, and civic elements appear as incidental, while the five others are substantial components of his classroom instruction.

4.5 Comparison of Cases

As stated in Chapter 3, two reasons for choosing multiple cases are to more deeply explore the phenomena and to strengthen any knowledge gained about their relationships. Analysis of the findings across the four cases reveals similarities and differences among cases in each phenomenon. As in each separate case, this cross case analysis is grounded in each of this study's three theoretical frameworks. Unexpected findings indirectly related to the areas of focus are included after the three phenomena.

4.5.1 Digital Literacy Instruction

A comparison of the findings related to each case's personal experiences with technology and each teacher's digital literacy instruction suggest varying degrees and ways of incorporating the eight elements. All four teachers use technology daily outside the classroom in ways unrelated to teaching. Mr. Taft describes using various platforms for three to four hours after school every day. Ms. Vaughan's personal use involves reading books on her Kindle. Mr. Fuller states that he relies on technology to learn and keep up with the world. He enjoys audio

books and uses YouTube and Google to find tutorials or information. Mr. Scott shares that he uses technology constantly to find news and information. He also serves as a moderator for an online message board. Technology is an integral part of each of their lives, yet two teachers express a desire to moderate their levels of use. Ms. Vaughan values her home time and limits her use of technology for work to a couple hours in the evening once or twice a week. Mr. Fuller shares a desire to not be, “too plugged in” and tries to balance his use of technology. All four cases use digital tools and platforms in their personal lives in various ways and levels.

Some of the eight elements of digital literacy explored in this study are evident in the digital literacy instruction of all four cases. TAL’s one-to-one structure, use of digital textbooks, and use of Google Classroom provide the foundation for the cultural element in each case. Students use these tools in every class and are familiar with how and when to operate in each context. Beyond this basic structure, each teacher exposes students to a variety of digital platforms. The type and number of these platforms varies between cases. Mr. Taft and Mr. Fuller include a greater number of digital contexts in their instruction such as videos, movies, etc. Ms. Vaughan primarily uses Khan Academy, Purple Math, and other math websites. Mr. Scott frequently uses Newsela. TAL students in all four classrooms are immersed in digital environments that foster the cultural element.

The cognitive and communicative elements of digital literacy are also apparent in data from every case. All four instructors encourage students to interact in digital contexts and think for themselves. Most communication occurs within the Google Classroom platform where students locate assignments, share ideas, submit completed work, and receive teacher feedback. Students demonstrate both these skills most often by searching for and sharing

information related to assignments or class discussions. Mr. Taft's and Mr. Fuller's lessons present a more diverse range of mental models and ways to interact in digital spaces. Some of these include the Zapruder film, a television show, YouTube, an online geographical mapping tool, and Disney movies. Each digital context presents information differently and requires unique ways of thinking and understanding. Students are exposed to various contexts, yet practical application of the communicative skill in public networks outside the school is absent from observational data.

A fourth element apparent in all four cases is the confident element. Support for this element lies in the way students work on assignments. They readily search for information and rarely show a hesitancy to respond in digital formats. Examples include Mr. Taft's students approaching him about doing their final a different way, and Ms. Vaughan's student working to write an algebraic expression by searching for the meaning of *quotient*. Two of Mr. Fuller's students figured out how both could respond in one digital document. Mr. Scott's students searched for state information without asking where to look or how to do the assignment. These behaviors indicate the confident element is apparent in the teaching of all four cases.

Evidence of the remaining four elements of digital literacy does not appear as consistently across cases. As stated previously, analysis of Ms. Vaughan's classroom observations reveals no occurrences of the constructive, creative, critical, or civic elements. Of these four, the most direct evidence available in data from the other three cases is the constructive element. All three instructors present lessons that require students to appropriately use content from a variety of sources. Students gather information, images, gifs,

memes, etc. and use what they have gathered to prepare original products in line with assignment criteria.

The creative, critical, and civic elements are less evident in the data and occur in more indirect or unintentional ways. Often, they are initiated by students as a secondary outcome of a lesson. The creative element appears in Mr. Taft's classroom data when a few students ask to do assignments in unique ways. Similar indirect occurrences are also evident in Mr. Fuller's classroom when the boys create a way to both do the assignment and in Mr. Scott's classroom when the student watching *Dead Pool* creates a way to use the movie for his argument essay. One exception to this pattern of indirect occurrence takes place when Mr. Fuller asks students to create a storyboard using images, gif, memes, etc. In this instance, the assignment specifies options and expectations that require students to use technology in creative ways.

A similar pattern of indirect occurrence is evident for the critical element. Mr. Taft and Mr. Scott discuss concepts related to critical reflection, such as power, audience, and bias; yet, do not ask the students to examine digital contexts to uncover these concepts. Two direct instances of instruction that builds the critical element occur in Mr. Taft's and Mr. Fuller's classrooms. Mr. Taft introduces the Poverty Project by asking students to critically evaluate digital images of three families from different parts of the world and to note 15 observations. Mr. Fuller's storyboard lesson that requires students to be creative also requires students to critically evaluate Disney movies to find sources of conflict, solutions, and evidence of transformation. These are the only direct instances of the critical element evident in the data.

Evidence of the eighth element also appears in mostly indirect events. Mr. Fuller focuses on world view and the impact it has on one's personal view. The lessons related to this concept,

however, do not ask the students to think about ways to use connections in digital contexts to promote change or, in this case, remedy the effects of negative world views on others. As well, Mr. Scott's focus on argument, an important part of the civic element, does not ask the students to include the use of technology as part of the resolution sections of their essays.

In summary, all four cases use technology in their personal lives in varying ways, with two recognizing the value of moderation. Findings support the inclusion of the cultural, cognitive, communicative, and confident elements in all four cases in various ways. The constructive element is evident in data from Mr. Taft, Mr. Fuller, and Mr. Scott but not in data related to Ms. Vaughan. The creative, critical, and civic elements are less apparent in the data for the three male participants and not at all for Ms. Vaughan. Findings suggest these three elements appear indirectly or as a secondary result of instruction. Two examples of direct critical and civic skill development are evident in Mr. Taft's data, and two direct examples of the creative and critical elements are evident in Mr. Fuller's data.

4.5.2 Interactive Decision Making

Examination of the findings across all four cases reveals similar and dissimilar qualities of decision making. The decision making of all four teachers follows the MTDMDIT. Observations in every classroom indicate each teacher seeks to follow a mental script and meet student needs. In addition to thinking about the script, all instructors consider their knowledge of a student: abilities, personality, patterns of behavior, etc. The cases also encounter common dilemmas. The cues that prompt interactive decision making in every classroom involve technology issues, student questions, students off task, and environmental issues. The cases also share similar decision making styles. Rational and intuitive are the two primary styles of all

four teachers, and all indicate moderate levels of the dependent style.

Differences also appear when analyzing across the four cases. Although the two primary decision making styles of all cases are rational and intuitive, the strength of these two vary. Mr. Scott and Mr. Fuller score highest in the intuitive style with rational scores slightly less, while Ms. Vaughan's intuitive and rational scores are equal. Mr. Taft scores highest in the rational style with an intuitive score slightly lower. The most apparent differences are evident in their scores and instructional behaviors for the spontaneous and avoidant decision making styles. GDMSQ scores in both styles vary only slightly across cases and rate spontaneous higher for each one. Differences are most apparent in their actions as they teach. Mr. Taft and Ms. Vaughan display both styles during classroom observations, whereas these styles are less frequent or nonexistent during observations of Mr. Fuller's and Mr. Scott's instruction.

Additional differences across cases involve their responses to dilemmas. Mr. Fuller and Mr. Scott most often address each dilemma in some way. Mr. Taft and Ms. Vaughan typically ignore dilemma's involving student behavior, until it escalates and disrupts other students or class instruction. A similar difference between cases is evidence of established routines. Although they vary, the basic structure of each teacher's classroom is very apparent. Some cases, however, exhibit routines for dealing with dilemmas, whereas other cases' responses are less consistent. During an interview Mr. Scott delineates his typical response to student behaviors like the hamster mask incident, and his behaviors confirm this routine. Mr. Fuller's initial response is to predict and eliminate behaviors before they happen, such as occurs with the two boys without computers who often distract themselves and others from the assigned task. Mr. Taft's responses to dilemmas related to student behaviors are not consistent enough

to suggest a pattern. He ignores, comments, or redirects, and sometimes gradually raises his voice and becomes firmer in his commands. Ms. Vaughan's responses are like Mr. Taft's, but she ignores and reaches the point of raising her voice more frequently.

Another difference in routines between cases is apparent when each one faces a technology dilemma. When the problem is related to connectivity, each one works on the student's laptop to correct the issue. If this fails or the student does not have a laptop, Ms. Vaughan tells the student to sit quietly so others can work. Mr. Taft usually lets the student use one of his devices, sends them to get a loaner from Dr. Krause, or tells them to use their phones. In one instance when the students cannot borrow a laptop from Dr. Krause, Mr. Taft does not know what to do, and he simply tells the student, "I don't know." When students do not have a laptop in Mr. Fuller's classes, he lets them use his device, borrows one from another class, asks them to pair up with someone who has a laptop, tells them to use their phone, or has them to work on paper, if the task can be completed that way. In contrast to the other three cases, Mr. Scott's classroom observations indicate only two instances of a student not being able to connect to the Wi Fi and no occasions when students do not have a laptop.

4.5.3 Teaching Expertise

Analysis across cases regarding teaching expertise reveals common and unique discoveries. Most apparent in the data is every teacher possesses much knowledge about their students and cares about each one. Their behaviors in the classroom and their comments during interviews suggest all are beyond the teacher- or self-centered stage of teaching. In addition, each teacher exhibits characteristics and behaviors in at least two stages of teaching

expertise. All four cases also agree with their expertise stage placement from my preliminary case summary.

Findings unique to one or more cases are associated primarily with differences between the stages of teaching expertise. Ms. Vaughan is a new teacher with several years of varied non-teaching experiences at a local college. Mr. Taft and Mr. Fuller both have less than three years of experience in the classroom, but each one has a variety of experiences outside the classroom. Mr. Scott has more than 15 years of teaching experience at secondary and collegiate levels. His experiences with students outside the classroom occurred in his early 20s when he worked with preteens and teens in his local church for about three years. One assumption of this study is that participants will have varied levels of experience. Data support this assumption.

Another aspect of teaching expertise that varies across cases is their professional qualifications. All four cases have at least one degree. Mr. Fuller has a bachelor's degree. Ms. Vaughan has a bachelor's degree and a master's degree. Mr. Taft has a bachelor's degree and a master's degree. Mr. Scott has a bachelor's degree, master's degree and has completed all doctoral level coursework for a Ph.D. All instructors, except Ms. Vaughan, hold Texas teacher certifications. Mr. Taft and Mr. Scott are certified in the content they currently teach. Mr. Fuller is certified to teach music, but is not certified to teach Health, the content area for all his observation sessions.

These differences in teaching experience, outside experiences with students, and professional degrees and certifications are only some of the traits that determine teaching expertise. As indicated by data analysis, their instructional behaviors support varied stages of

expertise. Ms. Vaughan consistently displays qualities of advanced beginner and competent teachers, though years of teaching experience align with the novice level. Mr. Taft's instructional behaviors fit best with the qualities of competent teachers, though some occasional behaviors, predicting events and acting intuitively, are indicative of proficient teachers. These levels are more advanced than his years of experience suggest. Mr. Fuller's classroom experience fits in the advanced beginner stage, yet his teaching behavior fits mostly in the proficient stage with some qualities of competent and expert teachers. Mr. Scott's years of experience and classroom teaching behaviors position him firmly in the expert stage; however, he occasionally demonstrates a quality of proficient teachers. The varied levels of experience and expertise across cases highlight the most apparent differences between cases.

4.6 Unexpected Findings

In addition to the findings rendered through analysis of each case and across cases, some unexpected patterns are evident in secondary ways, not directly related to the three theoretical frameworks. These unexpected outcomes provide further insight into the phenomena. Some relate to incidental comments during interviews, and others occur unexpectedly throughout the observation sessions.

One shared background for all four cases is a negative educational experience. Each case describes the experience and its effects during the initial interview. Ms. Vaughan dropped out of high school halfway through her junior year due to a horrible experience with her orchestra teacher. She hated school, dropped out, earned her GED and enrolled in college, then fell in love with it. Mr. Taft, Mr. Fuller, and Mr. Scott had similar experiences in education but as teachers, not students. Mr. Taft's first year of teaching ended in the middle of the year after

trying to teach in a large school district with large class sizes. He resigned and worked on his master's degree. He wanted to get out of teaching but "kept being drawn back to teaching." Mr. Fuller's first year of teaching also ended halfway through the year. After breaking up a student fight, he was put on leave and decided to resign due to a lack of administrative communication and support. His passion for working with children eventually led him to TAL. Mr. Scott says his teaching experience prior to TAL "didn't go as well as I'd hoped." He does not describe the experience in detail but expresses appreciation for my understanding of his teaching methods compared to previous administrators. This common negative history in educational settings is unexpected and interesting.

Another unexpected finding related to each teacher's decision making and expertise occurs due to the size of TAL. Class size is limited, and there is only one class for each grade level. When I decided to schedule my observation sessions so every class for each teacher was included, I did not foresee the added perspective this provides. Observational data captures the same students in each teacher's classroom at least one time, particularly students who create dilemmas. This highlights the differences in how each teacher responds to these students. Even though the students are not named, I observed that some teachers' decide to stop student misbehaviors and while others do not.

One observational session with Mr. Scott also provided impromptu comments from students after I was introduced to the class and explained my purpose for being there. As we discussed digital literacy, one student shared his assessment of Mr. Scott's instruction.

I've just found that, particularly, like what Mr. [Scott] has done in instituting at least an outline or schedule of sorts, fourth period, that helps to control the use of technology during that time and allow the maximum benefit to be able to use it as a device and

research and have more accomplishment, and being able to have good class discussion and interconnectivity with my classmates.

His unsolicited comment notes Mr. Scott's class routine and two of the eight elements of digital literacy, cognitive and communicative. I did not know it at the time, but my findings confirm his assessment.

Two additional unexpected findings involve my position as a nonparticipant observer in the classrooms. My field notes indicate my frustration when technology issues prevent learning, repeatedly. I did not make verbal comments but jotted down possible questions and solutions for this ongoing problem. I understand more fully the effect this has on instruction because I observed it so often and saw firsthand how much time it takes. I also noted my frustration when students misbehaved and continued to do so despite a teacher's response. My teaching experience provides me with many ideas of how to respond, yet I only made notes and remained a nonparticipant observer. This frustration at student misbehavior is not recorded in my field notes for every case. Each of these unexpected findings indirectly confirm other findings in ways that are discussed in Chapter 5.

4.7 Summary of Findings

Data analysis of each case and a comparison of cases revealed similarities and differences in digital literacy instruction, interactive decision making, and teaching expertise. Table 4.5 summarizes findings. All cases frequently use technology in their personal lives and included four of the elements in their instruction. Differences were evident in the way elements are used and in the frequency of use for more complex elements. Each teachers' interactive decision making aligned with the MTDMDIT and included dilemmas and considerations in

common with the other teachers. The two primary decision making styles of all teachers were the same but varied in prominence. The varied use of routines and responses to misbehaviors and technology revealed differences in teachers' decision making. All four cases displayed characteristics of two or more stages of teaching expertise, had varied experiences with students outside the classroom, and earned varying degrees and qualifications. All four teachers knew their students well and cared for their students. Unexpected findings across cases and in data provided additional understanding that supports some outcomes. Chapter 5 discussion connects the findings with the research questions of this study and connects them to existing research. Recommendations related to the findings are made for teachers, student learning, administrators, teacher preparation institutions, and future research.

Table 4.5

Summary of Findings

	Mr. Taft	Ms. Vaughan	Mr. Fuller	Mr. Scott
Age	27	45	29	51
Experience	2 years	4 months	1 year	15 years
Education	Master's	Master's	Bachelor's	ABD
State Certification	yes	no	yes	yes
Experience with students outside the classroom	some	some	strong	limited
Stage of Teaching Expertise	Competent to Proficient	Advanced Beginner to Competent	Proficient with some Competent and Expert	Expert with some Competent
Decision Making Style	Rational Intuitive Spontaneous Avoidant	Rational Intuitive Dependent Spontaneous Avoidant	Intuitive Rational Dependent	Intuitive Rational Dependent
Routines	some	few	established	established
Interactive Decision Making	Follows model (students, lesson)	Follows model (students, work/break routine)	Follows model (students, lesson, personal responsibility)	Follows model (students, lesson)
Personal Use of Technology	Daily	Daily	Daily	Daily
Evidence of Elements of Digital Literacy	Cultural	Strong	Strong	Strong
	Cognitive	Strong	Strong	Strong
	Constructive	Strong	None	Strong

(table continues)

		Mr. Taft	Ms. Vaughan	Mr. Fuller	Mr. Scott
	Communicative	Strong	Strong	Strong	Strong
	Confident	Strong	Strong	Strong	Strong
	Creative	Indirect	None	Limited	Indirect
	Critical	Limited	None	Limited	Indirect
	Civic	Indirect	None	Indirect	Indirect
Educational Experiences		Resigned midyear	Dropped out of high school	Resigned midyear	Previous position
Success of Student Behavior Management		Limited	Poor	Effective	Effective

CHAPTER 5

DISCUSSION

This multiple case study examined the digital literacy instruction and interactive decision making characteristics of teachers with varied levels of expertise. Its purpose contributes to the broader goals of expanding knowledge in these three relatively new fields of research and of exploring possible relationships among these phenomena. The qualitative design ensured data collected through surveys, questionnaires, observations, and interviews represents the natural setting for all three phenomena, a classroom. Multiple cases increased understanding and transferability to similar contexts. This study addressed the following questions:

1. What components of digital literacy are teachers including in their instruction?
2. What is the nature of the interactive decision making of teachers with varying levels of expertise during digital literacy instruction?

A discussion of findings is presented regarding each question, followed by recommendations for teachers, student learning, administrators, teacher preparation institutions, and future research along with limitations of this study.

5.1 Discussion of Findings: Research Question 1

Research Question 1 examined which components of digital literacy teachers include in their instruction. Data analysis using Belshaw's 8 elements of digital literacy revealed variations in frequency of the elements across the four cases with some commonalities. All four participants taught in ways that promote the cultural, cognitive, communicative, and confident elements. Three of the commonalities may stem from the digital structure of TAL. All students are issued Chromebooks, and teachers and students used the same learning platform, Google

Classroom. This structure provided a common foundation for the cultural, cognitive, and communicative elements. Mr. Taft and Mr. Fuller used a greater variety of digital platforms, so the cultural and cognitive elements appeared more frequently in their instruction than in the other two cases' classrooms. The communicative element was apparent primarily in the use of Google Classroom. Teachers distributed assignments, collected student work, recorded grades, and communicated via email in this platform. Mr. Taft and Mr. Scott also used the discussion feature as a regular part of their instruction. Analysis revealed students communicated in TAL's digital network, but lessons did not require students to communicate in public networks outside the school. The cognitive element was also apparent across cases confirming Bali's (2016) observation that this element takes time to develop. Students used digital devices every school day for most of the day. By the end of the school year, when data was collected, one would expect to see strong evidence of this element across cases if Bali's premise is correct.

In addition to these commonalities, analysis revealed greater variations in the presence of the constructive, creative, critical, and civic elements. The use of Khan Academy as the primary platform for instruction in Ms. Vaughan's math classes may limit opportunities for teaching these four elements. Students used outside information from math websites but did not create original work, do new things in new ways, reflect on power structures, or connect with others to promote societal change. In contrast, analysis revealed instruction that includes the constructive element in each of the other three classrooms and some limited evidence of the remaining three elements. The support for the creative, critical, and civic elements appeared more indirectly which agrees with findings in Kurtz and Peled (2016) that more complex thinking skills are known but not proactively used in digital contexts and in Porat et al.

(2018) that the biggest gap between students' perceived competencies and actual skill performance is in social emotional skills. Social emotional skills share common behaviors with the creative, critical, and civic elements and require complex thinking. Instructional episodes involving the civic element often included references by teachers or students to TAL's Habits of the Heart for Community. The school's community-minded focus may have indirectly contributed to the presence of this element in the data. Findings across cases indicated direct instruction in these three elements was less frequent, often unintentional, and sometimes initiated by students.

The occurrence and variation in frequency of all eight elements in the findings confirm Belshaw's (2012) premise that some elements are acquired through immersion in many varied digital environments. The excerpts from classroom observations for each teacher indicate that students, in varying degrees, are acquiring digital literacy skills. Their actions and comments demonstrated a familiarity with many digital contexts (cultural). They used digital platforms and tools to think (cognitive), received and responded to information (communicative), and prepared original work products (constructive and creative). They did not hesitate to use these digital skills, and some thought of unique ways to complete an assignment (confident). The immersion in digital environments, with intentional or unintentional instruction, unlocks digital literacy and fosters student learning.

The findings also strengthen Belshaw's (2012) idea that the elements are related and often overlap in a matrix that provides flexibility and practical adaptation to various contexts. This quality of digital literacy was noticeable during coding. As I reviewed the data to code evidence of each element, I quickly realized almost all extracts of digital literacy instruction

include more than one element. This also supports Chase and Laufenberg's (2011) description of digital literacy's complex and ambiguous nature as "squishiness." Overall, analysis revealed some of the eight elements were evident directly during instruction and others appeared incidentally or in less purposeful ways.

Over and above the finding related to the elements of digital literacy being taught, the current study adds to existing research on digital literacy in three categories: theoretical frameworks, technology support, and digital literacy instruction. As stated in Chapter 1, Belshaw's framework of digital literacy combines aspects of other frameworks to ensure practical use and flexibility in a variety of settings. It was designed to be useful for teachers and findings support these intentions. The lack of purposeful instruction in the more complex elements clarifies the importance of a broader view of digital literacy and the need for instructional frameworks. If other frameworks were used for analysis, the outcomes may not have revealed the lack of instruction for complex skills. For example, Martin and Gudezski's (2006) Levels of Digital Literacy includes more sociocultural components than other skills-based frameworks, yet it does not include Belshaw's critical and civic elements. In addition, their framework does not consider the innovation and creativity of Level III Digital Transformation to be skills necessary for digital literacy. Outcomes of this study suggest Belshaw's framework provides a more rigorous standard for digital literacy instruction and competence than other frameworks to date.

Furthermore, analysis of data also added to research emphasizing the importance of technology support. Findings revealed many dilemmas involving problems with technology and the effects of these problems on instruction. Belshaw (2012) emphasizes the importance of

exposure for the cultural and cognitive elements and how these elements contribute to other elements. Problems with technology limit this exposure and hinder the development of digital literacy. This confirms findings in Bingimlas (2009) and Inan and Lowther (2010) of the importance of technology support to increase instructional use and integration. Teachers were able to solve some problems, but the lack of outside support prevented students from learning and completing assignments.

This study's findings also contribute to research related to digital literacy instruction. Analysis of data revealed wide use of technology for gaming and social connections outside school but limited transfer of skills for educational purposes. This supports the gap found in Kumar and Vigil (2011) between preservice teachers' personal use and educational use of technology and confirms Lindstrom and Niederhauser's (2016) recommendation that teachers model the use of out-of-school practices within educational settings. Findings also revealed a lack of direct instruction in some components of digital literacy. This agrees with Levy's (2018a) emphasis on the importance of *how* technology is used. Outcomes also support Hagerman and Spires's (2017) synthesis of studies which found digital literacy instruction primarily required students to consume, create, and communicate. The variation in findings related to subject area support Koehler and Mishra's (2009) identification of a need for teachers to develop technology, pedagogy, and content knowledge (TPACK) in order to effectively teach with technology and, more recently, findings in Reed (2017) of high school English teachers and Watson (2019) of post-16 mathematics classrooms.

5.2 Discussion of Findings: Research Question 2

Research Question 2 examined the nature of the interactive decision making of the

teachers during digital literacy instruction. Findings were generated by analysis using Shavelson and Stern's (1981) model of teachers' decision making during interactive teaching and Berliner's (1994) stages of teaching expertise and then compared to Belshaw's eight elements of digital literacy. Findings presented in Chapter 4 suggested similarities and differences in line with Shavelson and Stern's model and variations associated with teaching expertise and digital literacy instruction. Unexpected findings are also discussed as they relate to each area.

Outcomes related to the MTDMDIT indicated common interactive decision making behaviors. Transcripts show that all four teachers seek to maintain a mental script and meet student needs. Common dilemmas included student comments or misbehaviors, technology problems, and environmental issues. This supports findings in Johnson (1992) that preservice ESL teachers act to maintain instructional flow and address unexpected student responses. When faced with a dilemma, all participants considered the lesson and their knowledge of the student before deciding on an action. These outcomes agree, in part, with the four underlying reasons for teachers' interactive decisions as presented in Li (2017). The current study's findings support two of the four reasons Li presents, unexpected or dispreferred learner contributions and potential learning opportunities. Study data, however, provided no evidence of decisions made based on task appropriateness or insufficient teacher knowledge. These two reasons were not reported by teachers as considerations for their interactive decisions. Finally, another common quality of the nature of the four teachers' interactive decision making was their primary decision making styles. Their instructional behaviors and self-assessment ratings demonstrated the same top two decision making styles, rational and intuitive. This supports Shavelson and Stern's (1981) assumption that, "teachers are rational professionals," (p.456)

and extends their description of the focus of interactive teaching to be, “smooth implementation,” (p.462). Rational thought is essential to the MTDMDIT. When presented with dilemmas, teachers considered relevant information about the students, the lesson, the context, etc. and used the information to make a decision that supports the lesson. Smooth implementation of a lesson while teaching occurred when routines were used to address dilemmas. As Shavelson and Stern note, “Routines minimize conscious decision making during interactive decisions,” (1981, p.482). When teachers acted with little conscious thought, intuitively using establish routines to deal with dilemmas, the lesson proceeded smoothly. This may explain why all four teachers shared the intuitive and rational decision making styles.

In addition to these similarities, outcomes also suggested differences related to the MTDMDIT. The routines and responses of each teacher indicated variations in their interactive decision making. Although each teacher’s classroom routine varied in some way from the others’, the foundational structure of all four classrooms promoted teaching and learning. The differences in routines and responses was most apparent when dilemmas occurred related to student misbehavior. These differences were highlighted because I unexpectedly observed the same students misbehave in each teacher’s class. The teachers handled the misbehaviors differently and some responses were more effective than others. Ms. Vaughan and Mr. Taft did not have routines that ended the behavior and had more frequent dilemmas of this type in their classrooms. Their responses to inappropriate student behaviors were more reactive, which supports findings in Shavelson and Stern (1981) that the lack of a routine usually leads to a reactive response. Likewise, their reactive responses involved behaviors such as ignoring and raising their voices, indicators of the spontaneous and avoidant decision making styles. On the

other hand, Mr. Fuller and Mr. Scott rarely displayed these styles. Mr. Fuller proactively worked to diminish opportunities for unwanted student behaviors and reminded students to be responsible for their own work and learning when any misbehavior did occur. Mr. Scott displayed and described his typical routine for dealing with unwelcome student behaviors and had the fewest dilemmas of this type. Mr. Fuller and Mr. Scott quickly and effectively made decisions with little effort. These findings support the importance of established strategies (routines) as presented in Byra and Sherman (1993), Leinhardt and Greeno (1986), and Shavelson and Stern (1981). The effortless and intuitive use of routines by Mr. Fuller and Mr. Scott align with the smooth implementation mentioned by Shavelson and Stern (1981) and the swift decision making described in Li (2020). Overall, the similarities and differences of the findings corroborated the MTDMDIT.

Research Question 2 included the examination of findings to discover any possible relationships between interactive decision making, teaching expertise, and digital literacy instruction. The first indication of possible relationships occurred during the analysis of observational data. During data collection, I listened to recordings multiple times focusing on dilemmas and interactive decisions. After reading the transcripts for accuracy, I began reading to assign codes according to each framework. It was very difficult to keep focused on only one framework as I read. Portions of each transcript included overlapping components of all three frameworks. This overlap led to the multiple focused readings and highlighting explained in Chapter 3. The possible relationships of teaching expertise and digital literacy instruction to interactive decision making became more evident during the comparison of cases. These

possible connections include variations related to teaching expertise and variations related to digital literacy instruction.

The variations in findings related to teaching expertise center around Berliner's basic statement that, "Experts do things that usually work," (1994, p.17). Findings indicated Mr. Fuller and Mr. Scott displayed characteristics most aligned with the proficient and expert stages of teaching, respectively. The interactive decisions they made worked, especially for dilemmas related to inappropriate student behaviors. They received the highest scores for the intuitive decision making style, which supports Berliner's description of proficient teachers. Mr. Scott's intuitive behaviors, however, involved a fluidity that elevated him to the expert stage, what Berliner describes as *arational* behavior. The intuitive nature of their instruction also aligned with their more frequent use of routines. Analysis of their behavior supports findings in Munoz et al (2013) that more effective teachers consider classroom management and organization to be the primary quality of effective teachers. This characteristic was unexpectedly confirmed by one student when he credited Mr. Scott's classroom routines and organization for maximizing learning, discussion, and student interconnectivity. Outcomes for Mr. Fuller and Mr. Scott also support Schön's (1983) description of "double vision." Both teachers continually processed cues from students and acted in ways that influenced current learning as they stored away information for future decisions. In contrast, findings suggest that Mr. Taft and Ms. Vaughan exhibited behaviors characteristic of lower levels of expertise. What they did *sometimes* worked. Analysis of their responses to ongoing inappropriate student behaviors confirm findings in Glock and Kleen (2018) that preservice (less experienced) teachers' responses to minor student behavior are harsher than responses of inservice (more experienced) teachers.

Both teachers initially ignored or used nonverbal responses, which suggests some experience. Their lack of expertise became evident when the behaviors continued, and they used harsher and louder tones to address the behavior. During one incident Ms. Vaughan assigned silent lunch to a student who was playing a game in class and not doing his work. She also threatened to assign talkative students to Saturday School, if they continued disrupting the class. These findings are indicative of lower levels of teaching expertise.

In addition, findings of each teacher's stage of teaching expertise support Kuhlmann and Ardichvili's (2015) claim that expertise is acquired over many years of practice. Mr. Scott's years of teaching experience aligned with his classification as an expert teacher. The other three teachers, however, exhibited teaching behaviors in higher stages of expertise than their years of teaching experience indicated. The experiences of all three teachers outside the classroom may explain this difference. Ms. Vaughan's unique experiences as an online learner and coursework in instructional design for online learning provide a level of expertise well suited for the independent learning structure of Khan Academy. These characteristics along with Ms. Vaughan's work with teenagers and college learners of all ages may have provided her with knowledge about students, how they think and their common behaviors. Her tasks during that time included some instances of being in front of students to share information. These experiences may have provided knowledge that advanced her level of expertise. The same is true of Mr. Taft and Mr. Fuller. Mr. Taft worked with students in various capacities in addition to his years in the classroom. Mr. Fuller had more years of experience outside of teaching than Ms. Vaughan or Mr. Taft, and many of these experiences positioned him as a teacher responsible for leading and managing students. Outcomes also indicated that each teacher

knows much about their students and uses this knowledge to address dilemmas during instruction. Barrow (2006) and Li (2020) emphasize that effective teachers use their knowledge of students to accommodate needs, foster interest, adjust instruction, and increase success. Their knowledge of their students and their experiences outside the classroom may contribute to their higher stages of expertise.

Other outcomes related to teaching expertise involved two unexpected findings. One unexpected finding across all four cases was a negative educational experience. Despite these experiences, the teachers still worked in education. Findings indicated all four moved past the negative experience and found an educational environment better suited to their interests and abilities. This suggests resilience, in some unidentified way, may contribute to teaching expertise. As in Cochran-Smith (2005) and Munoz et al (2013), the unknown behaviors and characteristics of effective teachers are referred to as the black box of teacher quality. This idea of a black box was also revealed unexpectedly during analysis of my field notes. My reactions during observation sessions support the idea of a black box. As a teacher with more than 13 years of experience in elementary to college classrooms, my thoughts were filled with a variety of strategies for addressing the dilemmas I observed. Somehow, without knowing the students, I was aware of several options for stopping the inappropriate behaviors. As a nonparticipant observer, I could not act on these thoughts, but I noted them and expressed my frustration. This occurred most often in the classrooms of the less experienced teachers and confirmed other findings for interactive decision making associated with routines and seamless instruction.

Variations of findings related to digital literacy instruction involved the impact of

technology on teachers' interactive decision making and the use of the eight elements in each classroom. The one-to-one nature of TAL provided more opportunities to develop digital literacy but also increased the number of dilemmas during instruction. Overall, teachers were able to address most power and connection issues and were unable to solve hardware problems with laptops, routers, or servers. The presence of technology also allowed teachers to quickly assess student understanding and provide immediate feedback or redirection, further increasing the number of interactive decisions and highlighting more ineffective responses. Technology affected the frequency and type of teachers' interactive decisions which adds to the findings in Li's (2017) study mentioned previously. Technology is not one of the four reasons listed for teachers' interactive decision making, yet the classrooms in Li's study are not one-to-one. This difference in settings suggests technology may affect teachers' interactive decisions.

Other variations in the findings related to digital literacy include the prevalence and use of the eight elements. Mr. Taft and Mr. Fuller, the two youngest teachers, used a greater variety of digital platforms during instruction and were more intentional in their inclusion of the elements than Mr. Scott or Ms. Vaughan. As previously mentioned, the lack of elements in Ms. Vaughan's classes may be attributed to the use of Khan Academy for math instruction. Mr. Scott's less intentional use of the elements may support findings in Hobbs and Tuzel (2017) of significant association between teachers' use of technology and subject area, specifically language arts teachers. Mr. Scott's digital literacy instruction may also indicate the struggle English teachers experience when integrating digital media with traditional pedagogical and content knowledge as suggested in Rust (2017). The current findings provide greater

understanding of teachers' interactive decision making and identify possible connections to teaching expertise and digital literacy instruction.

5.3 Recommendations

As indicated in Chapter 1, the expansion of technology, the lack of consensus on a definition of digital literacy, and the expectation that teachers prepare students for the future make research findings in this field especially relevant. Digital literacy is the key to future growth, innovation, and survival, but turning that key requires new knowledge and understanding. As described previously, findings from the current study add to existing knowledge and inform the following recommendations for teachers, student learning, administrators, teacher preparation institutions, and future research.

5.3.1 Teachers

Teachers are the primary key-turners of digital literacy. They are expected to develop digital competence in their students when there is no agreement on what it is and the best ways to do so. Findings from this study do not provide one comprehensive solution but they offer practical strategies to ensure improvement in digital literacy instruction, interactive decision making, and teaching expertise. Teachers can increase their personal knowledge of tools and programs through ongoing professional development. This learning should focus on how technology can be used within their content area. Teachers can also develop lessons that intentionally include one or more of the elements of digital literacy and expose students to a wide variety of digital programs and platforms. Problems during instruction can be lessened or eliminated by anticipating technology needs and by establishing routines for common patterns

of behavior. Teachers who know their students well will be better equipped to integrate technology and deal with dilemmas that may disrupt a lesson. Teachers' knowledge of students will also help them transfer skills used outside of school to academic settings. Finally, teachers should seek out any technical support available to remedy issues with devices or connections.

5.3.2 Student Learning

Although the focus of this study is not specifically on learners, findings suggest that teachers who turn the key of digital literacy foster the elements of digital literacy in their students. Students with working digital tools who are immersed in a variety of environments will understand how to operate in those environments and become more confident in doing so. Just as students become better readers by reading, students become more digitally literate if they are required to practice each of the elements of digital literacy in varied digital environments. In addition, findings related to interactive decision making and teaching expertise suggest student time on task is greater in classrooms with established routines for addressing misbehaviors and technology problems. Unlocking digital literacy for students requires unlimited access to digital tools, a reliable Internet connection, exposure to a variety of programs and platforms, purposeful instruction in all elements, and established routines for addressing technology issues.

5.3.3 Administrators

Local and district administrators help turn the key of digital literacy by selecting and supporting teachers. This study's findings suggest teachers who are rational, intuitive, and organized are likely to be effective in the classroom. Teachers who have worked with students

outside of the classroom may develop knowledge that enhances their level of teaching expertise. Selecting teachers with these qualities may improve digital literacy instruction, but administrators should recognize the role of teachers is still evolving and expertise takes time to develop. To ensure ongoing improvement, administrators can offer a variety of options for professional development that include programs, platforms, current research, and opportunities to develop technology, pedagogy, and content knowledge. Evaluation and assessment of teachers and students should include all eight elements of digital literacy in authentic contexts, not just skills. It is critical that funding is provided for technical support personnel, instructional technology, and enough devices for every student.

5.3.4 Teacher Preparation Institutions

To ensure teachers enter the classroom better prepared to deal with the challenges of teaching digital literacy, teacher preparation programs can emphasize the elements of digital literacy and ensure students know how to use digital tools for academic purposes. This should include pedagogical strategies for integrating technology in content areas. Preservice teachers should also be taught to build routines and to develop their interactive decision making. Since expertise develops through experience, students should be given many chances to practice these skills in real classrooms. These experiences will add to their personal black box and improve digital literacy, expertise, and decision making. It is also important that preservice teachers understand the importance of getting to know students and learn appropriate ways to do so.

5.3.5 Future Research

Based on the findings, future research recommendations include further study in some areas and expanded study in others. More research is needed to reach a consensus on a definition of digital literacy. This should include a framework to guide instruction and assessment. Additional research is also needed to explore the complexities and ambiguous characteristics of some components and how they relate to one another.

Future research should also expand to explore possible connections between prior personal experiences and teaching ability. This may include the impact of various types and quantities of positive and negative experiences on teachers' classroom behaviors. Other research should explore more fully the relationships between digital literacy instruction, interactive decision making, and teaching expertise. Areas of exploration may include the effects of one on the others and variations due to personality. Studies that explore the types, and differences of instructional and disciplinary routines may also provide further knowledge on teaching expertise and interactive decision making. Finally, future studies might focus on how and why various digital tools are used and any benefits to digital competence.

Additionally, studies conducted over a longer period may reveal changes in digital literacy over time in various educational settings. These may include the impact of more focused instruction of the eight elements on various student populations. They may also include long term effects of digital literacy instruction for preservice and inservice teachers. Studies in each of these areas may improve knowledge and understanding and enhance digital literacy instruction.

5.4 Conclusion

After the data for this study was collected, and while I analyzed and prepared this document, changes in my personal life, our country, and our world have increased and emphasized the importance of digital literacy in more concrete ways. In August of 2018 I returned to full time teaching in a one-to-one collegiate high school with limited class size. My previous years of experience in a one-to-one private school setting and my increased knowledge of digital literacy and tools helped me navigate the plethora of new digital programs and platforms I used. Even so, it was overwhelming. It took me several months to reactivate my prior knowledge and feel fluid in my teaching. In contrast to TAL, I had wonderful technical support at the local and district level, so I did not experience the frequency of technology issues observed at TAL. I witnessed firsthand the advantages of technical support and the difference it makes on instruction. Knowing that students benefit from exposure to a wide range of digital contexts, I purposefully explored new programs to integrate technology within my curriculum. Even so, as Hagerman and Spires (2017) found, my students primarily consume, create, and communicate with technology. Like the participants in this study, my digital literacy instruction rarely focuses on the critical and civic elements. I was reminded of this and other aspects of all three focus areas of this study during the COVID-19 pandemic and events following the death of George Floyd.

As COVID-19 spread across the United States and the world, one by one schools closed down and turned to virtual instruction. Whether they wanted to or not, teachers, students, parents, and employees across the country were forced to become more digitally literate. Conferencing platforms such as Zoom, Teams, and Google Meet expanded skills in the cultural

and communicative elements. Many were doing new things in new ways, increasing the cognitive, constructive, and creative elements. Over time, familiarity fostered the confident element. The lack of digital devices and a reliable Internet connection in some homes exposed the disparity in educational opportunities between students. In addition, disparities within our country were highlighted when George Floyd was killed, and citizens gathered to protest historical patterns of racial injustice. The importance of and need for the critical and civic elements of digital literacy came to the forefront during these events. It has become more apparent that digital literacy is a survival skill and the key to personal and civil advancement.

These events have also highlighted the disparities that exist between teachers. For example, while reimaging her laptop in a room with other educators, a coworker observed a teacher so unfamiliar with her district laptop that she did not know how to recharge it. When she shared the experience, we both felt sorry for her students. Her lack of digital literacy may not impact content learning as much in the classroom, but it will in a virtual environment. Findings suggest her digital literacy instruction, whether face to face or virtual, will be inadequate at developing digitally literate students.

In the midst of these events, I have also seen the importance of and need for expert teachers who can make decisions while teaching. During the spring, I was frustrated at the lack of student cues available in virtual settings. My initial thoughts were that little or no interactive decision making occurs while teaching virtually. However, the more I taught this way, the more I realized the cues were different. I can still see a students' facial expressions and hear the tone of their voice if they have their camera and microphone turned on. Their personalities and behaviors are apparent in their backgrounds and behaviors. I can build student knowledge and

rapport, essential components of IDM and teaching expertise, but it will be in new ways. My teaching is evolving as I learn to use tools that best fit my content area. I will continue to use the knowledge and findings from this study and future research to ensure my students know how to use technology in ways that develop all of Belshaw's 8 essential elements of digital literacies. It has never been more important for teachers, administrators, professors, and researchers to commit to turning the key of digital literacy, so students are able to thrive in any future path they choose.

APPENDIX A

TEACHER SURVEY/GENERAL DECISION MAKING STYLE QUESTIONNAIRE

Directions: Listed below are statements describing how individuals go about making important decisions. Please indicate the extent to which you agree or disagree with each statement.

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree	
	1	2	3	4	5	
1.	I double-check my information sources to be sure I have the right facts before making decisions.	1	2	3	4	5
2.	When making decisions, I rely on my instincts.	1	2	3	4	5
3.	I often need the assistance of other people when making important decisions.	1	2	3	4	5
4.	I avoid making important decisions until the pressure is on.	1	2	3	4	5
5.	I generally make snap decisions.	1	2	3	4	5
6.	I make decisions in a logical and systematic way.	1	2	3	4	5
7.	When I make decisions, I tend to rely on my intuition.	1	2	3	4	5
8.	I rarely make important decisions without consulting other people.	1	2	3	4	5
9.	I postpone decision making whenever possible.	1	2	3	4	5
10.	I often make decisions on the spur of the moment.	1	2	3	4	5
11.	My decision making requires careful thought.	1	2	3	4	5
12.	I generally make decisions that feel right to me.	1	2	3	4	5
13.	If I have the support of others, it is easier for me to make important decisions.	1	2	3	4	5
14.	I often procrastinate when making important decisions.	1	2	3	4	5
15.	I make quick decisions.	1	2	3	4	5
16.	When making a decision, I consider various options in terms of a specific goal.	1	2	3	4	5
17.	When I make a decision, it is more important for me to feel the decision is right than to have a rational reason for it.	1	2	3	4	5
18.	I use the advice of other people in making my important decisions.	1	2	3	4	5
19.	I generally make important decisions at the last minute.	1	2	3	4	5
20.	I often make impulsive decisions.	1	2	3	4	5
21.	I explore all of my options before making a decision.	1	2	3	4	5
22.	When I make a decision, I trust my inner feelings and reactions.	1	2	3	4	5
23.	I like to have someone steer me in the right direction when I am making important decisions.	1	2	3	4	5
24.	I put off making many decisions because thinking about them makes me uneasy.	1	2	3	4	5
25.	When making decisions, I do what seems natural at the moment.	1	2	3	4	5

Pseudonym:

Age:

Gender:

Ethnicity:

Marital Status:

Educational Level:

Teaching Experience (years):

Total number of field experience hours during teacher preparation:

List any experiences with children or teens prior to teaching (babysitting, scouting, coaching, etc.)

List any experiences with children or teens after you began teaching in which you were, or you are currently involved outside the school setting?

Describe your use of technology in your personal life.

APPENDIX B

INTERVIEW PROTOCOL FOR TEACHERS

BEFORE

Before five classroom observations but after survey completion: (1 hour)

1. Tell me about your experiences with children or teens prior to teaching.
2. Your survey response states that you have _ years of teaching experience. Describe the various grade levels and settings included in that experience.
3. Why did you want to teach at this school?
4. What qualities, skills, and characteristics do you possess that make you qualified to teach in this environment?
5. What are your beliefs about teaching and learning?
6. Describe one of your favorite teachers.
7. Describe one of your least favorite teachers.
8. What do you know about interactive decision making?
9. What do you know about digital literacy?
10. Think about instances in the classroom when you have to make a decision about what to do or say next. Using the handout as a guide, do any of these styles describe your typical behavior?

Five Decision Making Styles – (handout provided to the teacher)

Rational – logical and structured approaches to decision making

Intuitive – reliance upon hunches, feelings and impressions

Dependent – reliance upon the direction and support of others

Avoidant – postponing or avoiding making decisions

Spontaneous – impulsive and prone to making “snap” or “spur of the moment” decisions

11. Do you have any questions?

DURING

After each of five classroom observations: (30 minutes each time)

1. What are your thoughts about today’s observation session?

The interviewer will play the observation recording and ask the teacher to select three or four interactions from the recording to discuss in detail. The discussion will center on the following questions for each selected interaction:

2. What was the dilemma as you perceived it?
3. What factors did you consider as you negotiated a response?
4. Why did you respond as you did?
5. Did any follow up interactions occur related to this interaction?
6. Do you have any questions?

AT CONCLUSION OF STUDY

After all five observations and initial analysis of data: (1 hour)

1. What have you learned about digital literacy instruction and interactive decision making as a result of participating in this study?
2. Do you believe your decision making style changed over the course of the study?
3. Has participation in this study influenced your digital literacy instruction and interactive decision making? If so, how?
4. Do you have any questions?

APPENDIX C

TEACHER CLASSROOM OBSERVATION PROTOCOL

Date: _____ Time: _____ Length of activity: _____ minutes

Site: _____ Pseudonym: _____

Focus of Observation:

- What was the goal(s) of instruction?
- What digital devices or tools do the students and teacher use?
- What digital competencies are evident?
- What dilemma, unexpected event, and/or question provoked the interaction?
- What social cues (voices, intonation, body language, etc.) does the teacher display?
- Was the teacher's response student-, context-, and/or content-focused?
- What decision making styles are evident? Rational, Intuitive, Dependent, Avoidant, Spontaneous

Descriptive Notes

Physical setting: visual layout
Description of participants
Description of activities
Description of individuals engaged in activity
Sequence of activity over time
Interactions
Unplanned events
Participants comments: expressed in quotes

Reflective Notes

Questions to self
Observations of nonverbal behavior – voice, intonation, body language
My interpretations - my observation of what seems to be occurring

APPENDIX D

SAMPLE OF STIMULATED RECALL INTERVIEW TRACK MARKS GUIDE

Stimulated Recall Interview – Track Marks Guide

Teacher: T6

Date: 5/8/18

Observation recall #: second

Track Mark

#1 – boy sings after teacher comment about being in this together

(until 7:30)

#2 – during first 15 students begin sharing opinions

(until 10:05)

#3 – students can't edit comment in Google classroom

(until 16:55)

#4 – teacher notices student watching movie

(until 19:35)

#5 – asks for Joe's thoughts

(until 29:55)

#6 – student uses the word gay during discussion

(until 36:45)

#7 – teacher asking students if they understand the assignment, Mitchell

(until 43:15)

#8 – student asks teacher to like the video

(until 56:12)

NEXT CLASS

#9 – student has mask on face

(until 1:18:55)

#10 – refers to student as "whiskers"

(until 1:27:30)

#11 – student with mask responds, can't understand him

(until 1:37:25)

#12 – assignment due date and STAAR testing discussion

(until 2:14:50)

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