To my husband, Mitchell, and my children, Elias, Tenisen, and Jesien
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<td>PLC</td>
<td>Professional Learning Community. A group of teachers who come together regularly to work on a common goal toward professional learning.</td>
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<td>STLDM</td>
<td>Scaffolded TPACK Lesson Design Model. This is the model developed by Chai and Koh (2017) to help pre-service teachers incorporate technology into their instruction so that content is supported.</td>
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<td>TPACK</td>
<td>Technological pedagogical content knowledge. The blending of all types of knowledge (technological, pedagogical, and content knowledge).</td>
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The integration of technology into instructional practice is a goal for many teachers. However, professional development related to technology integration is often lacking in many districts across the nation and might not include a focus on the development of technological pedagogical content knowledge (TPACK), an important aspect of technology integration. To address this problem of practice, in this practitioner research case study, I established a technology-focused Professional Learning Community (PLC) at my school and studied teachers’ experiences while utilizing a particular professional development tool, The Scaffolded TPACK Lesson Design Model (STLDM), during a seven-week period. The purpose of this study was to understand what happens when the STLDM is incorporated into the fabric of the PLC experience for a group of in-service teachers. Research questions included: (1) What does it look like when teachers use the Scaffolded TPACK Lesson Design model in a PLC?, and (2) How do teachers experience the Scaffolded TPACK Lesson Design model as it unfolds within a professional learning community?

To gain insights into these research questions, data collection included observation and fieldnotes, transcriptions of PLC meetings, interviews, teacher journals,
and artifacts produced during the PLC work. This dissertation provides a detailed account of the 7-week PLC intervention as well as a reporting of two case themes: Affordances and Considerations. Within these themes, I detail six claims, highlighting the parts of the STLDM which helped the PLC members integrate technology in meaningful ways and the parts that must be taken into consideration when seeking to integrate technology into instruction. From these claims, six lessons emerged, which I synthesized into one overarching statement of learning: The Scaffolded TPACK Lesson Design Model is most effective with inservice teachers when combined with the Technology Integration Matrix (developed by the Florida Center for Instructional Technology) and housed in a supported PLC. This study concludes with reflections on my own practice, my school, and my district; implications for other teachers, schools, and districts; and suggestions for future research.
CHAPTER 1
INTRODUCTION, LITERATURE REVIEW, AND METHODOLOGY

As the mobile generation (21st century learners) makes up the entire population of our classrooms, the need for and interest in 21st-Century Learning skills has come to the forefront. The development of these skills extends beyond the acquisition of information and communication technology (ICT) operational knowledge (Chai, Koh, & Teo, 2018; Koh, Chai, Benjamin, & Hong, 2015; Koh, Chai, & Lim, 2017). Instead, 21st-Century Learning skills are comprised of students’ cognitive, metacognitive, sociocultural, productivity, and technological understandings (Koh, et al., 2015). Koh et al. (2015) highlighted the connection between ICT and 21st Century Learning skills: “Current literature in the learning sciences promotes the benefits of integrating ICT into lesson design to help students develop twenty-first-century competencies” (p. 537).

Ruggiero and Mong (2015) posited educators must know how to use technology in a pedagogically sound way for students to experience academic growth. This desire for increased student achievement is the driving force behind my district’s recent technology purchases, professional development offerings, and adoption of Marzano’s Teaching Evaluation framework for teacher evaluations. Even though my district is working to enhance access to technology, the professional development has fallen short. A typical Tuesday morning at my school reveals teachers tapping the tables with their pens, crossing and uncrossing their legs, sipping the dregs of their cold coffee and glancing at their watches over and over through the never-ending faculty meeting that not only covers news, dates, and policies, but also our professional development requirement. The last ten minutes of these meetings are dedicated to fellow teachers presenting new technology that they have found helpful. The technology is hastily
glossed over; the audience is distracted and tuned out. It is highly likely that the new tech tool will end up as a scribble on the corner of a notepad. In order for teachers to integrate new technology, they need time to learn, adapt their original lessons, reflect, and practice (Ely, 1990). As a teacher who loves to experiment with new technology and genuinely wants to learn how to improve integration in my own classroom, I find this drive-by technology training irksome because there is no time to learn what is being presented, let alone reflect and practice.

These technology presentations are a result of my district’s technology initiative, “Empower: Engage, Educate, Equip.” Over the past three years, my district has allocated a large portion of the annual budget to technology, specifically for teacher and student use. According to the budget summary submitted to the Department of Education for the 2017-2018 school year, Nassau County spent $486,695 on instructional technology alone. The school board, superintendent, and director of secondary education expect teachers to use the technology regularly. As a point of reference for this study, I define technology as a device (for example, an interactive whiteboard), a software or online package (such as Google Classroom and the G-suite Applications), or a standalone website (Nearpod, Flipgrid, or Thinglink are educational websites that can be referred to as tech tools). A handout on the school board website states:

Nassau County School District believes that technology can be a tool that bridges teaching and learning. Through the effective use of technology, students are more engaged, and teachers have the ability to introduce students to people, places, and things like never before. (Nassau County School Board, 2018)

These expectations are consistent with those expressed nationwide. With the increase of 1.17 billion dollars for Title IV Part A funding (safe and healthy schools and
educational technology) of the Every Student Succeeds Act in the 2019 budget, officials anticipate the teachers will utilize technology to enhance student achievement (Molnar, 2018; Spaulding, 2013). It is this desire for increased student achievement that also drives teacher evaluation systems. Because technology has become a priority, my district’s teacher evaluation system, Marzano’s Teaching Evaluation framework, includes a checkpoint for technology usage. Principals use this checkpoint as one of the main indicators of effective classroom instruction and teacher growth. I contend technology should be found in all teachers’ lesson plans, but the need is deeper than simply using the technology.

In this age of accountability, teachers must devote every second of class time to student learning, and my colleagues have expressed a need to not only know how to use the technology with which they are presented but how to incorporate it into sound pedagogical strategies to teach content, eliminating wasted classroom time. However, in my district, technology training which highlights technological pedagogical content knowledge (TPACK) is nonexistent. The literature indicated teachers need assistance in crafting lessons which create TPACK that supports content and ICT (Koh, et al., 2015). Therefore, Koh, Chai, Benjamin, and Hong (2015) suggested that design thinking will help teachers navigate unfamiliar waters.

Design thinking is defined as “implicit and intentional acts that lead to the creation or improvement of products, services, and experiences” (Koh, et al., 2015, p. 537). Design thinking focuses on creative solutions for practical problems. To accomplish this, Koh, Chai, and Lim (2017) devised a professional development

Koh, Chai, and Lim (2017) maintained that professional development for the promotion of 21st-Century Learning should include codesigning experiences, pedagogical orientation, opportunities for implementation, reflection, and evaluation of teacher and student outcomes. To help teachers externalize their design thinking, Chai and Koh (2017), created The Scaffolded TPACK Lesson Design Model (STLDM) by combining Dick and Carey’s 1996 model with Angeli and Valanides’ research on technology mapping as well as Kramarski and Michalsky’s research on metacognitive prompts.

The STLDM was primarily developed to help preservice teachers, who have little to no teaching experience, select the proper technology to deliver and deepen students’ understanding of content (Chai & Koh, 2017). Their findings indicated the STLDM model affects the relationships between various factors as teachers gain TPACK. Research has shown factors such as perceptions and beliefs about the benefits of technology, time to engage with new tech tools, access to technology, the level of self-efficacy, feelings of preparedness, and access to a support system can hinder the integration of technology (Spaulding, 2013). Considering these impediments and teacher needs, I used a professional learning community (PLC) as the venue for focusing teachers’ integration of technology for 21st-Century Learning into instructional practice because PLCs allow for collaboration, relevancy, ongoing and job-embedded exploration, and a focus on content. In sum, the purpose of my study was to document the experiences of in-service teachers when the STLDM was incorporated into a PLC.
Fortunately, having developed and conducted numerous workshops for my district’s schools, the staff development coordinator afforded me the opportunity to create a PLC focused on the integration of technology and lesson design. I was in a position to do this in my school because, having worked in the same school for my twenty years in education, the faculty knew that I am tech savvy and trusted my insight in teaching and teacher education.

Unfortunately, my school administration had been culpable of naming every meeting a PLC ever since it became a buzzword in education. In reality, our school was echoing what Dana and Yendol-Hoppey (2016) describe many other schools doing: taking an existing meeting, changing nothing, but tacking on the dirty three letters (PLC). For the faculty at my school, PLC was a code word for “another meeting” because with the additional letters came a deluge of additional meetings. It is this negative connotation associated with PLCs that has deprived my school of collegiality and innovation. As a precursor to our focus on tech integration, the negative perception of PLCs was one of the first issues we tackled.

To ensure that our goal of technology integration came to fruition, it was also essential that teachers understood the different forms of knowledge and how those forms play a part in designing lessons that mesh technology with what we already know about teaching. Sheninger and Kieschnick (2012) described how the primary forms of knowledge (content, pedagogy, technology) combine in various ways to form technological pedagogical content knowledge (TPACK), the knowledge of how to use technology with sound pedagogical strategies in a way that teaches content. Pedagogical knowledge (PK), content knowledge (CK) and technological knowledge
(TK) can combine to form PCK, TCK, and TPK. As illustrated in Figure 1-1, when they coalesce, TPACK is formed.

![Figure 1-1. Triple Venn Diagram from Sheninger and Kieschnick (2012) illustrating TPACK’s relationship](image)

The lines between technology, pedagogy, and content should be seamless. The fusion of these kinds of knowledge creates changes in teacher practice and student learning. However, Chai and Koh (2017) warned that teachers’ instructional design beliefs must be considered throughout professional learning if a TPACK framework is to be effective. Teachers who have taught with a teacher-centric instructional design tendency will need support and compassion when shifting to a TPACK framework, which is more student-centered.

Previous research on the STLDM involved only pre-service teachers; the purpose of my study was to understand what happens when the STLDM is incorporated into the fabric of the PLC experience for a group of in-service teachers at my school. Therefore, my two research questions were: (1) What does it look like when teachers use the Scaffolded TPACK Lesson Design model in a PLC? (2) How do teachers experience the Scaffolded TPACK Lesson Design model as it unfolds within a professional learning community?

To gain insights into these questions, I first established a PLC focused on technology integration at my school in October 2019, working with the PLC for
approximately four months to prepare for the introduction of the STLDLM. This pre-study stage, my Readiness Stage, was devoted to the building of our PLC and the learning of new technology. The second stage, my Intervention Stage, focused on the use of STLDLM to help the members of our PLC gradually learn to incorporate TPACK into lesson plans in a deliberate way.

In this chapter, I begin by describing what I learned from the literature that provided the foundation for this study. Next, I detail my research methods which include my context, recruitment strategies, participants, the stages of my study, data collection, and data analysis. I conclude the chapter by recounting the measures I took to ensure trustworthiness along with relaying my researcher positionality.

**Learning from the Literature**

The purpose of my study was to understand what happens when the STLDLM is incorporated into the fabric of the PLC experience for myself and a group of in-service teachers at my school. This study was situated between two bodies of literature, PLCs and technology integration. In this section, I will provide a brief review of the literature about professional learning communities and how that structure supports technology integration. I will then furnish an overview of the literature surrounding effective technology integration, factors affecting teachers’ willingness to integrate technology, and a lesson design model that may mitigate the factors impeding integration. After providing brief reviews of these two bodies of literature, I will turn to a description of the STLDLM as it was presented and studied by Chai and Koh (2017).

**Professional Learning Communities**

After investing billions of dollars on professional development each year, many efforts fail because the offered sessions, although well-intentioned, are not based on
teachers’ needs (Zhang, Parker, Koehler, & Eberhart, 2015). Desimone (2009) contended professional development should focus on how students learn the content; engage teachers in active learning experiences; be consistent with teachers’ belief systems, as well as their school and district policies; be continuous and ongoing with a suggested time of 20 or more hours; and provide opportunities for collaboration to construct new knowledge. Despite all we have learned about what professional development should look like, the “(a) one-shot and one-size-fits all workshops; (b) use of the transmission model from experts to teachers; (c) failure to address school-specific differences; (d) just-in-case training; and (e) system-wide presentations that do not provide sufficient time to plan or learn new strategies” still pervades school systems (Lock, 2006, p. 665). Mu, Liang, Lu, and Huang (2018) suggested that a professional learning community can remedy the downfalls of the pandemic of poorly designed professional development that seems to pervade many districts. To increase the effectiveness of PLCs, Dana and Yendol-Hoppey (2016), believed PLCs must do the following:

- evaluate student, teacher, and school learning needs by reviewing data on teacher and school performance;
- define a clear set of educator learning goals based on analysis of data;
- achieve educator learning goals by implementing coherent, sustained, and evidence-based learning strategies that improve instructional effectiveness and student achievement;
- provide job-embedded assistance to help teachers transfer new knowledge and skills to the classroom;
- regularly assess the effectiveness of PLCs in relationship to ongoing improvements in teaching and student learning; and
- request external expertise when the community determines it is needed. (p. 3)
PLCs are intended to influence student achievement by giving educators the opportunity to collaborate, share in the decision-making process, and become a leader (Lippy & Zamora, 2012-2013). It is the departure from an isolationist system with single leadership that makes a PLC different from meetings and workshops. However, simply collaborating and making decisions is not enough to impact student achievement; teachers must be willing to participate and share, implementation must be consistent in maintaining a common understanding of practices, and there needs to be time spent developing relationships within the PLCs (Lippy & Zamora, 2012-2013).

A literature review by Vescio, Ross, and Adams (2008) of ten American studies and one English study found that teachers participating in a PLC improved teaching practices and increased student achievement. They also asserted the most impactful characteristic of a PLC is a focus on student learning and achievement. Furthermore, research indicated a PLC focused on technological pedagogical content knowledge can have positive results (Vescio, Ross, & Adams, 2008).

Mu, Liang, Lu, and Huang (2018) conducted a quantitative study focused on the nature of building pedagogical content knowledge through PLCs in China. Their results demonstrated a positive relationship between the two and indicated that PLCs have the potential to combat the inequality of teacher quality (2018); therefore, it stands to reason, technological pedagogical content knowledge can also be built through a PLC. Research indicated PLCs focused on technology integration hold promise as a mechanism for professional learning (Dana, Dawson, Ma, & Dogan, 2018; Liu, 2013; Mouza, 2009; Potter & Rockinson-Szapiw, 2012). Thus, the PLC structure has the
potential to transform the ineffective professional development on technology integration that happens at my school.

With a structure designated for established professional learning to occur, I turn to the content and process for the professional learning that unfolded within our PLC – Technology Integration and the STLDM.

**Technology Integration, TIMs, and the STLDM**

The intent of investing federal and local money into technology was the technology would lead to student achievement. However, the results over the past decade have been lackluster (Spaulding, 2013). According to Cifuentes, Maxwell, and Bulu (2011), technology should be woven into the fabric of the classroom to motivate students, enhance instruction, increase productivity, and support content. These scholars asserted that technology integration is tedious and blending technology into one’s practice can only come to fruition through constant exploration. They posited the following criteria for effective technology integration:

1. an outside observer can see the technology activity as a seamless part of the lesson;
2. the reason for using the technology is obvious to the teacher, students, and others;
3. students are focusing on the learning rather than on the technology;
4. the teacher can describe how technology is helping a particular student;
5. the teacher would have difficulty accomplishing lesson objectives without technology;
6. the teacher can explain what the technology is supposed to contribute; and
7. all students are participating with technology and benefiting. (p. 61)

To help teachers effectively integrate technology into their daily classroom practice, the Florida Center for Instructional Technology at the University of South
Florida and the Florida Department of Education created the Technology Integration Matrix in 2006 (Welsh, Harmes, & Winkelman, 2011). The matrix (TIMs) was developed to establish a common vocabulary for educators as well as provide a lesson evaluation tool. The TIM website (https://fcit.usf.edu/matrix/matrix/background/) explicitly warns that the tool is “designed to evaluate a lesson, as opposed to rating a teacher or judging a discrete task” (2019). The matrix incorporates “five interdependent characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal-directed with the five levels of technology integration: entry, adoption, adaptation, infusion, and transformation” (Florida Center for Instructional Technology). TIMs also provides “descriptors for student activity, teacher activity, and the setting for each technology integration” (Welsh, Harmes, & Winkelman, 2011, p. 70). The TIMs website provides an interactive matrix where each category is detailed with questions, examples, and links to classroom videos from real Florida math, science, language arts, and social studies classrooms.

To aide teachers in gaining TPACK, Koh and Chai (2014) suggested lesson design as “an effective conduit for TPACK development as it supported connections among the three knowledge sources” (p. 222). The conception of the TPACK framework was established in Mishra and Koehler’s groundbreaking publication, Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge (2006). They proposed simply teaching educators about technology did not mean they could translate that knowledge into good teaching. Therefore, Mishra and Koehler (2006) insisted learning by design become part of the process.
In a 2015 study, Koh, Chai, Benjamin, and Hong suggested that TPACK be constructed using design thinking in order for teachers to address the complex factors associated with technology integration. Their framework for their study established that design thinking advances teachers’ ability to “synthesize their various forms of TPACK into concrete and implementable lesson ideas” (p. 540). In 2017, Chai and Koh further expanded their research in a study of 90 male and 195 female pre-service teachers in Singapore during a 12-week mandatory technology course. The STLDLM was introduced during the fourth week. Chai and Koh (2017) found that changes in beliefs were of medium effect while changes in technology-related factors were of large effect. The data also demonstrated a positive correlation between STLDLM and technology integration. As a result, the STLDLM model affects the relationships between various factors as teachers gain TPACK. While this study examined the STLDLM and its influence on the integration of technology with preservice teachers, this model holds promise for in-service teachers, as a means of shepherding them through deliberate and thoughtful technology integration.

Again, the STLDLM was primarily developed to help pre-service teachers, who have little to no teaching experience, select the proper technology to deliver and deepen students’ understanding of content (Chai & Koh, 2017). While utilizing the STLDLM, teachers are required to think through each step in the design process guided by epistemic prompts to help them make decisions about technology.

The first stage of the lesson design model cues pre-service teachers to address learning goals and student needs (Appendix A). The prompts ask them to look at the content and then articulate what knowledge the students should gain from the lesson.
The prompts then engage pre-service teachers in determining if the goal can be achieved or represented through technology. Also included in the first stage is an examination of the students’ struggles within the content. The second stage of the model guides pre-service teachers through considering technology’s role in the lesson. The prompts in this stage ask pre-service teachers to consider which types of technology would facilitate the learning of the subject matter, what resources are available, and how the learning will be assessed.

Chai and Koh (2017) contended that teachers should view themselves as not just “curriculum implementers but as designers of new learning experiences” (p. 118). The STLDM takes teachers’ various lesson design beliefs into account, allowing them to find value in transforming previously designed lessons and infusing them with supportive technology. This model guides teachers through a traditional lesson plan incorporating technology to support the content. The STLDM also maneuvers those who have practiced with a teacher-centric perspective slowly toward a more student-centered design. Rather than being standards driven, the STDLM method of planning asks teachers to consider the students along with the goals. This means that no matter what the agenda is, teachers must meet the students where they are and design the lesson backwards: what do these students need to meet the goal?

The STLDM hinges on technological pedagogical content knowledge and the process teachers use to ensure their lesson planning integrates technology with TPACK in the forefront of their thinking. Chai and Koh (2017) worked with pre-service teachers in their study and the data demonstrated a positive correlation between STLDM and technology integration with a focus on TPACK. While this is the only study examining
the STLDM and its influence on the successful integration of technology, my study explored the use of the STLDM by practicing teachers.

**Research Methodology**

To review, the purpose of my study was to understand what happens when the STLDM is incorporated into the fabric of the PLC experience for a group of in-service teachers at my school. Because I studied my own context and I am a practitioner, I framed my study as practitioner research. Practitioner research is defined as “the systematic, intentional study of one’s own professional practice” (Dana, Thomas, and Boynton, 2011). Practitioner research involves identifying a problem in a teacher’s practice, planning how to solve the problem, implementing the plan, and evaluating its effectiveness in order to continue to address the problem or reflect on other areas of improvement (Dana & Yendol-Hoppey, 2014). This is an appropriate way to frame my study because I am a practicing teacher who identified a problem (poor professional development focused on technology integration at my school) and planned how to solve the problem (establish a PLC focused on technology integration that uses the STLDM).

As a practitioner researcher, I used case study methodology as the mechanism to engage in my research. Case studies are a type of qualitative research that intensively analyze and describe a “single unit or system bounded by space and time” (Hancock & Algozzine, 2017, p. 9). In a case study, the researcher studies a bounded case within a real-life context to report themes or descriptions (Cresswell, 2013).

When deciding to use the framework of case study, I wrestled a bit with deciding which methodology to use: Yin, Marriam, or Stake. I read Yazan’s (2015) article, “Three Approaches to Case Study Methods in Education: Yin, Merriam, and Stake” in order to discern which approach would best fit my study.
I began by looking at each researcher's perspective on case studies. Yin had a positivist perspective, which relies on scientific evidence in order to make claims. Stake believed that "constructivism and existentialism (non-determinism) should be the epistemologies that orient and inform the qualitative case study research" (Yazan, 2015, p. 137). Merriam asserted "the key philosophical assumption upon which all types of qualitative research are based is the view that reality is constructed by individuals interacting with their social worlds" (Merriam, 1998, p. 6).

While grappling with Yin, I realized that I was having trouble deducing propositions for my study. A proposition "directs attention to something that should be examined within the scope of the study" (Yin, 2018, p. 27). Because I was interested in examining teachers' experiences as the PLC unfolded, I could not anticipate what I would be examining ahead of time; therefore, a constructivist perspective seemed much more appropriate. I did, however, draw from Yin his argument about when a single case study could be used. I felt that his delineation of single case versus multiple case study design was very clear. Yin (2018) suggested that the single case study design is appropriate under several circumstances: "when there is a critical, unusual, common, revelatory or longitudinal case" (p. 49). I concluded that my study encompassed a common case because the teachers in my study were reticent to use technology, like many other teachers (Koh & Chai, 2014).

Ultimately, I determined that Merriam was a much better match for my study because Merriam asserted that in a case study:

The researcher brings a construction of reality to the research situation, which interacts with other people's constructions or interpretations of the phenomenon being studied. The final product of this type of study is yet
another interpretation by the researcher of others’ views filtered through his or her own (Merriam, 1998, p. 22).

Merriam also views a case as “a person, a program, a group, a specific policy and so on, which represents a lot more comprehensive list than Yin’s and Stake’s” (Yazan, 2015, p. 139). The case I was investigating was the use of the STLDM used by teachers at my school within a seven-week time period. It seemed to me that her definition of a case study and the process used when determining the findings fit my perspective and study the closest. In addition, as a novice researcher, I needed a detailed protocol to follow:

Merriam (1998) presents step by step the process of designing qualitative research in a rather detailed fashion. Her discussion includes conducting literature review, constructing a theoretical framework, identifying a research problem, crafting and sharpening research questions, and selecting the sample (purposive sampling). Merriam’s approach in case study design is close neither to Yin’s nor Stake’s; it is a combination of both approaches. The design she recommends is flexible to a certain degree which is the influence of her coming from a qualitative tradition, but it is not as flexible as Stake’s account. (Yazan, 2015, p. 141)

Once I determined the study framework to be a single case study, I needed to decide which type of single case study was a match for my study: explanatory, descriptive, intrinsic, instrumental, collective (Baxter & Jack, 2008). Because a single descriptive case study focuses on an intervention and its context and my study looked at the utilization of the STLDM as a possible intervention, the single descriptive case study format was the best structure for my study (Baxter & Jack, 2008; Cresswell, 2013).

With a single descriptive case study, there is a reluctance to generalize results since contexts can differ. In turn, as a practitioner researcher, I was interested primarily in a dissertation study to impact my local context, not to be generalized to teachers everywhere. Yet, my study can be valuable to others outside my school as well. By
using case study to create rich, thick description about how the STLDM played out in my context, others can decide on transferability to their own context. Transferability refers to the degree qualitative results can be transferred to other contexts. This concept will be discussed in more detail later in the “trustworthiness” section of this chapter.

**Context, Recruitment and Participants**

My school is a 6-8th grade middle school in the South East United States with approximately 700 students. We have a faculty of 43 teachers. Our principal of 24 years was moved to the high school next door at the end of the 2017-2018 school year and our assistant principal moved into the principal position. The 2018-2019 school year was one of transition for our faculty. In addition to personnel changes at the start of the school year, we also received new whiteboard technology in all classrooms: Viewsonic 2.0 Boards. All district secondary teachers received a half-day training over the summer from the company on how to operate the boards. At the end of the training, the administration made it very clear that teachers would be observed and evaluated on their use of the boards. This demand to understand the new technology provided a ripe context for recruitment for my PLC and study.

Because PLCs are more effective when participants are willing and enthusiastic about implementing and maintaining consistency, it was crucial that the PLC participants in my study were also willing and enthusiastic (Lippy, & Zamora, 2012-2013). Therefore, the participation in the PLC was voluntary. I looked for three to four teachers who wanted to commit to a PLC focusing on technological pedagogical content knowledge. In September of 2018, I presented a Powerpoint slide show on my dissertation proposal to the entire faculty at a biweekly faculty meeting. I asked that
anyone interested contact me for further information. After my presentation, five teachers from different content areas expressed interest. I reviewed the informed consent form with each, and all five agreed to become members of the PLC and participate in my study. In February on 2019, one of the PLC members dropped out due to other obligations; so, in total, four teachers completed the study with me: Maggie, Melissa, Becky, and Cathy. As it is important to understand the background of the teachers in this study in order to understand the ways they experienced the STLDM, I turn now to a brief description of each teacher as well as myself, the PLC facilitator.

**Maggie**

At the time of my study, Maggie had five years of teaching experience in 8th grade English Language Arts. Her major in college was Public Relations with a minor in Education. Her passion was grammar and after taking a grammar course in college, she decided to pursue teaching because she felt that grammar was not taught as judiciously as it should be in secondary schools. Maggie, 26 years old, grew up as a millennial with access to technology for most of her life. She came from a line of educators and considered herself to be technologically savvy. Her reason for joining the PLC was “to give something new a shot because I don’t really seek things out that I haven’t been told about before” (Maggie’s Interview, April 19, 2019).

**Melissa**

At the time of my study, Melissa had taught for five and a half years in 7th and 8th grade Science and Math as well as one year in high school Advanced Placement Environmental Sciences. She had only been at our school for two years. Melissa had a master’s degree in Environmental Policy and previously worked for the state in Air Quality, coming to teaching later in life. According to a survey I conducted at the
beginning of the PLC, Melissa felt somewhat confident in her technological ability, using various programs in her instruction two to four times per week. Her goal for the PLC was “to learn one new program or one new tool that we could use in the classroom” (Melissa’s Interview, April 18, 2019).

Becky

At the time of my study, Becky could be described as a veteran teacher, having taught for 30 years. Her bachelor’s degree was in Biology with a minor in Therapeutic Recreation. Before teaching, she worked with severely disabled children for five years. She then went on to earn her master’s degree in Secondary Education Science. She had mainly taught middle school Science but did have experience teaching at-risk students in English Language Arts. In addition to teaching for 20 years at my school, she also acted as team leader to both the 7th grade team and the Science department. Becky was reticent when it came to using technology in her classes because she was concerned with students cheating as well as their physical health. She readily admits that her students knew more about technology than she did, and she didn’t want to spend time struggling to learn new tools on her own. Her purpose for joining the PLC was “the opportunity to pick up some tips and tricks” (Becky’s Interview, April 16, 2019). She was further enticed by the chance to learn with her colleague, Melissa, with whom she worked closely so they might piggyback on each other’s lessons.

Cathy

At the time of my study, Cathy could also be described as a veteran teacher of 22 years. She had taught 7th and 8th grade English Language Arts for intensive (a class comprised of students scoring a Level 1 and 2 on our state assessment), regular (students who scored a Level 3 and low Level 4), and advanced students (students
scoring a high Level 4 or the top tier, a level 5) at my school. Cathy held a bachelor’s degree in English with coursework in education. She also earned her master’s degree in Educational Leadership. Cathy felt less confident with using technology and has avoided employing it for instructional purposes in the past due to limited access and technical issues in her classroom. Since moving classrooms, she increased her technology use with her students and she joined the PLC “simply to learn more about technology” (Cathy’s Interview, April 17, 2019).

**Heather**

As PLC facilitator, I came to the study with nineteen years’ teaching experience in 6th, 7th, and 8th grade English Language Arts with intensive, regular, advanced, and gifted students. I created and implemented numerous workshops on the use of technology in the classroom for my district and state. I was known to use my own classroom as an inquiry lab for new tech tools. Colleagues often came to me with questions related to the best ways to integrate instructional technology in pedagogically sound ways. The teachers in my PLC felt that I could “unearth (my) wisdom” (Cathy’s Interview, April 17, 2019) and cited that as an additional motivator for participating in this PLC. Table 1-1 summarizes the backgrounds of the four teachers who participated in this study.

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Experience</th>
<th>Reason for joining the PLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maggie</td>
<td>8th Grade ELA teacher</td>
<td>5 Years</td>
<td>To try something new</td>
</tr>
<tr>
<td>Melissa</td>
<td>7th &amp; 8th Grade Science and Math</td>
<td>5.5 Years</td>
<td>To learn one new tool</td>
</tr>
<tr>
<td>Becky</td>
<td>7th Grade Science/</td>
<td>30 Years</td>
<td>To pick up some new tips and tricks</td>
</tr>
<tr>
<td>Cathy</td>
<td>7th &amp; 8th Grade ELA</td>
<td>22 Years</td>
<td>To learn more about technology</td>
</tr>
</tbody>
</table>

Once participants were recruited and selected, we began the process of establishing our PLC.
Readiness Stage: Establishing the PLC

Prior to the study time period, our PLC began meeting in October of 2018 for the Readiness Stage. We met for one hour every other week during planning time on our early release days (every Wednesday). The intent of this phase of the study was to create a PLC that was focused on technological pedagogical content knowledge and through this venue my colleagues and I learned to strategically identify the technology that would support our goals. Because creating an effective PLC is arduous work that happens over time, we spent approximately four months establishing our PLC and preparing for the introduction of the STLDM into our work. The first phase of establishing readiness included developing relationships with one another and establishing a mindset for learning with and from one another within the PLC structure (Dana & Yendol-Hoppey, 2016). This phase consumed approximately seven meetings and included setting group norms, reading and discussing literature on effective PLCs, lesson design and technological pedagogical content knowledge, and getting to know one another as professionals.

To establish group norms, we each made a list of what was important to us when thinking about professional learning and holding meetings. We then shared our lists, discussing each item, and crafted a master list with those items we all agreed upon. Using this process, the norms we established were:

- We will be respectful of other people’s time.
- Only positivity allowed.
- What’s discussed here stays here.
- Avoid speaking twice until everyone has had the chance to speak.
- The group will support one another.
- Chunking information is the best practice (Do one thing well).
- Provide How-to Instructions on Google Classroom--maybe take turns doing this.
• We will be exposed to a multitude of text and then focus on what will help us in our content.
• We will provide honest feedback.

Once norms were established, we worked together to deepen our knowledge of PLCs by reading and discussing the following: The PLC Book by Dana and Yendol-Hoppey (2016) Chapter 7 “Essential Elements of Forming Healthy PLCs” and a 2015 blog titled “First Steps in Forming a Professional Learning Community” by Ella Mireles. We used the National School Reform Faculty’s Text Rendering protocol (a process where each person shares a significant sentence, phrase and word from the text in order to get to its essence) to delve into each piece, and this gave us a better understanding of what a PLC should truly be along with the steps we needed to take to become a cohesive group. The National School Reform Faculty is a professional development initiative of the Harmony Education Center in Bloomington, Indiana.

As we read and discussed the literature, we also used our meeting time to get to know one another better. It is important to develop positive relationships within a PLC so meaningful conversations can naturally occur and members feel comfortable in pushing each others’ thinking with probing questions and personal insights (Dana & Yendol-Hoppey, 2016). We established our relationships as a result of using several protocols recommended by the National School Reform Faculty organization. Some examples of protocols we used were Creating Metaphors (each member describes themselves at their best and relates it to something concrete, followed by discussion on their decisions), Change in Practice (a quick write and then presentation, reflecting on a time when change was needed), and Compass Points (where members move to a
position in the room indicating a preferred style of working: detailed, action, big picture, or caring. This is followed by discussion).

Once we established our PLC relationships and mindset, we worked to clarify our group goals and individual goals. Because a major challenge to PLC work can be the effective use of time, we needed to set a goal that would help us maintain focus as well as understand the resources we had available (Dana, Thomas, & Boynton, 2011). To help us set that focus, I modified the Teacher Inquiry Planning Template from the New Zealand Ministry of Education (Figure 1-2).

<table>
<thead>
<tr>
<th>Hunch/problem/trigger (what is outcome in my class that I want to work on?)</th>
<th>Evidence (How do I know this is a problem? Data may be quantitative or qualitative)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology PLC</td>
<td>Students need more exposure because they will be required to use technology in the future; as students use technology more often, their reticence should decrease and engagement should increase.</td>
</tr>
</tbody>
</table>

What do I already know that could be useful?
We all have basic technology knowledge, having used some tech in the past. Some of us have experience in different tools and share that expertise with the other members.

What new knowledge or capacity do I need?
How to implement the technology effectively so that it runs smoothly with the students; a way to work with the user restrictions that keep the students safe but also gives them access to educational tools. The knowledge about specific programs and how those programs fit the standard or subject effectively.

What are some possible strategies I could use?
- Pair-share with the subject areas of our PLC members to troubleshoot and brainstorm
- Test out the new tech on one student before releasing it to all the students or test it out on a class that has good rapport with that teacher
- Converse with other teachers who have already used it.
- Teach students one tool at a time so they can master it without being overwhelmed
- Interactive programming??

How will I measure change? How do I know it has made a difference?
- Increased student engagement
- Compare the new tech version with the old version to find out if students are more engaged and content knowledge has improved
- Compare students success after they are familiar with using the technology
- Observe students first for tech usage and content knowledge
- Whole-class participation increases
- Student feedback

Figure 1-2. Our PLC Inquiry Plan

In addition to understanding PLCs, we also worked on understanding technology integration. To do this, we listened to Jennifer Gonzalez’s podcast entitled “Is your Lesson a Grecian Urn?” After listening to the podcast, we wrote down our reactions and connections in our teacher journals. We also read Cifuentes, Maxwell, and Bulu’s
(2011) article “Technology Integration through Professional Learning Community,” creating a small poster we could refer to when creating technology-integrated lessons.

While the first step in establishing a PLC was to learn how to function as a PLC and set goals for our work, the second step was to learn what technology was available to us. I provided each participant with a license to *The 2018 Teacher’s Guide to Tech* by Jennifer Gonzalez. We spent two meetings looking through the guide, using its list of categories to direct our perusal. I shared the technology I’d used, giving an overview of how I used it and what my thoughts were. Everyone shared out tools they found interesting and conjectured how they might use it in the future.

The final step in the Readiness Stage was to examine previous lessons by measuring their level of integration. In the past, my school has used SAMR (Substitution, Augmentation, Modification, and Redefinition) as a tool to discern the level of integration, but I decided to introduce the PLC to the Technology Integration Matrix (TIMs), developed by the Florida Center for Instructional Technology.

We used the TIMs to not only see where we stood in terms of its categories, but also to set goals for ourselves. Cathy and Maggie determined they were at Entry level in terms of students’ Goal-directed Learning and therefore decided they wanted to improve in that area. Melissa found that she was at the Adoption level in Active Learning and decided she would focus on improving that aspect of her lesson while Becky evaluated herself as Adoption level in Knowledge Construction, setting her focus there.

To guide the group’s new lesson design with those goals in mind, I introduced the group to the STLDM. This is where my study began.
**Intervention Stage: Scaffolded TPACK Lesson Design**

The intervention stage concentrated on using the STLD Model over a seven-week period where we met every other week (except for Spring Break), encompassing five PLC meetings. In this section, I describe this seven-week time period week by week in general terms. Consistent with case study research, I will provide rich, thick description of our meetings and the specific ways they unfolded in Chapter 2.

During the first PLC meeting of the intervention stage, we discussed the STLD Model and how this lesson design model could help us effectively integrate technology that supports content knowledge in a pedagogically appropriate way. Included in this meeting, we reviewed some of the tech tools we learned about in the Readiness Stage. Since we evaluated lessons in the Readiness Stage, we selected a lesson to revise that currently lacked technology integration.

During the second PLC meeting in the intervention phase of this study, each PLC member planned a new lesson version, experimented with the new tech tool, and helped each other when needed. At the conclusion of this meeting, each participant was ready to implement the newly designed version of their lessons in their individual classrooms.

While our PLC meetings were a time to formally come together as a group, a well-functioning PLC supports each other between meetings (Dana & Yendol-Hoppey, 2016). During the third week, we did not hold a formal meeting; instead, teachers implemented their lesson and journaled, assessing the new lesson with the Technology Integration Matrix to determine if the lack of integration, complexity, and applicability are addressed.
We held a PLC meeting the following week at which time we shared experiences and reflected on our effectiveness of using the technology in supporting our content and the engagement of the students. Amid the sharing, we also offered each other suggestions to help improve the lesson and reviewed the STDLM. After refining our understanding of the tech tool and the STLDLM, we met again and designed a second lesson with the same technology but compatible content, assessing the degree of integration, complexity of the task, and relevance of the material.

Similar to week three, in the sixth week, we did not meet as a PLC, but implemented the new lesson in our own classrooms, journaled daily, and assessed the overall effect once again. The final PLC meeting of this cycle consisted of debriefing.

The activities that occurred in each week of the study are summarized in Figure 1-3.

<table>
<thead>
<tr>
<th>WEEK</th>
<th>PLC ACTIVITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Held a PLC meeting</td>
</tr>
<tr>
<td>Feb. 6</td>
<td>• Discussed the STDLM and reviewed the tech tools we learned about in the Readiness Stage</td>
</tr>
<tr>
<td></td>
<td>• Selected a lesson to revise and began brainstorming</td>
</tr>
<tr>
<td>Week 2</td>
<td>Held a PLC meeting</td>
</tr>
<tr>
<td>Feb. 20</td>
<td>• Planned a new version of the selected lesson using the STDLM, seeking help from other members when necessary</td>
</tr>
<tr>
<td></td>
<td>• Self-evaluated lesson and use of technology with the Technology Integration Matrix</td>
</tr>
<tr>
<td>Week 3</td>
<td>No meeting</td>
</tr>
<tr>
<td>Feb. 27</td>
<td>• Implemented lesson</td>
</tr>
<tr>
<td></td>
<td>• Journaled daily</td>
</tr>
<tr>
<td></td>
<td>• Assessed the overall outcome of the lesson</td>
</tr>
<tr>
<td>Week 4</td>
<td>Held a PLC meeting</td>
</tr>
<tr>
<td>Mar. 6</td>
<td>• Shared our experiences, reflected on what we have learned, and reviewed the STDLM</td>
</tr>
<tr>
<td>Week 5</td>
<td>Held a PLC meeting</td>
</tr>
<tr>
<td>Mar. 27</td>
<td>• Designed a new compatible lesson with the same technology, paying close attention to the Technology Integration Matrix</td>
</tr>
<tr>
<td>Week 6</td>
<td>No meeting</td>
</tr>
<tr>
<td>Apr. 3</td>
<td>• Implemented lesson</td>
</tr>
<tr>
<td></td>
<td>• Journaled daily</td>
</tr>
<tr>
<td></td>
<td>• Assessed the overall outcome of the lesson</td>
</tr>
<tr>
<td>Week 7</td>
<td>Held a PLC meeting</td>
</tr>
<tr>
<td>Apr. 10</td>
<td>• Shared experiences, learning, and insights</td>
</tr>
</tbody>
</table>

Figure 1-3. The chart for one cycle of using STDLM in our PLC
As I implemented the seven-week plan, I collected data to understand what the STLD looked like when it was used by teachers in a PLC and how the members of the PLC experienced the model.

**Data Collection**

As collecting data from a variety of sources allows for a deeper understanding of the experience, I used three different data collection strategies in this study: field notes, artifacts, and interviews. These strategies served to capture “the data’ of life in school” (Dana & Yendol-Hoppey, 2014, p. 85).

Field notes are a way of capturing what is happening in meetings and classrooms. They can take the form of scripting dialogue and conversations, diagramming the study site, noting what students are doing during observation, and recording questions. My field notes (Appendix B) consisted of scripting teacher talk that occurred at each PLC meeting because “field notes are not interpretations but rather focus on capturing what is occurring without comment” (Dana & Yendol-Hoppey, 2014, p. 92). To assist in the process of field noting, I audio recorded each PLC meeting. Because I was participating in the dialogue, I did not want to create an artificial atmosphere; therefore, I recorded the meetings and transcribed them at a later date as well as took notes by hand, recording my observations in detail afterward (Merriam & Tisdell, 2016).

Another source of data were the documents and artifacts produced during the study because when teacher-inquirers collect the papers related to their study, those papers become artifacts (Dana & Yendol-Hoppey, 2014). The primary artifacts I collected were the learning community teachers’ lesson plans and journal responses when using the STLD.
When journaling, I provided journal prompts to help direct the reflections on TPACK, lesson design, and technology integration. Because it can be difficult to recreate emotions, thoughts, and bursts of ideas a week or more after an experience, we made journaling a part of our PLC work. The journal provided a clearer picture of the full implementation of the TPACK lesson. The data from the journals also enhanced my understanding of the ways that the STDLM was strengthening the transition to technology integration. Subsequently, the journals served as a means for sharing our learning at future PLC meetings. An example of a participant's journal entry appears in Appendix C.

Finally, I conducted semi-structured interviews with each participant individually to aid in my understanding of each teacher's experience using the STLDM and participating in a PLC that focused on technological pedagogical content knowledge. Individual interviews were important here because I did not want participants to be influenced by the words of another. My questions were open-ended, allowing for probes when necessary. I focused on experience and behavior, opinions and values, feelings, and knowledge questions when creating the questions prior to the interview (Merriam & Tisdell, 2016). According to Merriam (1998), the best way to analyze data is to do it simultaneously with data collection; therefore, after each interview, I added questions to my list for the next interview such as questions involving 21st-Century Learning skills. Below are the base questions I used during the interviews.

1. What lead you to join the PLC?
2. What were your expectations when you joined?
3. In what ways were your real experiences in the PLC different or the same regarding your initial expectations?
4. Can you tell me a little about your past technology use before the PLC was formed?

5. How has your perception of TPACK changed throughout this study?

6. What was it like to evaluate previous lessons with the SAMR model and the Rigor/Relevance framework?

7. Can you recall and speak a little about when we first learned about the Scaffolded TPACK lesson design model?

8. Looking at your first draft of your STDLM plan and your revision plan, what is your perception about the effectiveness of the STDLM in terms of integrating technology?

9. What aspects of the STDLM did you perceive to be effective?

10. What aspects of the STDLM did you perceive to be ineffective?

11. How has your ability to integrate technology into your practice changed?

12. What were the changes you experienced overall in your professional practice?

**Data Analysis**

Data analysis is defined as “developing an understanding of what your data are telling you based on a close, careful, and critical examination of it over time” (Dana & Yendol-Hoppey, 2016, p. 57). In case study research, gathering multiple pieces of data is important. The data ultimately converge into one tightly woven analysis rather than individual pieces (Baxter & Jack, 2014). In qualitative studies, data collection and analysis occur concurrently. As I collected data, I previewed the fieldnotes and meeting minutes because they provided information as to how the PLC was functioning in terms of the criteria for effective PLCs. In addition, these data served as a barometer for progress made throughout the process, navigation of lesson design, and participants’ stress levels.

Coding happens in two stages. The first stage, First Cycle Coding, is the first impression of the research data (Saldana, 2016). The second stage of coding is Second Cycle Coding, and this is when the researcher is looking for patterns in the codes, such
as words or phrases that are repetitive, while synthesizing all data (Saldana, 2016).

After the study period concluded, I began First Cycle Coding by reading through each journal entry, typing them up, and collating the responses with the prompts. This allowed me to see each member’s responses side-by-side, which helped me look for similarities and differences. I read through each entry and pulled out the main idea by writing it to the side, which became a code because “a code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language based or visual data” (Saldana, 2016, p. 4). An example of my coding can be seen in Appendix D.

I later highlighted the similarities, looking for possible themes or claims. Next, I read through the interview transcripts, again, pulling out the main ideas and highlighting similarities. I decided to make a chart with the five categories that repeatedly cropped up: PLC, template, factors that hinder integration, 21st century learning skills, and TIMs.

After creating the chart, I drafted a data matrix which cross referenced all data sources and each PLC member with my two sub-questions (Appendix E). I went back through the journal entries and field notes, pulling out comments and codes, and sorted them based on the questions: how teachers experience the STDLM; what it looks like, and the features teachers perceive as having the most impact. The questions helped me get to the heart of my purpose and the matrix helped me to refocus on my research questions (Baxter & Jack, 2014; Cresswell, 2013).

When the data matrix was filled in, I turned to my field notes and the teachers’ lesson plans. I coded each and then added comments to the data matrix. In addition, I constructed data posters for each PLC member. Up until this point, I was looking at the
PLC as a whole. The data posters helped me look at each individual more closely. The posters contained their TIMs rating and goals, lesson plans, codes for each sub-question, and their transcript comments broken into the most common categories. From this initial analysis, I drafted possible claims.

The next step was to work on a thick, rich narrative of how the PLC meetings unfolded, and how teachers experienced the STLDM. By combing through my field notes and the members' journals, I was able to not only reconstruct what happened at each meeting, I was also able to discover further possible claims.

Because coding and data analysis is cyclical, I began my Second Cycle coding by creating a flow chart, combining all data sources, PLC members, criteria for effective technology integration, criteria for an effective PLC, reported hindrances to tech integration, and my two sub-questions. This flowchart helped me combine categories and develop claims for each sub-question.

**Trustworthiness**

Qualitative research is often thought of as less scientific than quantitative research because there is skepticism in terms of the validity and reliability of the research (Creswell, 2013). Merriam (1998) asserted that consumers of research need to know that the results presented are trustworthy. To establish trustworthiness, the researcher must take measures to account for construct and internal validity and reliability.

Construct validity is defined as “identifying correct operational measures for the concepts being studied” (Yin, 2018, p. 42). To ensure construct validity, I applied the criteria for effective PLCs as presented by Dana and Yendol-Hoppey (2016) to all work and meetings. I made sure that we kept our PLC on track with these criteria by referring
to them as a kind of checklist. In addition, when applying technology to our lessons, we
not only referred to the TIMs, but also looked to the seven criteria for effective
technology integration espoused by Cifuentes, Maxwell, and Bulu (2011).

Internal validity addresses the congruence of research findings to reality
(Merriam, 1998). Qualitative researchers seek to understand the meaning embedded in
other people’s experience and the information gathered is mediated through the
investigator’s perceptions. Because of this, the findings must be reflective of all the data
and must be proven valid. This can be accomplished through the establishment of
credibility, dependability, transferability, and confirmability (Rolfe, 2006).

Credibility can be enhanced by using multiple data sources and triangulating
them, looking for commonalities amongst all data. It is important to triangulate data
because “triangulation in qualitative research assumes that if multiple data sources
come to the same conclusion, then the conclusion must be accurate” (Tracy, 2010, p.
843). To demonstrate credibility, researchers should also supply rich, thick description
which will allow readers the opportunity to decide if the study can be transferable
(Creswell, 2013). To increase credibility, I triangulated the data from the artifacts, field
notes, and interview transcripts (Creswell, 2013). I provided rich, thick description that
allowed readers the opportunity to view our PLC meetings, the process of
implementation, and the teachers’ experiences when working with the STLDM.

The establishment of dependability means the research can be repeated and the
results are consistent (Cope, 2014). The aim is to make sure the findings correspond
with the data. I increased dependability with an inquiry audit, in other words, having an
outside person examine the process and analysis of the study. To accomplish this, I had
an external third party look through my coding methods to confirm that the codes I attributed to the data and the patterns I saw resonate with the data.

Transferability refers to the ability to apply results from one study’s context to other contexts. To increase transferability, I provided rich, thick descriptions of all meetings, data collection strategies, and data analysis so others can determine if this study’s methods and findings would be relevant to their contexts.

Confirmability occurs when the results can be proven to be the participants’ thoughts rather than the researcher’s biases (Cope, 2014). I asked the PLC members to read the transcripts from their interviews and look through my interpretations to check the accuracy of their voices and perspectives. They only found a few grammatical errors they wanted to fix, but otherwise agreed with the transcripts. An additional method to creating confirmability is being forthcoming with the researcher’s positionality. Hence, I offer a positionality statement at the end of this chapter.

Reliability refers to the extent the findings of a study can be repeated if the study is replicated (Merriam, 1998). To establish reliability, I used the case study protocol I developed so that others can recreate my study. I also documented all PLC activities in my field notes through copious notes. According to Merriam (1998), the researcher can increase reliability by being forthcoming with their positionality, triangulating the data sources, and creating an audit trail. To create an audit trail, “the investigator must describe in detail how data were collected, how categories were created, and how decisions were made throughout the inquiry” (Merriam, 1998, p. 207). This was done through my comprehensive sections on data collection and data analysis.
Researcer Positionality

As previously mentioned, to increase confirmability a researcher should reveal their positionality. Cresswell (2013) asserted that researchers should present their backgrounds, biases, and motives for their study to the intended audience as a means of transparency, alleviating concerns about the researcher’s position. Reflexivity is the process where the researcher presents this information because experiences and opinions do have a bearing on how we interpret data. It is impossible to come to teacher research without biases because our experiences and perspectives influence every decision we make. Therefore, in this section, I share my own background and experiences that led to this study.

At the time of the study I had taught language arts for 19 years and I have always been a teacher who learns and uses technology. I created my own classroom website well before school districts embraced Google Classroom. I did this to create open communication with families. I bought my own grading program for the lonely Mac I had in the back corner of my classroom seventeen years ago because I wanted the assurance that a computer calculation could bring to grading. As technology has advanced, I have consistently used technology tools as a means for instruction and student knowledge generation.

I wished to engage in this study not only because I see the importance of authentic technology integration but because I believe in preparing students for what is ahead in high school and college. Being a language arts teacher, there is something magical about holding a book in your hands, but being a student and a professional, I also know the digital world offers efficiency and professionalism. To help prepare all students for this digital world, I maintain that teachers must be prepared to integrate
technology. However, knowing how to upload a document to Google Classroom or recreate a quiz in Google Forms is simply a substitute for copying handouts. Teachers must learn how to use technology to support their content in a way that makes sense. Teaching students to create research-based blogs or to splice together interview audio to support a theme in a podcast is a much better way to teach content standards.

Therefore, I came to this work with a bias toward TPACK.

Also, due to my time in the University of Florida’s Curriculum, Teaching, and Teacher Education doctoral program, I have built a more robust understanding of PLCs. I trust that when PLCs are implemented correctly, they are effective venues for professional growth. I also expect that participants may come to the PLC with negative feelings about its effectiveness due to our school’s misuse of the term. Because of this negative association, we worked to clarify those misconceptions at the onset of our PLC work.

Finally, while designing this study, I asserted that combining a PLC as a means for professional development with a focus on TPACK will result in positive outcomes for the teachers involved. I understand that when analyzing data, I must look at the data’s representation and avoid imposing my own wishes on the data. To do this, I relied on the measures that I took to increase the trustworthiness of the findings.

**Summary and Overview of Dissertation**

In this chapter, I introduced the purpose and context of my study, reviewed the literature on professional learning communities, technology integration, and the Scaffolded TPACK Lesson Design Model, and discussed my methodology. Chapter 2 details my findings, which I present in the form of two case themes with six claims. Finally, Chapter 3 emphasizes the lessons I learned from my study, my overarching
statement of learning, my reflections on my practice, and suggestions for future research.
CHAPTER 2
FINDINGS

The purpose of this study was to understand what happens when the STLDM is incorporated into the fabric of the PLC experience for a group of in-service teachers at my school. The following two research questions informed my study: (1) What does it look like when teachers use the Scaffolded TPACK Lesson Design model in a PLC?, and (2) How do teachers experience the Scaffolded TPACK Lesson Design model as it unfolds within a professional learning community?

A hallmark of case study research is its rich, thick description providing “enough detail to show the author's conclusions ‘makes sense’” (Merriam, 1998, p. 199). Therefore, I will begin this chapter by addressing my first research question: What does it look like when teachers use the Scaffolded TPACK Lesson Design model in a PLC? To address this question, in the first section of this chapter titled “PLC Meetings and Work,” I used my data sources to reconstruct each meeting with the rich, thick description that case studies call for. Following my description of each PLC meeting, in the second part of this chapter, I turn to my second research question in a section titled “Teachers’ Experiences with STLDM.”

**Research Question One: PLC Meetings and Work**

**PLC Intervention Week One: Template and Ratings**

Our first meeting of the intervention stage of the study occurred on February 6, 2019. Because we met on our early release Wednesdays (the students go home an hour early on Wednesdays so the faculty can meet, plan, and confer with parents), my PLC members trickled in from their assigned duty stations. We had snacks and coffee as we chatted about our day, warming up to the work ahead of us in the next hour.
Becky sat with Maggie as she always did because, as Becky acknowledged, “I really don’t enjoy learning how to use new technology without help. During our meetings my partner, Maggie, is awesome. She always helps me out” (Becky’s TJ, February 9, 2019, p. 3). Everyone else spread out their computers, journals, and folders at their own table in my classroom, facing each other in a circle.

We began with distributing a hard copy of the STLDM template I created based on Chai and Koh’s model (2017). The template is comprised of all the questions in Chai and Koh’s model, but in a format where teachers can write in it (Appendix F).

Even though we had previously explored the Chai and Koh (2017) model, we went through the template and re-read each question to refresh our memories. Maggie pointed out the question “Can the topic be represented by technologies such that it becomes pedagogically more powerful?” This ignited the conversation about what pedagogically powerful means and how one can determine if a lesson or strategy is more pedagogically powerful.

Cathy noted “pedagogically powerful” can be a manual product or demonstration, and there should be a balance between technology and paper-pencil student products. Melissa posed the question, “How we can tell if something is more pedagogically powerful when technology is used?” Becky pulled a handout from her folder which listed Cifuentes, Maxwell, and Bulu’s (2011) criteria for effective technology integration:

1. an outside observer can see the technology activity as a seamless part of the lesson;
2. the reason for using the technology is obvious to the teacher, students, and others;
3. students are focusing on the learning rather than on the technology;
4. the teacher can describe how technology is helping a particular student;
5. the teacher would have difficulty accomplishing lesson objectives without technology;
6. the teacher can explain what the technology is supposed to contribute; and
7. all students are participating with technology and benefiting. (p. 61)

I reminded everyone technology can be used in both teacher instruction or in student products, and the key to being a good teacher is knowing our reasons behind the decisions we make. Becky brought up her lower level students who may need extra help navigating the technology and she was worried her content might suffer. Maggie interjected, reminding us, we were planning to use the same tech tool twice so we could move beyond the students “figuring out the tool” (Fieldnotes PLC Week 1, Feb. 6, 2019).

As we continued to pour over the template, two questions in particular gave us pause: What are students’ usual misconceptions? and What are the problems and necessary supports for the students to proceed with their learning? We felt these questions should be combined. Cathy suggested that one leads to the other. This prompted further discussion about other areas of the template seeming repetitive. Melissa pointed out we already fill in the objectives and standards on our school-required lesson plans and items such as these are unneeded (Fieldnotes PLC Week 1, Feb. 6, 2019). We decided to proceed with the template as it was designed, but to note possible areas for feedback as we worked through the process.
<table>
<thead>
<tr>
<th>LEVELS OF TECHNOLOGY INTEGRATION</th>
<th>CHARACTERISTICS OF THE LEARNING ENVIRONMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTRY LEVEL</td>
<td>ACTIVE LEARNING: Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.</td>
</tr>
<tr>
<td>ADOPTION LEVEL</td>
<td>Active Adoption: Conventional and procedural use of technology tools.</td>
</tr>
<tr>
<td>ADAPTATION LEVEL</td>
<td>Active Adaptation: Conventional independent use of tools; some student choice and exploration.</td>
</tr>
<tr>
<td>INFUSION LEVEL</td>
<td>Active Infusion: Choice of tools and regular, self-directed use.</td>
</tr>
<tr>
<td>TRANSFORMATION LEVEL</td>
<td>Active Transformation: Extensive and unconventional use of tools.</td>
</tr>
</tbody>
</table>

**ACTIVE LEARNING**
- Active Entry: Information passively received.
- Collaborative Entry: Individual student use of technology tools.
- Constructive Entry: Information delivered to students.
- Authentic Entry: Technology use unrelated to the world outside of the instructional setting.
- Goal-Directed Entry: Directions given; step-by-step task monitoring.

**COLLABORATIVE LEARNING**
- Collaborative Adoption: Collaborative use of tools.
- Collaborative Infusion: Choice of tools and regular use for collaboration.

**CONSTRUCTIVE LEARNING**
- Constructive Adoption: Guided, conventional use for building knowledge.
- Constructive Infusion: Choice and regular use for building knowledge.

**AUTHENTIC LEARNING**
- Authentic Adoption: Guided use in activities connected to students' lives; some student choice and exploration.
- Authentic Infusion: Choice of tools and regular use in meaningful activities.
- Authentic Transformation: Innovative use for higher-order learning activities connected to the world beyond the instructional setting.

**GOAL-DIRECTED LEARNING**
- Goal-Directed Adoption: Purposeful use of tools to plan and monitor.
- Goal-Directed Infusion: Flexible and seamless use of tools to plan and monitor.

The Technology Integration Matrix was developed by the Florida Center for Instructional Technology at the University of South Florida, College of Education. For more information, example videos, and related professional development resources, visit [http://mytechnomatrix.org](http://mytechnomatrix.org). This page may be reproduced by schools and districts for professional development and pre-service instruction. All other use requires written permission from FCT. © 2005-2019 University of South Florida.
Once we finished combing through the template, we took out the TIMs developed by the Florida Center for Instructional Technology at the University of South Florida (Figure 2-1) and the current lesson plans everyone brought with them. The plans consisted of lessons the PLC members wished to revise by integrating technology into them or reconstruct them entirely based on new tech tools. As shown in Figure 2-1, the matrix is broken vertically into the following elements: Active Learning, Collaborative Learning, Constructive Learning, Authentic Learning, and Goal-Directed Learning. These elements are based on the 21st Century Learning Skills. Horizontally, the matrix describes levels of integration: Entry, Adoption, Adaptation, Infusion, and Transformation. These levels slowly release the teacher’s control of technology to the students. The goal is for the students to eventually use the technology in innovative ways.

Each teacher rated their current lesson (Entry, Adoption, Adaptation, Infusion, Transformation) according to the Matrix. Table 2-1 lists each teacher’s goal, lesson rating, lesson content, and the technology they chose to use.

Table 2-1. A summary of each teacher’s first cycle rating, goal, lesson content and chosen technology

<table>
<thead>
<tr>
<th>Teacher</th>
<th>TIMs Focus</th>
<th>Rating</th>
<th>Lesson Content</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maggie</td>
<td>Goal-directed</td>
<td>Entry</td>
<td>Grammar</td>
<td>Google Docs table</td>
</tr>
<tr>
<td></td>
<td>Learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cathy</td>
<td>Goal-directed</td>
<td>Entry</td>
<td>Self-reflection on informative essay</td>
<td>Screencastify</td>
</tr>
<tr>
<td></td>
<td>Learning</td>
<td></td>
<td>Solar System</td>
<td></td>
</tr>
<tr>
<td>Melissa</td>
<td>Active Learning</td>
<td>Adoption</td>
<td>Solar System</td>
<td>Thinglink</td>
</tr>
<tr>
<td>Becky</td>
<td>Constructive</td>
<td>Adoption</td>
<td>Natural Selection</td>
<td>Thinglink</td>
</tr>
<tr>
<td></td>
<td>Learning</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

By rating the previous lesson, many of us discovered we are not as adept at integrating technology as we thought. Maggie admitted, “I use technology every day, but not to the
level this calls for” (Transcripts PLC Week 1, Feb. 6, 2019). The TIMs helped the members of our PLC see where they truly were on the continuum and set a plan for moving to more integrated levels. For example, the lesson Maggie brought was on grammar; she looked at her overall approach to teaching grammar and referred to the Matrix. She decided she wanted her students to become more independent, goal-directed learners; therefore, she began thinking of ways for her students to use technology to set their own goals and monitor their progress. Usually, she gives directions and provides all instructional materials, grading and recording the students’ practices afterward. Instead, Maggie wanted to create a way for students to do all those steps on their own. Cathy and I, being English Language Arts teachers as well, suggested her students could use some form of technology to monitor their progress in a grammar unit, perhaps creating their own method for this. Maggie liked the idea and turned to The Teachers’ Guide to Tech to look for ideas.

Cathy, on the other hand, needed a way to infuse technology with her current unit on expository and argumentative essay writing to prepare her students for the state writing assessment. She wanted her students to become more authentic learners by self-assessing their writing and reflecting on improvements. I suggested she use Screencastify to have her students compose an auditory reflection. Screencastify is a Google extension that uses your computer’s camera and microphone to record you or your screen with sound. Someone might use this extension to record a presentation or demonstrate something on their computer. I recommended that Cathy have her students record their reflections verbally because I have found when students are given the opportunity to speak instead of write, they tend to say more. I have used this tool to
provide feedback to students and I, too, was able to give more depth to my commentary than I would have if I had simply written my comments on their essays. Cathy decided she would explore this option more; so, we made sure the tool was on her computer and set up her account before she left.

While I was working with Cathy to set her computer up, Becky moved to Melissa’s table and they huddled together, conferring about possible units they could improve. Melissa, thinking about what her students need and wanting to direct her instruction toward those needs, decided:

I would like my students to move from simply receiving information about the solar system to becoming much more involved in learning the information on their own and then presenting it so I can see their learning (Transcripts, PLC Week 1, February 6, 2019).

They spent the rest of the meeting looking through The Teachers’ Guide to Tech because they were certain they wanted their students to create some sort of interactive poster, which is a web-based poster containing screens, links, and animated content, making the experience much more exploratory. Melissa’s target lesson was on a body or planet in space. Her old plan culminated with students creating a trifold brochure encouraging people to visit a body in the solar system for vacation (Melissa’s TJ, Feb. 20, 2019, p. 9). Becky’s unit was on natural selection. Previously, Becky had taught the lesson with Venn Diagrams and a video, with no student projects.

We concluded the meeting after an hour, deciding not to fill out the STLDM template until we felt sure about the technology options from which we might choose. Everyone wanted a little more time to intentionally look through the technology guide and to plan in their heads before committing anything in writing. I typed out our homework for the next meeting and sent it via email:
- Continue to search for tech to help us revise the current lesson so that it meets our TIMs goal
- Explore the tech tools we are considering, creating accounts if needed.
- Create a list of questions for the next meeting if you are having trouble with the tech (Email PLC Week 1, Feb. 6, 2019).

**PLC Intervention Week Two: Technology Exploration for Goals**

Our second PLC meeting was held on February 20, 2019. Only two PLC members were able to attend. Maggie sponsored our school’s tennis team and had a previously scheduled match that day. I gave her the agenda and journal prompts the morning before the meeting, but we only had a few minutes to chat about it. Cathy had a prior engagement but met with me later in the week during her planning period. Since we were all working professionals with other obligations (children, extracurricular sponsorships, personal appointments), this week was a testament to flexibility and adaptability. Melissa and Becky met with me during our scheduled time.

The meeting began with snacks and small talk, but we quickly got to work because Melissa and Becky had made up their minds that they wanted to use Thinglink, which is a free website requiring enrollment that allows users to upload a picture and create hyperlinks to other websites to deepen comprehension.

Since Melissa and Becky seemed to have a general game plan in mind, they arrived ready to put time into understanding Thinglink. I pulled up a sample I’d made three years before on the circulatory system for a Science meeting—Becky had attended that meeting, so she knew a little about the program whereas Melissa hadn’t been a teacher at our school at that time. I showed them some of the highlights and then they both set up their own accounts. Right away Becky wanted to know about student access and how she would receive the projects upon completion. Melissa saw
an option for buying student “seats.” The website is free, but if teachers want the ease of access to students’ projects and wish to monitor progress, then special enrollment, or “seats,” can be purchased. I suggested students could simply turn in the links to their projects electronically through our teaching platform, Google Classroom, but because Melissa wanted a direct and easy way to access them; she decided to pay for the seats.

Becky did not want to do that, so she would try my suggestion.

After I showed them how to add pictures and create links inside the pictures, Melissa suggested the creation of a student instruction guide, fearing her struggling students would become confused. Becky pointed out the section on the STLDM chart that asked for student supports. She noted that the technical instructions should be added there.

As Melissa and Becky worked on creating a student sample for their lesson topics, Melissa noted there wasn’t much room to type and explain the link labels in the program (Fieldnotes PLC Week 2, February 20, 2019). She expressed concern over whether this program would ultimately demonstrate student learning if the text capacity was limited. They tabled this discussion until they had time to play with the program more, as our hour was nearly up. Melissa and Becky began writing out their new lesson on the STLDM template as a means of mentally working through the possible problems with the technology and planning out exactly what they wanted the students to demonstrate, but the templates had to be finished on their own time.

At the end of the meeting, I handed them their journal prompts for the week. We became accustomed to bringing our journals to our meetings and writing in them during the Readiness Stage of our PLC meetings. As we read over the prompts, I asked Becky
and Melissa to respond to the first three when designing their lesson and the last two prompts after completing the template:

**Lesson considerations when designing**

- What is the content of the lesson you are changing?
- When you evaluate your old lesson using the TIMs, where does it fall?
- Which component would you like to work on with this lesson? Why?

**After completing the Lesson Design template**

- Can you explain what you were thinking as you completed the Lesson Design Template?
- Which aspects and/or prompts stood out to you? Why? (PLC Week 2, February 20, 2019).

After discussing the prompts, Melissa and Becky left the meeting eager to explore Thinglink more and to finish their STLDM templates.

Later in the week, Cathy came to my classroom so I could help her learn to use Screencastify. Cathy’s initial plan was to have her students hand-write their essays while using technology to self-reflect. She also wanted students to use highlighters to break down the parts of their essays. It didn’t occur to her the students could type their essays (which the state assessment requires) and use the digital highlighting tool to break the essays apart. We discussed how her students could use the technology in a more meaningful way, similar to the actual test. She reluctantly agreed to consider this option. I helped her add Screencastify to her Chrome extensions and showed her how to use it. She did not want to record herself in her sample, so I appeared on screen for her. After recording her demonstration video, I gave her the journal prompts and then she left to complete the template on her own. The week passed without meeting with Maggie again.
Not having focused time with Maggie that week made me think about whether we were still holding true to the criteria for effective PLCs presented by Dana and Yendol-Hoppey (2016); therefore, I decided to take the time to look through the list, mentally noting any weaknesses:

- evaluate student, teacher, and school learning needs by reviewing data on teacher and school performance;
- define a clear set of educator learning goals based on analysis of data;
- achieve educator learning goals by implementing coherent, sustained, and evidence-based learning strategies that improve instructional effectiveness and student achievement;
- provide job-embedded assistance to help teachers transfer new knowledge and skills to the classroom;
- regularly assess the effectiveness of PLCs in relationship to ongoing improvements in teaching and student learning; and
- request external expertise when the community determines it is needed. (p. 3)

I felt like we were meeting all the criteria, but I wanted to do my due diligence by alerting the head of our technology department in case we ran into roadblocks with our PLC work. The technology department head is an expert on hardware and some online programs. It was important to let her know what we were working on and to convey to the PLC members that her services were available if needed. Therefore, I sent out an email to all PLC members with the reminder that help was close-by during the interim between meetings.

**PLC Intervention Week Three: Implementation**

We did not meet in week three because the PLC members were implementing their lessons and using their journals to reflect. I provided the following prompts to aide their reflection:
• Describe your experiences leading up to the implementation.
• Explain how you felt about the preparation.
• Explain how the technology you chose enhanced your previous lesson (or did not).
• Explain the role that the lesson design template played (E-mail, Week 3, February 27, 2019)

To illustrate the work the members did between the meetings, I now present Becky’s lesson revision in figures 2-2 through 2-5. Notice how the old 2018 version required her students to listen to information from a teacher lecture or videos. The students were spectators to the learning. However, through her completion of the STLDM, Becky shifted the onus of learning to the students as they explored information and assembled relevant facts for a presentation. Her new 2019 version held students accountable for searching for the information and becoming the expert.

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**Figure 2-2. Becky’s old lesson plan from 2018**

<table>
<thead>
<tr>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Objectives</strong></td>
<td><strong>Objectives</strong></td>
<td><strong>Objectives</strong></td>
<td><strong>Objectives</strong></td>
</tr>
<tr>
<td>Activities and Assignments</td>
<td>Activities and Assignments</td>
<td>Activities and Assignments</td>
<td>Activities and Assignments</td>
<td>Activities and Assignments</td>
</tr>
<tr>
<td>Holiday</td>
<td>Students will explain the theory of evolution by natural selection over time.</td>
<td>Students will explain the theory of evolution by natural selection over time.</td>
<td>Quiz over standards/vocabulary</td>
<td></td>
</tr>
<tr>
<td>Page 411-422 Cornell Notes</td>
<td>DE Video Notes</td>
<td>Finish as needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DE Video Notes: Form and Function using guided note sheet.</td>
<td>Compare/contrast Land Marine Iguana using venn diagram</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quizlet posted on GCR</td>
<td>RE Quizlet posted on GCR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other study for quiz: Keep all science papers in the science section of your binder. Number all your assignments according to the assignment log.

Other study for quiz: Keep all science papers in the science section of your binder. Number all your assignments according to the assignment log.

Other study for quiz: Keep all science papers in the science section of your binder. Number all your assignments according to the assignment log.

Other study for quiz: Keep all science papers in the science section of your binder. Number all your assignments according to the assignment log.
Figure 2-3. The front side of Becky’s STLDM for her first cycle

Figure 2-4. The back side of Becky’s STLDM for the first cycle
PLC Intervention Week Four: Sharing and Brainstorming

Our next PLC meeting was held on March 6, 2019. The objective for this meeting was to share our experiences with implementing the revised lesson and to brainstorm our next cycle. As the group came together, they were already buzzing with excitement and frustration about how their lessons went. Again, Maggie was unable to attend because she had another tennis match. She caught up with me at lunch and I briefed her on the agenda. She told me she had implemented her lesson and felt like everything went well. I asked her if she needed any help, but she said she was fine. When we ended our impromptu meeting, I told her I would email her our homework.

In our PLC meeting, each member took turns sharing how their new technology infused lesson went. At the very beginning, Melissa, who worked with Becky using Thinglink, admitted things were going slowly by relating her technical issues:
I bought 30 class seats in Thinglink so we could use them in pairs in my advanced classes. But it got all messed up. To make sure we could get on, I had some students join it. I figured I could just delete the class afterward and then we could go from there. No. There was a problem. They are attached to my name, not in a class, and now they can’t join a class. I have called the company but have gotten no response (Transcripts, PLC Week 4, March 6, 2019).

Because of the issues with seats, she allowed the students to choose from three different avenues: Google Slides, Thinglink, and paper/pencil. She really wanted her students to have a choice, because this is an indicator of a higher TIMs level: Infusion. Melissa reported that the students who could access Thinglink really liked it thus far and enjoyed using something new. At the time, they were still finishing up the project, but Melissa was optimistic.

When asked about her experience with Thinglink, Becky immediately said, “Well, it is always good to think about what possible problems might occur during the lesson and having seen Melissa’s struggles, I decided to go a different route” (Transcripts, March 6, 2019). She decided to use Google Slides since she hadn’t used it much with her students. She believed she prepared her students well with an example and clearly defined instructions as to what needed to be on each slide. She also relayed that if students wanted to do something on their slide show that she didn’t know how to do, there were pre-selected students who could help their peers by plugging their own device into the interactive whiteboard for a short demonstration. Becky stated that she felt like the students improved their technology skills even if content was on the “back burner, but this was not a Grecian Urn” (an activity consuming a great deal of time and is fun, but the concept could have been learned with a much shorter strategy) (Transcripts, March 6, 2019). It was important to her that all on-task time was intentional and overall, Becky liked the use of the technology, though one concern
surfaced: students cheating. She discovered some of her lower level students were using the “share” feature in Google Slides with other classes, allowing them to copy and paste slides into their presentations without doing the work. When she became aware of the problem, she told her students she would penalize anyone who did this. She also explained (and exaggerated) how she could track all changes through the program and catch them if they did copy and paste. She felt like the issue was handled and still felt optimistic about the technology.

On the other hand, when it was Cathy’s turn, she expressed how she felt anxious because she didn’t have enough time to fully prepare for introducing her students to the technology, Screencastify. Cathy relayed her past technical issues and told us how she is leery of “things not working when she needs them to” (Transcripts, March 6, 2019). She went on to say because she had “cold feet” she gave her students the option of using Screencastify or paper/pencil. To her surprise, she “had a lot of takers. They were excited and they were engaged, having never seen it before. So, they thought it was the coolest thing” (Transcripts, March 6, 2019). Cathy divulged, though, “They didn’t have a quiet place at school to record themselves; so it all had to be done at home and some of my students don’t have internet access” (Transcripts, March 6, 2019). Cathy also mentioned she was afraid the novelty would wear off but hoped not. At that point, she had not watched the video recordings, but was looking forward to exploring them.

Since Maggie was not in attendance, she had put her journal and lesson plan in my school mailbox. Maggie’s lesson included students peer editing each other’s work. Once students received feedback, they charted their errors in an online Google Docs table. I read aloud from Maggie’s journal:
I really enjoyed using this technology as a new way of holding students accountable because it did just that. Students knew that when they were given peer feedback, their peer would be utilizing that feedback and would be counting on them. The kids were engaged. Although the technology added an extra step, it was worth it because the students had to take care and put thought into their feedback (Maggie’s Journal, February 27, 2019).

After everyone had shared their experiences, we discussed our next steps. A new STLDM chart was given out and we created a list of homework:

- Decide on and find old lesson that you want to revise
- Complete journal prompts, which will help you plan for the next revision
- Make adjustments to the technology as needed (contacting company about student seats, finding a quiet space for recording, etc.) (PLC Week 4, March 6, 2019).

**PLC Intervention Week Five: Second Lesson Planning**

Due to Spring Break, there was a three-week lapse between PLC meetings. Our next meeting was held on March 27, 2019. This meeting was much more unstructured because the teachers just wanted time to work on their next lesson. Again, Maggie was missing, but we spoke later in the week and I gave her the journal prompts.

The second revised lesson would repeat the use of the same technology; our assumption was the students would move from focusing on the tech tool to focusing more on the content since they had experience with the technology. In addition, we felt we all had a better grasp of the technology, which would allow everyone to embrace more nuances of the tool.

Everyone brought a copy of their old lesson plan for this second cycle of revision and we rated it according to the TIMs. All teachers decided to continue working on the same TIMs goal but to either increase their level of integration or include a secondary goal. For example, Becky’s original goal was Constructive Learning but her new goal
for the second revised lesson added Collaborative Learning. She also added in an element of choice, allowing her students to create partnerships and determine the elements on each slide. Table 2-2 summarizes each member’s second rating, goal, content, and technology tool.

Table 2-2. A summary of each teacher’s second cycle rating, goal, lesson content and chosen technology

<table>
<thead>
<tr>
<th>Teacher</th>
<th>TIMs Focus</th>
<th>Rating</th>
<th>Lesson Content</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maggie</td>
<td>Goal-directed Learning</td>
<td>Entry</td>
<td>Grammar</td>
<td>Google Docs table with Noredink.com Screencastify</td>
</tr>
<tr>
<td>Cathy</td>
<td>Goal-directed Learning Constructive Learning</td>
<td>Adaptation</td>
<td>Self-reflection on argumentative essay</td>
<td></td>
</tr>
<tr>
<td>Melissa</td>
<td>Active Learning Collaborative Learning</td>
<td>Adoption Adaptation</td>
<td>Ecology Review</td>
<td>Thinglink Google Slides</td>
</tr>
<tr>
<td>Becky</td>
<td>Constructive Learning Collaborative Learning</td>
<td>Adoption</td>
<td>Animal Biomes</td>
<td>Google Slides</td>
</tr>
</tbody>
</table>

During this PLC meeting, all members were much more autonomous, and my role was simply to act as a sounding board when needed. Becky’s new lesson dealt with animal biomes. She wanted students to work on their research skills and their understanding of biomes, versus the intricacies of Google Slides. She also felt that allowing students to partner would help her lower-level students. In the past, Becky did not have her students make a product for this lesson; she had them complete a worksheet from their consumable textbook. After seeing the success with the last technology infused lesson, she hoped her students would “deepen their understanding of the content by interacting with it” (Becky’s Interview, April 16, 2019).

Melissa chose an ecology project where students would be able to choose from Thinglink, Google Slides, or paper/pencil to construct their final product. Much like
Becky, she previously had her students complete the pages in their consumable text and take guided notes from a lecture. During the second cycle of using the STLDM, she wanted her students to become more active and collaborative. Her goal for this lesson was to move from Adaptation to Infusion, giving students more choice and freedom. Melissa described the changes in her journal, “I chose the context and general content but the students chose the tools and the overall outcome” (Melissa’s TJ, March 27, 2019, p. 17).

Cathy decided to repeat the entire Screencastify process with an argumentative essay for this cycle; however, she wanted to improve her instruction by including a minilesson revolving around reflective thinking and self-evaluation. After viewing some of the first cycle Screencastify videos, she realized her students seemed to struggle with knowing what to say about their own writing. In this second cycle, her new understanding of the students drove the direction of her lesson. She wrote in her journal, “Students need more structure in self-assessing strengths and weaknesses of their written essay. I will provide a guided question sheet for the students to use” (Cathy’s TJ, March 27, 2019, p. 9). Cathy planned her mini-lesson with examples and non-examples and crafted a guided question sheet that mirrored what her students learned about self-evaluation.

After spending the hour working on individual plans, I shared the next journal prompts. No one had finished their STLDM chart; therefore, the chart and prompts were completed outside of the meeting:

**Lesson considerations**

- What is the content of the lesson you are changing?
- When you evaluate your old lesson using the TIMs, where does it fall?
- Which component would you like to work on with this lesson? Why?
- Is it the same component as last time?

**After completing the Lesson Design template**

- Can you explain what you were thinking as you completed the Lesson Design Template this second time?
- Which aspects and/or prompts stood out to you? Why? (PLC Week 5, March 27, 2019).

While Maggie did not attend the meeting, when we met later in the week, she told me she planned to continue with grammar, but to attack it a little differently. She was planning to use more technology in the second cycle by introducing the online program Noredink.com, which administers a pre-test and offers video tutorials and practice problems on various grammatical errors. Her students used the pre-test to set goals, explored areas of weakness through lessons on Noredink.com and completed practice problems on their own. Once the students felt remediated, they took the pre-test again and used the Google Doc table to track their progress.

**PLC Intervention Week Six: Implementation**

Again, so the teachers could implement their lessons and journal, we did not meet during week six. The prompts for their journals helped us to share and debrief during the final PLC meeting.

- Describe your experiences leading up to the implementation.
- Explain how you felt about the preparation.
- Explain how the technology you chose enhanced your previous lesson (or did not).
- Explain the role that the lesson design template played (purple sheet) (E-mail, Week 5, April 3, 2019).
PLC Intervention Week Seven: Sharing and Debriefing

All PLC members were able to attend our final meeting on April 10, 2019. We spread out across a large table, allowing room for snacks and drinks as a means of celebration. Everyone was in good spirits and was happy to share all they had learned with the second revised lesson.

As everyone was eating, we gathered all journals, STLDL charts, and old lesson plans for discussion. Maggie admitted she was a little nervous to share because she had missed so many meetings, but she also made sure to note that she had done all her homework. Since she had already started talking, she decided to share her experiences first. While debriefing, she realized her technology integration was not as purposeful as she had hoped. One section of the template asked whether the lesson could be done without the technology just as well. The intention of this question was to help teachers decide whether technology made the instruction more pedagogically powerful. This prompt directly speaks to technological pedagogical content knowledge, whether the technology supports the content. In Maggie’s case, her students could have used paper and pencil to do the same tasks. Becky pointed out, though, that perhaps the technology played a role in helping the students stay more organized, allowing easy access to their work. Maggie agreed and admitted attending the meetings would have helped her work through this discrepancy. She explained that the next time she intentionally incorporates technology into a lesson, she will use it for remediation in addition to tracking progress. She acknowledged that, in hindsight, her students weren’t really using technology for Goal-directed Learning but maybe for Constructing Knowledge.
On the topic of constructing knowledge, Becky jumped into the conversation because her focus for her students was also Constructive Learning. She conceded that using the same technology, Google Slides, a second time proved more valuable than she originally thought. She asserted that the repetition of the technology tool helped students move from simply learning how to use it to focusing on deepening their content knowledge.

Cathy expressed how she felt differently. She explained that the novelty of Screencastify had worn off for her students, which is what she feared, and most of her students chose to use paper and pencil for their work. She felt the technology invited more work, albeit deeper thought, and the time of the year found her students apathetic, “30% used it the first time but less than 10% used it this time around. It was extra credit. They are over the writing and they didn’t want to invest the time” (Transcripts, PLC Week 7, April 10, 2019). Cathy concluded that the time of year had a great deal to do with students’ motivation.

Melissa relayed that due to technical issues with Thinglink, none of her students opted to use it for their assignment. Instead, all but one student chose Google Slides, a program with which they were all well acquainted. Melissa reported that the one student who didn’t use technology (she created a paper/pencil product) avoided technology at all costs and did not try to use Thinglink or Google Slides. “I could feel the students’ frustration with Thinglink; so, I confided in them I had been frustrated, too, and it was okay to just use Google Sides. They were worried I would be mad” (Transcripts, PLC Week 7, April 10, 2019). She went on to offer advice to anyone else who wanted to use
this technology tool, “Make sure you have a contact at the company who is reliable and will respond to you in a timely manner” (Transcripts, PLC Week 7, April 10, 2019).

At the conclusion of the meeting, we scheduled one-on-one interviews to be held within the next week. Everyone gave me their journals, old lesson plans, and STLD templates before they left. They each expressed their gratitude for the opportunity to work on their technology-infused lessons during the school year.

**Research Question Two: Teachers’ Experience with the STLDM**

Having provided the rich, thick description of each PLC meeting in the previous section, I turn now to the second research question and report on how the teachers experienced the STLDM as it unfolded within a PLC. In this section, I represent my findings related to how teachers experienced the STLDM by reporting case themes. According to Ryan and Bernard (2003), a case theme is a pattern of shared meaning found throughout the case. Through the data analysis process described in Chapter 1, I derived two case themes in this study: Affordances and Considerations. After providing a general description of each case theme, I further describe the theme through the statement of claims, defined by Merriam and Tisdell (2016) as inferences drawn from the data in order to make meaning. The statement of claims is one suggested strategy for illustrating a teacher’s findings as a practitioner researcher (Dana & Yendol-Hoppey, 2014), and as such, is particularly suitable as a strategy to help illustrate, organize, and communicate findings in this practitioner research dissertation. Dana and Yendol-Hoppey (2014) state the importance of identifying the data that support each finding, and subsequently selecting excerpts from your data “to be used as evidence for your claims” (p. 171). Therefore, after naming each claim, I support them with salient
evidence from all the data sources in this study: fieldnotes, meeting and interview transcripts, teacher journals, and lesson plans.

**Case Theme One: Affordances**

The first case theme, Affordances, describes the parts of the STLDM template and the process which helped the PLC members integrate technology in meaningful ways. The case theme “Affordances” unfolds through the description of three claims:

- The use of the Scaffolded TPACK Lesson Design Model and the Technology Integration Matrix provided scaffolding for teachers to intentionally reflect on their practice.
- The use of the template with the Technology Integration Matrix forced teachers to focus on their students when revising a lesson.
- The use of the same technology through two cycles of the Scaffolded TPACK Lesson Design model helped teachers and students focus on content rather than just technology.

**Claim One: The use of the Scaffolded TPACK Lesson Design Model and the Technology Integration Matrix provided scaffolding for the teachers in my study to intentionally reflect on their practice.**

Through journal responses and personal interviews, it was evident the STLDM presented an opportunity for teachers to reflect on their previous lesson and more thoughtfully plan their new version. Melissa admitted that initially completing the template was tedious, but it forced her to reflect on what she was doing. In our final meeting, she confessed:

> While I didn’t like filling in the plan because it was repetitive since we need some of the same things on our actual lesson plans, the template did make me stop and consider certain aspects I usually never would, like the pedagogically powerful thing. (PLC Week 7, April 10, 2019).

Similarly, Maggie wrote in her journal about how the STLDM’s question on powerful pedagogy created more awareness about the intention of technology planning:
It made me think of more ways that I could utilize technology to make my lesson more pedagogically powerful (this actually was thought about before filling out the template based on the last lesson I created with the tech tool). The design template continues to make me aware of good practices to use when designing a lesson. (Maggie’s TJ, March 27, 2019, p. 6)

In her interview, Maggie said the most effective aspect of the STLD template was this section because it made her think about whether the technology was “actually beneficial or just a bright, shiny object” (Maggie’s Interview, April 19, 2010). Furthermore, Maggie elaborated in her teacher journal:

Technology should only be used to enhance learning. I learned to really focus on how to use technology carefully to make students successful. It should never just be an addition--it should be seamless. That is what this template was able to help me accomplish. (Maggie’s TJ, February 20, 2019)

The reason why the prompt “Can the topic be represented by technologies such that it becomes pedagogically more powerful?” sparked so much thought is because until Maggie had to articulate her motives with technology, she had always taken it for granted that when technology was used, learning would happen. Following the PLC meetings and the study, she now feels like she will use technology more efficiently and make sure there is a direct link to student learning when students plug-in. Cathy echoed this sentiment in her interview:

I think it was very helpful and that I was able to look at different ways to present things through technology. No Grecian Urns. I really have to think about what the objectives are and how to use technology with fidelity. It’s not to create something fancy, funny or cute. [The use of technology] had to have some kind of learning outcome. (Cathy’s Interview, April 17, 2019)

Good teaching requires the learning objectives, assessments, and instructional strategies be aligned. Cathy felt the suggestion of designing from the most difficult to the least difficult task was important:
The aspect and/or prompt that stood out to me most in the lesson design model was the “learning objectives” section. This allowed me to think on the most cognitively challenging parts of the overall lesson. I felt this was helpful to me to stay on target with the lesson objectives while remaining on the learning outcome of the lesson, thinking of each step or stage needed for the success of my students. (Cathy’s TJ, February 20, 2019, p. 5)

Becky also acknowledged in her interview the template forced her to think more critically about her objectives and how to get her students to successful mastery:

> It was a nice reminder of objectives. What is your real outcome and what do you want to get out of it? So, for me, it was a gentle reminder. I really enjoyed thinking more critically about my goals and when I’m supposed to teach something and why I’m doing it because after you’ve been doing it for such a long time, you just kind of let some things slide. (Becky’s Interview, April 16, 2019)

In her interview, Melissa also expressed, overall, the template made her much more reflective:

> I really thought it helped me self-reflect and I’m hoping that stays with me for the long term because we do get caught up with this job and what has to be done in the day-to-day like grading, paperwork, etc. There’s not a lot of time to reflect or we don’t take the time to reflect. (Melissa’s Interview, April 18, 2019).

Consequently, through reflection, PLC members changed their perceptions about the importance of technology and the place it holds in instruction. Initially, the members of the PLC viewed technology as something they had to incorporate when they were evaluated or simply as a platform for disseminating information to students. As such, technology was very much an afterthought. I noted this in my fieldnotes after my meeting with Cathy: “Cathy is still thinking of technology as an end result as opposed to a process” (Fieldnotes, February 22, 2019).

Now, many of the PLC participants have decided technology is important to enhance students’ 21st-Century Learning skills. They began to perceive technology
integration as beneficial and not quite as scary as they once did. Cathy admitted that she started out very low on the TIMs rating (the matrix used to measure levels of technology integration), but she now wants to increase her usage:

When I measured myself on the TIMs, that was pretty eye opening because I was on the low end. I'm just not experienced with a lot of that. I guess for the 21st-Century Learning skills, I know I need to incorporate more of this. I think it’s good for my students because that's what they are going to need in the workforce and in college. (Cathy’s Interview, April 17, 2019)

Agreeing with Cathy, Melissa commented on how she will continue to use the matrix and employ more technology into her units. “Thinking about the matrix, I will probably keep a copy of the matrix to look at. I'm thinking about the 21st learning practices. I have 21st Century students, even though I'm like 1990s. It is important” (Melissa's Interview, April 18, 2019). Likewise, Maggie felt as if she didn’t use technology to its full potential before the PLC meetings began:

I feel like I'm in that middle category where I use technology but just in some familiar ways that have been used before and I feel like I will now look or think outside the box. I don’t think I have utilized it as much as I could have in the past but now I want to branch out. (Maggie’s Interview, April 19, 2019)

In sum the teachers in my PLC were able to think critically about how technology was being used in their instruction and changed their perceptions about the importance of it. Dana and Yendol-Hoppey (2014) emphasized that “reflection is critical to good teaching” and that teachers rarely carve out time to reflect (p. 22). Sheffield and Blakely (2018) described a professional learning model, the Reflection Formation Identity Model, where reflection is a key component to technological understanding. In their model, teachers explore technology, reflect on their personal experience, implement a lesson derived from their experience, and then cull student data in order to reflect on
student learning so lessons can be revised. They asserted that reflection is essential for targeting student needs. In this study, we learn when teachers use the STLDM and the TIMs matrix, they become much more aware of their technology use and the intention behind the instruction. The heart of technological pedagogical content knowledge is understanding how and when to use technology to support instruction. Therefore, teachers who intend to incorporate more technology into their instruction may wish to use the STLDM and TIMs in concert.

Claim Two: The use of the template with the Technology Integration Matrix forced the teachers in my study to focus on their students when revising a lesson.

The reflection and critical thinking the PLC members spoke of, ultimately, led to instruction that was much more student-driven as opposed to teacher-driven. Because much of what teachers do is heavily regulated by state standards, it can become very easy to let the standards lead the lesson, but the template brings the students to the forefront by asking about the learner types, usual misconceptions, the structure of the lesson, and how the lesson will be assessed. Maggie highlighted this in her journal responses: “For me, the lesson design template brought about a sense of awareness to the needs of my students. Ultimately, it helps you avoid making assumptions and future frustrations due to unexpected bumps in the road” (Maggie’s TJ, March 27, 2019, p. 9).

The use of the template to create lessons gave Becky a better understanding of how to “connect the dots” for her students and she also became aware of just how interested she was in this concept (Becky’s Interview, April 16, 2019). “I became very aware that those connections between concepts is super important to me and I really enjoyed figuring out how to facilitate those aha moments for the kids” (Becky’s TJ, April 6, 2019, p. 17). Becky’s second cycle lesson plan indicated this shift in thinking
because she wrote “Remind students that biomes connect back to our lesson on adaptation” (Becky’s Lesson Plan, April 3, 2019).

Our PLC used the TIMs to set goals for the revised lessons. The TIMs model speaks to the 21st-Century Learning skills that permeate many of our district’s initiatives. By combining the TIMs with the STLDM, teachers were forced to think about where their students were in terms of technology usage and where they need to be. Melissa pointed out in her interview:

I thought the TIMS matrix really helped me think: well, can I give them more tools and fewer directions or give them a direction but not be so specific on the outcomes? So the outcomes would be more student directed and less teacher directed. (Melissa’s Interview, April 18, 2019)

This was a new concept for the PLC members because they had always thought strictly in terms of their content area as opposed to bringing in 21st-Century Learning skills. Because of this shift in thinking, Melissa changed her mindset between creating her first lesson and her second lesson, allowing the students much more freedom and choice:

I’m kind of stagnant on the left side of the matrix instead of trying to move myself and the kids over to where they are more independent learners. It’s so funny, we complain about them not being problem solvers, but then we don’t really let them solve problems. We are really micromanagers so often; we don’t really give them a chance to be creative. I think that was really powerful for me, thinking that I’m supposed to really just give them the tools and a direction, I should not have everything be quite so dictated. They should have more independence in their learning. (Melissa’s Interview, April 18, 2019)

During the interview, Melissa also concluded that the technology skills she is teaching her students translate into their future educational aspirations and careers. She noted:

That’s the difference that I need to consider in teaching just because they’re not in midlife like I am. They need to be ready for a world that I’m not necessarily going to have to be ready for and that it’s important to get them ready for it even here in middle school. I need to consider those learning skills and when I give them something to do, or if I am discussing
In sum, like Melissa, who considered her students’ future goals, all PLC members began to think more about their students’ needs and how to get them to mastery of the standards instead of leading with the standards, which can create gaps in learning if students don’t understand the material. As Hanewicz, Platt, and Arendt (2017) advised, when teachers create instruction centered on students (learner-centered) as opposed to instructor-centered, learning is enhanced. In this study, we learn that the use of the STLDM combined with the TIMs promoted a more student-centered approach to teaching. Therefore, teachers who wish to enhance student learning through the incorporation of technology into their instruction may want to consult the TIMs as they use the STLDM, which will help teachers to set goals and monitor their own progress.

Claim Three: The use of the same technology through two cycles of the Scaffolded TPACK Lesson Design model helped the teachers in my study and their students to focus on content rather than just technology.

In addition to generating a more student-driven method of instructional design, the repetition of using the same tech tool enhanced instruction because it allowed students to deepen their knowledge in both content and technology. The reason behind utilizing the same technology tool was to give students the opportunity to learn how to use the technology; therefore, in the future, they have one more tool in their arsenal when trying to determine how to demonstrate understanding. Initially, Becky admitted she was wary about using the technology twice, but she discovered how crucial that aspect was:

I didn’t really think about it at the time but having to repeat the same use of technology turned out much better than what I had anticipated because I wasn’t really expecting so many of my students, including my two regular
Becky went on to explain it was obvious they had improved in terms of technology and content because they felt more confident in how they were using the technology tool so they could invest time in what they were saying about their topic. “The depth of thinking amazed me” (Becky’s Interview, April 16, 2019). Her students were able to make connections on their own as opposed to simply regurgitating a lecture.

Like Becky, Melissa also experienced the depth of understanding with her students. She explained,

> By using Google Slides already, they learned how to do more the second time. They inserted videos and pictures that really helped them explain their concepts. Those visuals helped them make connections they otherwise wouldn’t have. They truly understood their material and I could see that clearly the second time around. (Melissa’s Interview, April 18 2019)

In addition, Cathy, the most reticent technology user, asserted she was able to figure out what her students needed and remediate because she utilized the same technology twice. By making a change in her instruction, her students were able to think more critically in their second use of Screencastify. She described her initial realization and plan to adjust in her teaching journal:

> I didn’t realize how much my students needed help with identifying strengths and weakness in their writing until I watched their Screencastify videos. Because we will use the Screencastify again, I will provide a guiding question sheet that they can use as a reference on creating their Screencastify reflection. I know they are engaged in the technology and now it is my job to make sure they understand how to use it in a more reflective way. (Cathy’s TJ, March 27, 2019, p. 9)

Comparatively, Maggie discussed how making changes in her second cycle of using Google Docs gave students a better understanding of grammar concepts. She believed the addition of Noredink.com in the second cycle was crucial to student learning and
she would never have made the addition if she hadn’t used the technology for two cycles. The combination of Noredink.com and a Google Docs table created accountability for her students and another layer of explanation she that hadn’t given them before.

In sum, by allowing students to practice using the same technology, the teachers in this study enabled their students to get past the heavy task of learning how to use the technology and move to a more complex comprehension of the content. According to Koh et al. (2015), students must become “21st century knowledge workers” because they will be expected to use technology when thinking creatively, productively, and collaboratively when they enter “the real world” (p. 538). We learn in this study that experiencing the same technology tool more than once can move students from a primary focus on how to use the technology to deeper learning and skill transference. The more students can practice using technology, the more likely the technology will become a tool for learning, enabling students to develop into the “21st century workers” called for by Koh and his colleagues. Therefore, teachers who wish to use the STLDM may wish to complete at least two cycles using the same technology before moving on to another technology tool.

Case Theme Two: Considerations

The second case theme, Considerations, describes parts of the process that were integral and must be taken into consideration when seeking to integrate technology into instruction. The case theme “Considerations” includes three claims:

- Continuous, dedicated time for sharing ideas and experimenting with technology is crucial for technology integration into teachers’ instruction.
- Reliable access to technology is needed for teachers to more effectively integrate technology into their instruction.
• The PLC structure enables teachers to think through their decisions and support one another in problem-solving.

Claim One: Continuous, dedicated time for sharing ideas and experimenting with technology is crucial for technology integration into teachers’ instruction.

The PLC members all expressed one main reason as to why they did not usually incorporate more technology into their instruction: time. Learning the technology and reflecting on current instruction takes extra time that teachers may not have during the school day. The dedicated PLC time and the sharing in the PLC mitigated this concern for the members. As Becky stated in her journal:

We have so much on our plates, between grading and keeping up with what you're going to be doing and planning that like, I'm not really interested in sitting down and opening up a new program and figuring out how to use it. Having this PLC has given me courage to try something, but only because I knew Melissa was using the same technology and could help me figure it out. (Becky’s TJ, February 27, 2019, p. 8)

Similarly, Cathy added that sharing experiences with each other about the technology helped her to wade through the tools and foresee possible issues, cutting the time it would take for her to cull the possible technology on her own. She isn't someone who gravitates toward risky situations; so, having the knowledge about the technology beforehand alleviated some of her fears. She commented in her interview:

It's time for planning and making sure that everything is in place so you could implement it. I don't think that is anything that anyone can give you. So, that's why I said that collaboration with what works, what didn't work with these tech tools that people have used, I think is very helpful because then you can learn from others' mistakes and then you're not trying to do everything. For instance, when Melissa was talking about her problems with using Thinglink, then I knew in advance that if I want to go use that, then I have to do x, y, and z. I would like to see more of this in the future. (Cathy’s interview, April 17, 2019)
Knowing that dedicated time for technology exploration is imperative to integration, Cathy asserted we need more professional development that continues to expose teachers to new technology:

Quite frankly, we need an immersive class or workshop that lets you actually go and kind of play around with these tools. I know they tried that a little bit at some of the faculty meetings but that wasn’t really helpful. Just getting up there and showing something and giving three minutes of something that’s not really what is needed. You actually need to sit down and see this is what works, this is what didn’t work, this is what I’ve used. Or, hey, you could use this kind of thing for that, et cetera. (Cathy’s Interview, April 17, 2019)

Likewise, Maggie acknowledged teachers need more support in this way. “I think more teachers would benefit from using a PLC like this, being able to see what’s really out there and learn it together. I think it would be excellent for all teachers” (Maggie’s Interview, April 19, 2019).

While Melissa experienced problems with getting her students into Thinglink, she believed the PLC helped because “it gave me an impetus to get along with something because everything is time consuming when you are teaching” (Melissa’s Interview, April 18, 2019).

In sum, PLC members were able to help each other navigate new technology, cutting down the exorbitant amount of time it takes to seek out the right tool and learn how to use it. As Spaulding (2013) posited, “In-service teachers are often reluctant to integrate technology because of factors such as lack of time and/or insufficient access to technology” (p. 74). This was the case for the teachers at my school. In this study, we learn that PLCs house the potential to alleviate some of the burden by creating a space and time for teachers to work together. Therefore, when seeking to incorporate more
technology into instruction, it may be wise to create a PLC dedicated to technology integration to make better use of the time needed to explore and learn new technology.

**Claim Two: Reliable access to technology is needed for teachers to more effectively integrate technology into their instruction.**

As Melissa pointed out, access to working technology is still a problem, yet all the teachers agreed the PLC gave them more access to knowledge about what tools are out there. Maggie admitted she joined the PLC for the purpose of exposure, “I joined just so I could give something new a shot even though I’m pretty tech savvy and incorporate technology. I don't really go out and seek things that I haven't been told about before” (Maggie’s Interview, April 19, 2019). Cathy also felt the PLC gave her more information about available technology:

> I feel like I got a lot of information that I could use in the future, like I could go back and try to use some of the things. There's a lot of different technologies tools that I would like to use that I didn't get a chance to use that I may try to incorporate next year (Cathy’s Interview, April 17, 2019).

Even though Cathy expressed the desire to explore other technology tools, she confessed the fear of technology not working was still present.

> I think what hinders me are the roadblocks, whether the kids are blocked or they don't have access to it. A lot of times you don't know what the problem is going to be until you actually try to implement it with the kids and so then you are like, ‘Oh, my goodness, well, I realized that they had to have their own email or something like that to do something.’ (Cathy’s Interview, April 17, 2019)

Student access was a concern for her. At the time of the study, Cathy taught many lower level classes and those students often did not have internet access beyond their cell phones:

> Recording at school is a problem. Students need a quiet “alone” space so they can record without interruptions, background noise, and have a comfort zone to record without being embarrassed recording reflection around peers. For my lesson, students had to use Screencastify for their
Becky agreed access is an impediment to her willingness to integrate technology more in her instruction, but not for the same reason as Cathy. Our district tends to abandon technology just after teachers have gotten used to it:

[Our district's approach to technology] is very frustrating to me. Is this our third year of using Google? It's year three and then they're going to abandon the Google contract and go with Microsoft 360. That, to me, is frustrating. When everybody's using it and they become comfortable with it what would be the purpose of abandoning it except for the fact that you're going to save a buck, because you already bought this other contract and then we become the victims again? (Becky’s Interview, April 16, 2019)

In her lesson plan, Becky acknowledged she chose Google Slides because “All students have access to it for now” (Becky’s Lesson Plan, March 27, 2019). If the students had reliable access to more programs, Becky agreed she would be more willing to try other technology tools.

In sum, the experiences of the teachers in this PLC echo what Inan and Lowther (2010) noted about teachers’ willingness to integrate technology, “Computer availability directly and indirectly increases teacher technology use” (p. 147). Reliable access to computers, websites, and other technology is an obvious necessity for teachers to integrate technology into their instructional practice. The teachers in this study discussed not just the importance of this access, but the role the district plays in issues related to access. My participants noted that teachers do not want to dedicate precious time to learning technology only to have the access restricted or the district change to something new. Hence, we learn in this study, that teachers are willing to try new ideas and lessons infused with technology as long as they feel access to the technology is
consistent and reliable. Therefore, districts who would like their teachers to take advantage of technology in their instruction may need to listen to the teachers' suggestions and concerns when it comes to introducing the availability of new technology as well as maintaining older tools.

**Claim Three: The PLC structure played an essential role in the teachers’ decision-making processes and confidence to problem solve.**

Time to work as a PLC is imperative because, unfortunately, while the STLDM helps guide teachers’ reflection on their current practices, it does not provide the same support colleagues can give. Once the PLC members realized the importance of effective technology use, they began to fret if they could make “the right decisions” (Maggie’s TJ, March 27, 2019, p. 13). Spaulding (2013) reminded us that “teachers need a support system they can access if they have problems or need help (p. 75).” Because technology integration may be new to teachers, the PLC can provide support for thinking through the problems and possible solutions.

In particular, Maggie, who was unable to attend most of the meetings, worried she wasn’t taking full advantage of technology. Her concern came from her use of Google Docs where students charted their progress in a table. In her first lesson, students peer edited one another’s work and tracked their errors in the table. In her second lesson, students used Noredink.com to establish a baseline on their understanding of certain grammatical errors and then worked through videos and practice problems for remediation, tracking their progress in their table as they went. During our final PLC meeting, I asked Maggie how the table helped her lesson be more pedagogically powerful and whether the students could have accomplished the same task manually. She noted:
The act of charting their progress made them focus on self-improvement. [Teachers] are usually the keeper of the data. Now the students are seeing if they are learning. But I guess they could have done that on paper. I didn’t really think of that. Maybe if I had been able to attend all the meetings, I could have hashed that out with all of you. (Transcripts, PLC Week 7, April 10, 2019)

Maggie’s lesson plan indicated she believed at the time that her lesson was pedagogically powerful:

By utilizing platforms such as Noredink.com, the students and teachers can see their progress in real time. Also by using Google Docs tables, the students and teacher can track and evaluate progress (before and after) throughout the grammar lesson all in one location. (Maggie’s Lesson Plans, March 27, 2019)

Had Maggie been able to work with the PLC members she may have realized the technology was not supporting the content. We could have pointed out that her plan lacked TPACK and helped her come up with a different plan. Cathy explained, “Sometimes just thinking aloud with someone acting as a soundboard can help us make a better decision” (Cathy’s Interview, April 17, 2019).

Cathy also confessed she felt like she struggled with determining if and what technology would be most effective: “The template asks me to think about it, but I may not know the answer. Maybe this comes back to needing the PLC or professional development” (Cathy’s Interview, April 17, 2019). Clearly, Cathy and the other PLC members found the meetings to be important to their work.

In the struggle to plan lessons which take advantage of technology, teachers were concerned about the difficult balance between the district’s push to use more technology with the idea that students still need to use paper and pencil for some assignments. Through conversing, the PLC members were able to work through those concerns and come to their own conclusions, making their own decisions about the use
of technology. An important construct of TPACK is understanding when and how to use technology to support students’ learning of the content. For example, Maggie concluded that students need both technology and manual tasks to enhance learning:

I was looking back at the results and using just purely technology didn’t advance many of my students as I would have liked. So, I think it takes a combination of both. It was the first time trying it out, like what happens if you use all technology, and I think for the next lesson I’m going to incorporate a little bit of both worlds because they need those different aspects. (Maggie’s Interview, April 19, 2019)

Even with the worries surrounding the issue of balance, at the end of the study period, all members of the PLC articulated more confidence in their ability to implement a lesson with a new tech tool and attributed this to the PLC work, as Cathy articulated,

Yeah, I think the needle has moved because I was able to do something that the kids were engaged in. I feel, I guess, more comfortable in doing it. I feel I have a little bit more knowledge about the different tech tools I could use. I’m already generating ideas and things of how I could use. Next year I will definitely feel more confident in doing this again and maybe even more new things. (Cathy’s Interview, April 17, 2019)

Cathy attributed her confidence to the collegiality we built during our PLC time, which allowed us the chance to discuss ideas and create solutions. Similarly, Maggie explained having others to share with in the PLC gave her confidence to keep going:

I really liked being able to be open and creating that atmosphere where it’s sacred to be able to just openly talk. When we shared what was happening with our classes or our ideas in general, being able to feed off of each other or listen to one another, I found that to be really helpful, because we don’t hear from other subject areas very often. To see their struggles and then their strengths because they used some things that I don’t use just because of my subject area. It’s nice to know that I’m not alone in this. It gives a sense of camaraderie when we can get together and explain things and help each other. It makes me feel confident that I can do this, too. (Maggie’s Interview, April 19, 2019)

Melissa echoed Maggie’s sentiment because the ability to seek support from other PLC members made her feel capable of working through the issues she faced. “I knew I
could work through everything because of the PLC. It's always good to bounce ideas off other people and maybe get ideas for how to solve your problem and I thought that was good and if you have a hesitancy you can ask or something” (Melissa’s Interview, April 18, 2019).

In sum, collaborating with colleagues is critical for creating new content, pedagogical and technological knowledge. As expressed by Mu, Liang, Lu, and Huang (2018) “Innovative teaching is likely to occur when teachers develop robust connections to their colleagues within an enabling community” (p. 25). Since teaching can be isolating in the day-to-day work, it is essential that teachers have access to PLCs which foster learning and creativity. The purpose of 21st-Century Learning skills is to help students become more innovative and collaborative; thus teachers must also practice those skills. PLCs are an effective avenue to developing 21st-Century Learning skills within teachers. In this study, teachers were better able to think through problems and find possible remedies through the conversations fostered in an effective PLC. Therefore, teachers who wish to navigate the treacherous waters of technology integration may also wish to find like-minded teachers who would form a PLC dedicated to this purpose.

**Conclusion**

In this chapter, I answered my first research question, “What does it look like when teachers use the Scaffolded TPACK Lesson Design model in a PLC?” by describing the PLC meetings and work we did within the seven-week study. Next, I answered my second research question, “How do teachers experience the Scaffolded TPACK Lesson Design model as it unfolds within a professional learning context?” through two case themes and a series of claims. In chapter 3, I will summarize chapters
1 and 2, synthesize the lessons learned, offer reflections, and discuss the implications of my study along with future research.
CHAPTER 3
LEARNING, REFLECTIONS, AND FUTURE RESEARCH

The purpose of this study was to understand what happens when the STLDM is incorporated into the fabric of the PLC experience for a group of in-service teachers at my school. The following two research questions informed my study: (1) What does it look like when teachers use the Scaffolded TPACK Lesson Design model in a PLC?, and (2) How do teachers experience the Scaffolded TPACK Lesson Design model as it unfolds within a professional learning community?

In this final chapter of my dissertation, I first provide a brief synopsis of my findings presented in Chapter 2. Next, I emphasize the lessons learned from each claim and synthesize them into one overarching statement of learning. I then use this statement of learning to reflect on my own practice, my school, and my district. In addition, I offer implications for other teachers because “as a teacher-inquirer in charge of your own learning, you become part of a larger struggle in education—the struggle to better understand, inform, shape, reshape, and reform standard school practice” (Dana & Yendol-Hoppey, 2014, p. 12). Finally, I make suggestions for future research.

**Dissertation Summary**

In Chapter 1, I framed my practitioner research study within the context of my district and school because practitioner research is defined as “the systematic, intentional study of one’s own professional practice” (Dana, Thomas, and Boynton, 2011). I then discussed relevant literature surrounding my study and outlined my methodology, which centered on a case study approach.

In Chapter 2, I used rich, thick description to describe how the PLC meetings unfolded, thus answering my first research question. I then turned to my second
research question and reported on my two case themes, Affordances and Considerations, by stating six claims and discussing their implications for teachers and/or districts wishing to integrate more technology into instructional practices. The case theme Affordances describes the parts of the STLD template and the process which helped the PLC members integrate technology in meaningful ways. The case theme Considerations describes parts of the process that were integral and must be taken into consideration when seeking to integrate technology into instruction.

My first claim under the case theme of Affordances was: The use of the STLD and the TIMs provided scaffolding for the teachers in my study to intentionally reflect on their practice. The lesson design template offered various prompts to help teachers think through integration in a more thoughtful and methodical way. The teachers in my study pointed to the prompt “Can the topic be represented by technologies such that it becomes pedagogically more powerful?” as one of the most thought-provoking prompts as it spoke to the essence of technological pedagogical content knowledge because teachers must determine if the technology truly supports content or is unneeded. Often teachers think that simply using technology is enough, but do not always consider how the technology benefits instruction. The STLD created an impetus for examining this crucial aspect of integration. In addition, the use of the TIMs helped the teachers in my study understand the various levels of integration and the gradual release of innovative usage to the students. The TIMs demonstrated that when students begin to make informed choices about technology themselves and can apply the technology tools to reinforce or demonstrate their learning, they perform at a much more sophisticated level of content interaction.
The reflection on and intentional use of technology ultimately caused a shift in perceptions about the importance of technology in teachers’ practices. The teachers in my study arrived at the conclusion that technology integration and the teaching of 21st-Century Learning skills is imperative for this generation of students in order for them to be competitive in future educational endeavors and career aspirations. Therefore, the lesson I learned from this is that when teachers use the STLDM and the TIMs matrix, they become much more aware of their technology use and the intention behind the instruction.

My second claim under the case theme Affordances was: The use of the template with the TIMs forced the teachers in my study to focus on their students when revising a lesson. In addition to the STLDM prompts that called for reflection on the pedagogical analysis of the technology, other prompts promoted the consideration of student needs compelling teachers to move toward more student-centered teaching. By using the STLDM and referring to the TIMs, the teachers in my study set goals for their integration which revolved around their students reaching the 21st-Century Learning skills along with mastering their content. By looking at student needs before state mandated standards, the teachers began to create lessons which started with the students and slowly led them to the desired mastery of standards. Therefore, the lesson I learned was that the use of the STLDM combined with the TIMs promoted a more student-centered approach to teaching.

My third, and final, claim under the case theme Affordance was: The use of the same technology through two cycles of the STLDM helped the teachers in my study and their students to focus on content rather than just technology. Several teachers in
my study indicated some skepticism about using the same technology tool twice but understood that when students have more practice with a new tool they become more proficient in its use, thus they acquiesced to my request. After experiencing two cycles with the same technology tool, the teachers in my study admitted there were unforeseen benefits. The students during the first cycle were focused on understanding the tool and learning its nuances, but during the second cycle, students were able to manipulate the technology in ways that fostered a deeper understanding of content and a more sophisticated demonstration of their comprehension. Therefore, the lesson I learned was that using the same technology tool more than once can move students from a primary focus on how to use the technology to deeper learning and skill transference.

My first claim under the case theme of Considerations was: Continuous, dedicated time for sharing ideas and experimenting with technology is crucial for technology integration into teachers’ instruction. Because teachers are often pressed for time, the teachers in my study indicated they did not usually seek out new technology. They relayed that the time it takes to explore new options and learn the technology was a challenge. The PLC, though, gave the teachers a chance to learn from one another and to help each other, cutting down the time needed to cull technology options and wade through instructions. What I learned was that PLCs house the potential to alleviate some of the burden by creating time and space for teachers to work together.

My second claim under the case theme Considerations was: Reliable access to technology is needed for teachers to more effectively integrate technology into their
instruction. My school went one-to-one only a year prior to my study. Throughout the process, restrictions were placed on sites teachers used. The problem was that the restrictions would change spontaneously, and access wasn’t always consistent for teachers or the students. This issue has become a point of frustration for the teachers in my study and has been one of the main causes for their reluctance to integrate more technology into their lessons. When access can be guaranteed, the teachers in my study were willing to try new ideas and lessons infused with technology. Therefore, one consideration that districts must make if they want teachers to incorporate more technology is that access to the technology tools for the teachers and students must be consistent and reliable.

My third, and final, claim under the case theme Considerations was: The PLC structure that housed the STLDM played an essential role in teachers’ decision-making processes and confidence to problem solve. When faced with time constraints and access issues, the PLC venue gave the teachers in my study a place to brainstorm and help each other to problem-solve. It was through the intentional structure and support of the PLC that they were able to work through barriers that arose during their implementation of the new technology. During the Readiness Stage, the first PLC meetings were dedicated to creating a functioning PLC structure with a basis of trust between its members. This trust enabled the PLC members to feel comfortable talking about their obstacles and giving advice to others in need. Therefore, I learned that teachers are better able to think through problems and find possible remedies through the conversations fostered in an effective PLC.
Lessons and Overarching Statement of Learning

Through the analysis process and discussion of my six claims, I identified specific lessons that I learned from each claim. These lessons may benefit other districts or teachers who wish to integrate more technology into teachers’ practices.

Figure 3-1 presents the six claims and implications, or lesson learned, as were detailed in chapter two.

<table>
<thead>
<tr>
<th>Case Theme</th>
<th>Claim</th>
<th>Implication: Lesson Learned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordances</td>
<td>The use of the Scaffolded TPACK Lesson Design Model and the Technology Integration Matrix provided scaffolding for the teachers in my study to intentionally reflect on their practice.</td>
<td>When teachers use the STLD and the TIMs matrix, they become much more aware of their technology use and the intention behind the instruction. The heart of technological pedagogical content knowledge is understanding how and when to use technology to support instruction. Therefore, teachers who intend to incorporate more technology into their instruction may wish to use the STLD and TIMs in concert.</td>
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<tr>
<td></td>
<td>The use of the template with the Technology Integration Matrix forced the teachers in my study to focus on their students when revising a lesson.</td>
<td>The use of the STLD combined with the TIMs promoted a more student-centered approach to teaching. Therefore, teachers who wish to enhance student learning through the incorporation of technology into their instruction may want to consult the TIMs as they use the STLD, which will help teachers to set goals and monitor their own progress.</td>
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<tr>
<td></td>
<td>The use of the same technology through two cycles of the Scaffolded TPACK Lesson Design model helped the teachers in my study and their students to focus on content rather than just technology.</td>
<td>The same technology tool more than once can move students from a primary focus on how to use the technology to deeper learning and skill transference. The more students can practice using technology, the more likely the technology will become a tool for learning, enabling students to develop into the “21st century workers” called for by Koh and his colleagues. Therefore, teachers who wish to use the STLD may wish to complete at least two cycles using the same technology before moving on to another technology tool.</td>
</tr>
<tr>
<td>Considerations</td>
<td>Continuous, dedicated time for sharing ideas and experimenting with technology is crucial for technology integration into teachers’ instruction.</td>
<td>PLCs house the potential to alleviate some of the burden by creating a space for teachers to work together. Therefore, when seeking to incorporate more technology into instruction, it may be wise to create a PLC dedicated to technology integration to make better use of the time needed to explore and learn new technology.</td>
</tr>
<tr>
<td></td>
<td>Reliable access to technology is needed for teachers to more effectively integrate technology into their instruction.</td>
<td>Teachers are willing to try new ideas and lessons infused with technology as long as they feel access to the technology is consistent and reliable. Therefore, districts who would like their teachers to take advantage of technology in their instruction may need to listen to the teachers’ suggestions and concerns when it comes to introducing the availability of new technology as well as maintaining older tools.</td>
</tr>
<tr>
<td></td>
<td>The PLC structure enables teachers to think through their decisions and support one another in problem-solving.</td>
<td>Teachers are better able to think through problems and find possible remedies through the conversations fostered in an effective PLC. Therefore, teachers who wish to navigate the treacherous waters of technology integration may also wish to find like-minded teachers who would form a PLC dedicated to this purpose.</td>
</tr>
</tbody>
</table>

Figure 3-1. Study claims and implications with lessons learned

When looking at all six lessons, I saw that the use of both the STLD and the TIMs helped the teachers in my study become much more intentional and student-focused when planning instruction involving technology. The internal support within the PLC created a climate where sharing could alleviate burdens and help teachers to problem-solve while gaining the needed confidence to tackle the difficult task of integrating technology and trusting that two cycles of technology usage would create deeper
learning. While we did not always have reliable access to technology due to district restrictions or technical issues, it became obvious that access was an essential element to increasing teacher willingness. I believe that a supportive school district will help teachers find time in their busy workday to meet and will also work with teachers on access issues.

It is with these findings and beliefs in mind that I crafted an overarching statement of learning that synthesized everything I learned from the analysis of my data about the STLDM, TIMs, PLC, and district support: The Scaffolded TPACK Lesson Design Model is effective with inservice teachers when combined with the Technology Integration Matrix and housed in a supported professional learning community. Figure 3-2 illustrates the connection I made from my claims and lesson learned to the overarching statement of learning.

Figure 3-2. Claims, lessons learned and overarching statement of learning
Actions

My role in this study was one of PLC facilitator. I used the knowledge I gained from my work at the University of Florida to implement the criteria that Dana and Yendol-Hoppey (2016) suggested for an effective PLC:

- evaluate student, teacher, and school learning needs by reviewing data on teacher and school performance;
- define a clear set of educator learning goals based on analysis of data;
- achieve educator learning goals by implementing coherent, sustained, and evidence-based learning strategies that improve instructional effectiveness and student achievement;
- provide job-embedded assistance to help teachers transfer new knowledge and skills to the classroom;
- regularly assess the effectiveness of PLCs in relationship to ongoing improvements in teaching and student learning; and
- request external expertise when the community determines it is needed. (p. 3)

I also used the criteria set forth by Cifuentes, Maxwell, and Bulu (2011) which described effective technology integration:

1. an outside observer can see the technology activity as a seamless part of the lesson;
2. the reason for using the technology is obvious to the teacher, students, and others;
3. students are focusing on the learning rather than on the technology;
4. the teacher can describe how technology is helping a particular student;
5. the teacher would have difficulty accomplishing lesson objectives without technology;
6. the teacher can explain what the technology is supposed to contribute; and
7. all students are participating with technology and benefiting. (p. 61)

These criteria guided our PLC meetings and how we chose to integrate technology.
For me, even though my role was different from those participating in my study, I have learned a great deal about how to use technology wisely in my own classroom. For example, I wrote a grant at the beginning of the 2018 school year for ten external microphones for my students to use in creating their own podcasts and radio dramas. I decided that it would be a great idea to combine explainer video technology, My Simple Show, with my existing unit on short story writing. My Simple Show allows students to type text into the website, choose pictures to accompany the text, and voice over record narration, explaining the content to the viewer. In my case, students used the microphones to record the stories they wrote in class and combined the stories with digital pictures. The concept of My Simple Show houses tremendous benefit, but my plan, once implemented, turned into a huge waste of time. I ended up printing their short stories so I could more easily examine the content. The videos ended up only being an accompaniment to the printed stories. Through the conversations in my PLC and relaying my lesson to the participants, I concluded that I was using technology for technology’s sake and my instruction was not bettered by its usage. Those discussions helped me to think through my decisions and arrive at a better solution for future instruction. In addition to the conversations fostered in the PLC, the use of the STLDM has taught me to look at what is most pedagogically powerful, whether it uses technology or not. Sometimes, technology is not needed for effective instruction. I will make sure to apply this principle to all my technology plans in the future.

Based on the results from my study, I understand how an effective PLC can increase teachers’ willingness to infuse new technology into their practice; therefore, I am leading another community of teachers this year at my school through the process
of technology integration. At the time of writing this dissertation, I am in the throes of recruitment, for which I have several interested teachers who are new to teaching or returning to teaching after many years away. This year, I will continue to use the TIMs for goal-setting since all study participants agreed that using it helped them navigate integration, but we will use a modified version of the STLDMM, taking out the components the teachers in my study specified were unnecessary or repetitive for an in-service teacher: objectives, ICT tools for assessing emerging understanding, and cyber wellness. These are unnecessary or repetitive because, as practicing teachers at my school, we have a separate lesson plan template where we indicate objectives and we are given diagnostics for assessing our students’ emerging understanding of content. We also have a separate class for English as a Second Language speakers, so we do not have to assess emerging language users. In addition, students are required to take a technology class in sixth grade, which covers cyber wellness issues. Therefore, the participants in my study felt comfortable removing these prompts from the STLDMM.

As Cathy and Maggie suggested during their interviews, I have approached the head of staff development about incorporating more opportunities to explore the technology available to us and to share ideas. So far this school year, we have had training on two technology programs purchased for Language Arts teachers, and there are plans for other content areas to also receive more direct instructional training on new programs purchased for students in their content areas. I will continue to advocate for more events that promote the sharing of ideas and knowledge amongst the schools within my county. I think it is also important that teachers and instructional leaders learn
about the inquiry process, effective PLCs, and technology integration supporting the acquisition of TPACK.

I advance that other teachers, schools, or districts wanting to integrate more technology into instruction should first look at their district’s access to technology and technology tools, ensuring consistence and reliability because, as Inan and Lowther (2010) noted, “Computer availability directly and indirectly increases teacher technology use” (p. 147). I would also suggest that the PLC structure be utilized in each school in order to mitigate some of the factors that Spaulding (2013) asserted could potentially hinder technology integration: perceptions and beliefs about the benefits of technology, time to engage with new tech tools, access to technology, the level of self-efficacy, feelings of preparedness, and access to a support system. It is these factors that create reticence amongst teachers.

Suggestions for Future Research

This study was important because it brought together two misunderstood facets of educators’ professional practice, professional learning communities and TPACK, in a way that pushes teachers’ beliefs about their practice and how students learn. This study contributes to the conversation about technology integration for teachers who are reticent. Chai and Koh (2017) conducted a study on the STLDM and how it changed pre-service teachers’ efficacy and design beliefs. My study addressed the use of the STLDM with in-service teachers who needed help integrating technology with a TPACK perspective while participating in a PLC for support. The data from my study indicate the STDLM is most effective when combined with the TIMs and housed in a supported PLC.
This study was limited to four teachers currently teaching in the same middle school where technology was a priority for the school district. It may be valuable to further research how the STLDM combined with the TIMS would impact a PLC made up of participants from varying schools or districts because not all schools or districts make technology a priority or support PLCs. In-service teachers need support when working through new practices; perhaps the support doesn’t have to come from their personal school or district to be of benefit.

Since my study included only participants who volunteered, it might also be interesting to research how requiring the TIMs and STLDM when planning instruction might impact the integration for all faculty members in a school. If a school committed to the process and created time for teachers to explore technology and share ideas, would the climate of the school change to one of willingness and experimentation? Would there be a distinction between new and veteran teachers?

**Conclusion**

This study provides valuable insight into helping in-service teachers integrate technology into their instruction in a way that promotes TPACK. By studying a group of four in-service teachers at my school, I found that the STLDM combined with the TIMs in a supported PLC helped the teachers in my study become much more intentional and student-focused when planning instruction involving technology, alleviated some of the burdens associated with learning new technology tools, provided teachers a platform to pose questions and problem-solve, and increased their confidence when attempting integration.

It is my goal to continue integrating technology into my own practice and to help other teachers do so as well. I will continue to learn about best practices for integrating...
technology while taking the lessons learned in this study into consideration as new technology develops and becomes available.
APPENDIX A
THE SCAFFOLDED TPACK LESSON DESIGN MODEL
(Adapted from Chai & Koh, 2017)
Field Notes

Date: Feb 20, 2019

Attendance: Cathy, Maggie, Melissa, Becky

Materials/resources:
- Journal Prompts provided
- Thing Link
- Storm Chat

Events:
1. Looked at old lesson and how it rated in TIMs
2. Discussed new goals and chose technology possibility
3. Did a Thinglink tutorial and helped them create a sample
4. Started Storm Chat

Discussion:
- Student seats
- Instructions for students
- They want more room for text - so we played with it
- Will this meet our needs?
- What really needs to be filled out on the chat?

Concerns:
- Making sure students can navigate the site (particularly level 1 & 2 students)
- Melissa & Becky needed one-on-one instruction on saving pictures
- Will the teachers look competent in front of the students? (Becky said she doesn’t mind asking a student for help)
Participant’s journal entry for February 27th

02/27

* Had students choose destinations

* Told students to try to login to Thinglink to make sure it worked

* Few problems creating accounts

However

* Too many students logged in under my account. When I remove them from the class, they were still somehow linked to my account. Therefore, all 35 slots appeared full. When the kids tried to access the accounts again, they wouldn’t work. I emailed Thinglink but it hasn’t been fixed. Students who can’t use their Thinglink can either use Google Slides or create a brochure.

* The preparation was simple but the actual execution was stressful
not every day on a lesson. To get back to your first question about the model, the T pack.

The learning objectives, making sure that they’re in order as far as, okay, are you making it chunked the lesson because we know to do that but are we always doing that because of time constraints. It is very important because I might want to get through a grammar lesson in a day and then often I’m very disappointed every single time because it takes at least two days, I’m like, “I can do this.” It’s like, “No.”

So, whether it’s written or not chunking it out and kind of like placing a timestamp next to it I think it’s very nice to be able to do and say, “Hey, they actually need a little bit longer on this objective.”

So, planning it out like that is very helpful. The type of learners I think this would be great. Not to get ahead in your questions template learners is wonderful to be thinking about, I do not have that many different types of learners as far as extremes like ELL’s.

That demographic in my classroom, they’re all placed into one regular advanced and intensive, so, you kind of have them grouped already. So, you just have to think about that for the individual classes themselves.

I think that’s great but depending on the type of teacher, I really liked this that you brought up at the beginning of the year, is it use the technology to be pedagogically more powerful and you had talked about the Grecian urn and I really liked that image in the podcast that you gave with that because it makes me think when I’m teaching a lot now.

Is what I’m doing at the end of the day giving them what they need or is it just to like check something off or not even check something off because it’s a waste of time to do it. So, I really appreciate that being on there because it’s just a reminder, okay, or any of these steps even with the technology not needed, are we wasting time because we didn’t even think about that category is it needed or not, so, that’s what I liked about this.

**Intv:** Is there anything on there that you think is like the most effective thing, so, if we were to change it at all like what must we keep?

**Resp:** I think the learning objectives, is it pedagogically more powerful to use the technology, do we really need to use the technology to get across the point because we don’t want to just use technology for technology’s sake.

**Intv:** That comes down to the whole like promise of T pack is making sure that the technology goes with the content and what you’re trying to teach and all of that.

**Resp:** So, I think that’s very important.
## APPENDIX E
### DATA MATRIX

Completed data matrix.

<table>
<thead>
<tr>
<th></th>
<th>What does it look like?</th>
<th>What features create the most impact?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Becky</td>
<td>Enjoyed Issues with access Teacher learning Student progression (repetition of tech tool was important and results surprising) Gave students organization Addressed student needs Students connecting with a variety of concepts</td>
<td>Goals Learning objectives Types of students Possible problems Built-in supports Pedagogically more powerful Assessment <strong>How to reduce cheating</strong></td>
</tr>
<tr>
<td>Maggie</td>
<td>Minimal effort Excited Enjoyed Depth of thinking increased Emphasized student accountability More tech was needed</td>
<td>Student needs Avoid unexpected bumps 21st Century Learning Skills Strengths and weaknesses of existing ways to teach Appropriate objectives Pedagogically more powerful (balance of tech and paper/pencil) Existing resources <strong>cyber wellness not needed</strong> <strong>Different types of learners</strong></td>
</tr>
<tr>
<td>Melissa</td>
<td>Tech access issues Pushed students to dig deeper More freedom to students More collaborative classroom environment</td>
<td>Became more student-centered Misconceptions 21st Century Learning Mindful of teacher choices <strong>Tedious/repetitive</strong> <strong>Strengths and weaknesses of existing ways to teach</strong></td>
</tr>
<tr>
<td>Cathy</td>
<td>Access to quiet space was needed Students need models Students needs in general</td>
<td>Types of learners Cognitively most challenging Instructional activities to promote student progression Pedagogically more powerful</td>
</tr>
</tbody>
</table>
This illustrates the front of the template.

The Scaffolded TPACK Lesson Design Model

<table>
<thead>
<tr>
<th><strong>Goal</strong></th>
<th><strong>Type of Learners</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the educationally sound attitudes, skills (higher-order thinking and process), and knowledge that students should learn for the subject matter?</td>
<td>What are the learners’ difficulties in learning the topic? What are the usual misconceptions?</td>
</tr>
<tr>
<td>Can the topic be represented by technologies such that it becomes pedagogically more powerful?</td>
<td>What are the strengths and weaknesses for the existing ways of teaching the topic? Could it be enhanced with technology?</td>
</tr>
</tbody>
</table>

**Learning Objectives**
Articulate learners’ appropriate objectives and arrange the list of objectives starting from the cognitively most challenging objectives.
This illustrates the back of the template.

<table>
<thead>
<tr>
<th>Plan Instructional Activities</th>
<th>Choose Media/Create ICT-based Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the appropriate 21st-century learning practices (see below) that could be incorporated for the learning of the subject matter and the development of the learning practices?</td>
<td>Media:</td>
</tr>
<tr>
<td></td>
<td>What are some good practices associated with the chosen technologies?</td>
</tr>
<tr>
<td></td>
<td>Any consideration for cyber wellness issues?</td>
</tr>
<tr>
<td></td>
<td>Any good ICT tools for assessing emerging understanding?</td>
</tr>
<tr>
<td></td>
<td>How do subject matter experts use technology to represent and make meaning of the topic?</td>
</tr>
<tr>
<td></td>
<td>Are there existing good quality online resources already created?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Develop Assessment Tools: Formative and Summative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determination of means of evaluating students’ digital artifacts and learning processes (usually through rubrics)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Formative:</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Summative:</td>
</tr>
</tbody>
</table>
LIST OF REFERENCES


BIOGRAPHICAL SKETCH

Heather Elizabeth Stefanski received her Bachelor of Science degree in English education from Florida State University in 1999. From there, she began her teaching career at Fernandina Beach Middle School and remained there for the past twenty-one years. During her career in education, she earned National Board Certification in 2003 and recertified in 2013. She earned her master's degree in Secondary Education from the University of North Florida in 2006. Through the opportunities to present and implement educational workshops in her district and state, Heather has developed a passion for working with adults. As this passion has grown through her coursework at the University of Florida, she has committed herself to working in higher education. Heather resides in Yulee, Florida with her husband, Mitchell, and three children, Elias, Tenisen, and Jesien.