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Intermediate Elementary Teachers' Perception and Use of a Learning Management System in  
Supporting Effective Teaching and Learning: A Mixed Methods Study

A Dissertation

Presented to the Faculty of the  
Department of Education & Social Work  
West Chester University  
West Chester, Pennsylvania

In Partial Fulfillment of the Requirements for  
the Degree of  
Doctor of Education in Policy, Planning, and Administration

By

Jennifer Southmayd

May 2022

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## Dedication

This dissertation is dedicated to my family. Education was always an unspoken non-negotiable in our household growing up. Good grades were an expectation and a result of hard work, commitment, and dedication and my parents, Kim and Tom Southmayd, practiced what they preached. They modeled persistence, resiliency, self-discipline, and authenticity while exuding compassion and understanding at every turn. And above all, they have always remained a constant source of support through every adventure, obstacle, and roadblock that has tested those traits. Early on, they instilled in all their children that there is no limit or bound to what is possible, and for that I am so grateful. Next, I dedicate this dissertation to my brothers, Geoff and TJ, who always provided the familial competition and desire to always achieve more the next time than what we accomplished today. They, along with their wives and my nieces, provided the encouragement and confidence needed to complete this endeavor. Finally, I dedicate this dissertation to my friends who feel more like family. In addition to their ongoing motivation and reminders that the finish line was within reach, they forced me to continue to find time to enjoy life along the way.

## Acknowledgements

My passion for effective technology integration and innovative teaching and learning has only gained momentum throughout my career and educational journey. While the passion never faded, changes in career positions and school districts during my doctoral studies placed unanticipated new adventures during the dissertation process. Through it all, I have depended on and benefitted from a network of incredibly supportive people. I would like to express my gratitude to each person who impacted my journey. To my faculty advisors, Dr. Heather Schugar and Dr. Matthew Kruger-Ross, I am thankful for your support and guidance with both the big picture and the granular details that brought this dissertation to fruition. To my committee member, Dr. Tammi Florio, I am appreciative of your perspective and regular reminder of the application of this work into our daily practice. To my mentors, Rebecca Eberly and Nora Wheeler, thank you for taking a chance on me, demonstrating what true instructional leadership can look like, and modeling the power a woman can have in administration. You both have guided me along this dissertation path and always provided a listening ear and a rational perspective when it was needed most. To Tara Allen, my first true professional teammate, you have stretched my leadership lens to better understand the humanistic nature of our work and the value of a team. You always reminded me of the importance of self-care and self-preservation when it was most necessary, and for that I am so grateful. To the members of my cohort, learning from each of you and your varied experiences as we moved through each course only added to this great learning opportunity. Finally, to the teachers who gave their time and engaged in rich dialogue as a participant of this study, thank you. I am in awe of what you, our teachers, do each day to bring learning to life in our classrooms; it takes a village, and I am grateful you are a part of ours.

## Abstract

Teachers in K-12 public schools have found themselves immersed in educational technology amidst a global pandemic that shifted the landscape of instructional delivery. This study targeted intermediate elementary (3-5) teachers' acceptance of an LMS as a central hub for student learning. While there is a volume of research to support the efficacy of an LMS at the secondary level and in higher education, there is minimal research to show its value-added in supporting intermediate learners at the elementary level. This explanatory sequential mixed methods study inquired to capture teachers' perceptions and use of an LMS to support student learning. Integrated qualitative and quantitative findings were analyzed according to a conceptual framework including: Technological Pedagogical Content Knowledge framework (TPACK), SAMR Model, Technology Acceptance Model (TAM), and Universal Design for Learning (UDL). This mixed methods study discovered that the role of the LMS in elementary classes focuses around content objective, assessment for learning, and student access to resources. Further, teachers' perceived ease and use is supported by students' ease in navigation and LMS skill development. Lastly, teachers' comfort level is a contributing factor in teachers' perceptions and use of an LMS, though pandemic instruction improved teachers' technological skill development. Practical implications of LMS integration at the elementary level were discussed.

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## **Chapter I**

### **Introduction**

The use of Learning Management Systems (LMS) and their depth of integration in educational settings has grown exponentially in recent years (Friedman, 2020). Despite being introduced in higher education and making its way into the K-12 sphere, LMSs have a strong impact on knowledge acquisition in 21st century school systems (Hill, 2009). Despite the variety of LMS platforms available, there are more similarities than differences among LMS products as most LMS contain generic tools such as quiz/test options, forums, scheduling tools, collaborative workspaces, and grading mechanisms (Black et al., 2007).

With limited disparity between platforms, schools need to focus on the implementation of the system while navigating the need to overcome institutional discomfort surrounding platform adoption (Black et al., 2007). As schools increasingly adopt LMS at the K-5 elementary level, purposeful implementation planning is essential to support teachers' perceived ease of use, beliefs, and perceived usefulness of the LMS.

In this chapter, I aim to identify the purpose, rationale, and targeted research questions that guide this study. An informed problem statement and identification of the significance of the study sets the tone for the value of this work in assessing the role of an LMS at the elementary level.

#### **Purpose of the Study**

Though the prevalence of Learning Management Systems (LMS) at the elementary level is increasing in response to the COVID-19 pandemic need for remote and blended learning, the depth and type of use varies greatly across classrooms (Friedman, 2020). The purpose of this study is to target elementary intermediate teachers'

beliefs regarding the value, ease, and effectiveness of an LMS with students in grades three through five. Further, the study aims to identify current LMS usage statistics and real-world application of LMS integration within instruction. Through analysis of teachers' decision making and perceived use of an LMS, administrators can better understand and plan for improved implementation with the help of effective professional learning.

To better understand teachers' current use and potential for greater integration, this research uses the Technology Acceptance Model to gauge how teachers receive, accept, and use an LMS. Then, the Universal Design for Learning framework provides guidance for ensuring all learners have access to and can engage meaningfully with LMS-based learning opportunities. Once teachers accept and use the platform and differentiate for a variety of learners, the next step is to determine how to transform student learning by shifting teachers' LMS integration skills across the SAMR model from substitution into modification and redefinition

### **Local Context**

I am a principal in a top performing school district in the mid-Atlantic region of the United States. As a district, our students and teachers work in and attend technology-rich schools with access to an abundance of technology resources (hardware and software). Elementary professional staff have access to a district-issued laptop, iPad, interactive whiteboard, and document camera, and all K-5 students receive a district-issued iPad that remains at school. Students in grades three through five have an iPad case to bridge the transition to middle and high school in which students receive a laptop that travels to and from school. All schools in the district have high-speed Wi-Fi access and families in need of Internet access can request a Wi-Fi hotspot.

Prior to becoming Principal, I held the position of Instructional Technology Coordinator within the same school district where I was responsible for overseeing K-5 technology integration. During my time in that position, student access increased from a 2:1 device to student ratio to 1:1, providing all students in grades 3-5 with an individual device. Additionally, in 2016 the district began a pilot program with teachers in grades 3-5 to determine the value-added of an LMS at the elementary level. In 2017-2018, an increasing number of teachers in grades 3-5 saw benefit in adopting an LMS and thus volunteered to join the pilot program resulting in a full adoption of Schoology for all students in grades 3-5 in 2019.

Currently, the district has two elementary Instructional Technology Coordinators to oversee instructional technology integration. Further, each school has a full-time instructional coach and a supplemental contract awarded to a teacher to serve as a technology advocate to support teachers with implementing instructional technology. From a hardware perspective, each building has a full-time technology associate responsible for repairing devices, maintaining Wi-Fi, and managing technology mishaps each day.

Though human resources are in place to support teachers' effective technology integration, a shift in the delivery and focus of professional learning is essential to transform teaching and learning. During its initial adoption of an LMS in 2019, professional learning centered around the functions and features of the LMS and navigating, uploading, and curating within the web-based platform. In April 2020, as the COVID-19 pandemic forced schools to move to remote learning, 54% of the materials posted on Schoology for grades 3-5 in District A of ten elementary schools were either a file (PDF, Microsoft Word, Excel, PowerPoint) or a link to an external website (M.

Wagman, personal communication, April 21, 2020). Over half of the content within the district's courses at the elementary level led to further content via web address, PDF file, or attachment. In contrast, 11% of the materials posted within the LMS were discussion posts to engage students in peer dialogue, and 16% of materials were assignments and assessments for submission purposes. Anecdotal evidence demonstrates a need for further investigation and study concerning the depth of integration at the elementary level.

### **Significance of Study**

This study aims to make contributions to district planning for elementary level adoption and implementation of an LMS. As District A begins work on their Comprehensive Plan and an innovative teaching and learning initiative, the district vision intends to equip and empower teachers with the necessary skills, understandings, and beliefs that are foundational to purposeful technology integration with the LMS as the central platform. My research aims to provide a local rationale for current LMS usage in grades 3-5 within the research site, while providing direction for further professional learning and response to teachers' beliefs and perceptions of an LMS within instructional practice.

There is minimal research to support the use and integration of an LMS at the K-12 level, specifically within grades 3-5. I hope to provide suggestions to District A's Comprehensive Council to create specific, meaningful goals with actionable steps to increase the effective and purposeful use of an LMS in the intermediate grades to support the district's vision of innovative teaching and learning.

### **Problem Statement**

To gain teacher buy-in to transformed, innovative teaching and learning practices, technology integration needs to focus on teachers' pedagogical purpose, context, and



setting (Derry, 2008). As Learning Management Systems move from higher education institutions into K-12 systems, educators have seen a shift in the learning environment and educational landscape that facilitates student learning with increased access to devices, technology-rich classrooms, and increased technological skills among teachers and students. Elementary schools need practices to identify teachers' beliefs and values as well as current LMS practices in use to transform student learning. This mixed methods study uses survey method and case study design to understand teacher decision making regarding adoption, implementation, and integration of an LMS.

### **Research Questions**

The following research question guided this study: *How do teachers in grades 3-5 perceive the role of an LMS at the elementary level in supporting instructional practices and student learning?*

Sub-questions within the study include:

1. What role does an LMS play in a technology-rich, intermediate elementary classroom?
2. How do intermediate elementary teachers describe the ease of use and perceived usefulness' of an LMS?
3. In what ways do intermediate elementary teachers' comfort level with an LMS correspond with their LMS integration?

### **Rationale for Methods**

As researchers seek to analyze and identify the use of a technology tool within instruction, they often turn to qualitative designs to capture participants' assumptions and decision-making around the use and implementation of educational technology tools and resources (Webster, 2017). Using interviews and written questionnaires, Webster (2017)

conducted research among technology directors and instructional technology specialists that produced three technology views: (a) instrumental view of technology, (b) technology optimism, and (c) a technological determinist perspective that sees technological change as inevitable. Qualitative studies such as Webster's revolve around perception including perceived experience and perceived use and integration of technology.

Palak and Walls (2009) research focused on determining if teachers who frequently integrate technologies and work at technology-rich schools change their beliefs and consequently their instructional technology practices toward a student-centered paradigm. In this work, Palak and Walls (2009) stressed the need for mixed methods design over qualitative research with regard to instructional technology decision-making as teachers' beliefs are a messy, ill-structured construct that does not lend itself neatly to empirical investigation nor by how teachers are likely to use technology. Through an explanatory mixed methods approach, they collected data sequentially across two phases with multiple sampling strategies. Palak and Walls (2009) argued that it allowed for trends and findings across data collection tools while minimizing errors that may arise from a single technique and maximizing the meaning from results of data interpretation.

For the purpose of this study, I selected a mixed method design that includes both case study and survey methods. The study aims to identify teachers' perception and use of a Learning Management System (LMS) at the intermediate elementary level through a two-phase approach in data collection (See Figure 1.1)

**Figure 1.1***LMS Integration Two-Phase Research Approach*

*Note:* Research design includes sequential mixed methods.

Phase I surveys all third- through fifth-grade teachers who utilize an LMS to gain greater district-wide understanding of LMS platform integration. Based on quantitative survey analysis, Phase II selected participants will represent low, average, and high levels of self-assessed beliefs, values, confidence and perceptions of instructional technology integration. Phase II consists of qualitative measures including an LMS platform analysis and semi-structured interview. The qualitative measures within Phase II aim to identify barriers to transformation of innovative teaching and learning. Within Phase II, the platform analysis gleans real-world examples of each teacher's LMS integration. This design allows for comparison of teachers' self-assessed beliefs and perceived use with transfer and application of professional learning into practice (Yin, 2014).

**Limitations**

Regardless of whether researchers select a qualitative, quantitative, or mixed methods design, teachers' beliefs and decision making is a complex topic (Palak & Walls, 2009). Through a mixed methods design, I aim to collect both quantitative survey data and qualitative interview as well as platform analysis information. Some researchers may identify the number of participants in Phase II to be a limitation, though for the purpose of this study, the quantity of participants represents a variety of technology integration users in District A.

Non-probability sampling limits the generalizability of the study as all participants are from the same school district. The research site is a high performing, technology-rich district which enables students to surpass first-order barriers that include external factors like access to devices, wireless internet, and technology support. The ability to surpass first-order barriers limits the generalizability of the study, though it enables the district to focus its efforts on second-order barriers (Ertmer, 1999).

As a building administrator in one school within the study's selected school district, the potential for researcher bias and subjectivity requires the use of strict protocols and procedures for selecting participants to proceed to Phase II. The purpose of Phase II is to delve deeper into teacher decision-making and perceived use of an LMS. Prior to reaching Phase II, participants must self-assess their LMS integration skills and competence, as well as their values and beliefs regarding LMS implementation. Self-assessment in Phase I that leads to participant selection for Phase II is a limitation of this study. In response to this limitation, a protocol tool provides a more objective view of the participant's Schoology courses, and a set of pre-determined questions for the semi-structured interview keep the participant's responses aligned to the research questions.

### **Definition of Terms**

The following terms are associated with this area of research and used throughout this dissertation:

*learning management system (LMS)* – platforms that use synchronous and asynchronous technologies to facilitate access to learning materials including links to files and resources, discussion posts, assessments, and assignments.

*digital technology* – hardware and software tools for the design, implementation, and assessment of learning experiences.

*educational leaders* – wide variety of school administrators who support teachers in advancing student achievement and meeting policy mandates (e.g., principals, directors, curriculum supervisors, and superintendents).

*first-order barriers* – logistical factors or institutional and structural obstacles which limit technology integration such as the number of computers, speed of connectivity, and technical support (Ertmer, 1999).

*instructional technology* – practical techniques of instructional delivery that systematically aim for effective learning, which may or may not include the use of technological resources (Gagne, 2013).

*leadership* – phenomenon that resides in the context of the interactions between leaders and followers (Northouse, 2010, p. 5).

*second-order barriers* – teachers' personal attitudes, beliefs, and practices that about technology and comfort level using technology (Ertmer, 1999).

*technology-rich* – high-quality access and use of a wide array of hardware and software available for use in all phases of instruction to promote increased student engagement and promote student learning.

*personalized learning* – learning opportunity that provides students with control and choice over their learning goals, time, place, pace, and path (Borup & Archambault, 2017).

*differentiated learning* – when a teacher uses student data and interests to adjust the learning experience for the student (Borup & Archambault, 2017).

*digital immigrants* – a person who did not grow up in the digital age but learned to use technology later in life (Prensky, 2010).

## **Summary**

LMS are platforms designed to provide improved access to digital resources, promote peer collaboration, and increase student learning through both asynchronous and synchronous learning experiences. District A has surpassed many first-order barriers through one-to-one device deployment and district-wide LMS adoption; therefore, the current focus of professional learning is platform implementation and teachers' beliefs regarding the value added through LMS adoption and integration.

Within this chapter, I reviewed the setting, research questions, and study overview. In the next chapter, I summarize the literature concerning LMS with a focus on designing effective instructional technology professional learning and explaining the theoretical frameworks that informed this study.

## Chapter 2

### Review of Literature

Before technology reaches the hands of students and teachers in the classroom, there are many considerations connected to the research on integrating educational technology that influence its adoption and implementation that must be examined. This chapter leads with a conceptual framework to identify the purpose and rationale for technology integration, then provides a literature review separated into the following sections: (a) digital tools and student-centered learning; (b) teacher beliefs on instructional technology, and (c) supporting instructional practices through professional learning.

#### Conceptual Framework

From private companies and organizations selling products, resources, digital curricula, and learning management systems to the nationwide Every Student Succeeds Act that monetarily incentivizes and fuels the use of technology in classrooms, school districts face many external pressures to integrate technology. Internally, districts feel the need to craft a vision for optimal teaching and learning that both supports teachers while promoting student achievement. The dichotomy between internal and external pressures necessitates that school districts have a strong pedagogical footing.

The National Center for Education Statistics (2018) showed that between 1995 and 2008, the number of instructional computers in elementary public schools increased 281% from 3,453,000 to 9,711,000 computers. Similarly, the ratio of elementary students to instructional computers with internet access decreased from 7.8 in 2000 to 3.2 in 2008, thus creating greater access to technology than ever before (U.S. Department of

Education, 2018). As the quantity of devices increases and the ratio of shared devices decreases, educators are improving their ability to use technology in the classroom.

In response to the COVID-19 school closures in 2020, 81 percent of US educators reported that their ability to use educational technology improved (Bushweller, 2020). Though infusing instructional technology within practice can create some challenges, providing teachers with frameworks to support their integration may prove helpful. In the next section I provide four frameworks to guide instructional technology integration: TPACK framework, the SAMR model, Technology Acceptance Model, and Universal Design for Learning.

### **Technological Pedagogical Content Knowledge Framework**

Mishra and Koehler (2006) established the TPACK framework to identify three types of knowledge instructors that are essential to successful instructional technology integration. Through technological, pedagogical, and content knowledge (TPACK), the framework provides a map for understanding how to integrate technology effectively. The intersectionality of the three primary forms of knowledge found in TPACK demonstrate the deeper levels of understanding present when investigated as the secondary and tertiary levels. When all three forms of knowledge are woven together, the user represents a full understanding of how to teach with technology (Mishra & Koehler, 2006).

This framework provides educators with a basis to assess current technology integration and areas for improvement. For example, a teacher who has high content knowledge (CK) and a strong foundation of skills within a learning management system (TK), may still fill their LMS course with text-based PDFs that limit student engagement due to low pedagogical knowledge (PK).



TPACK is a framework to be applied during the planning stages of instruction or during professional learning as it helps teachers to better understand the synergy between technology and pedagogy (Maor, 2013). Inherently, teachers develop content knowledge through curriculum adoption and years of teaching experience, and they develop technology skills during professional learning as districts adopt new technologies. That said, technological pedagogical knowledge (TPK) is an area for ongoing development with an emphasis on blending teachers' technological skills and pedagogical knowledge to deliver effective teaching and learning.

### **The SAMR Model**

The SAMR Model, which is an acronym for Substitution, Augmentation, Modification, and Redefinition, is a framework that supports educators in assessing the depth of technology integration (Puentedura, 2006). In contrast to TPACK that focuses more on instructor decision-making for effective integration, SAMR aims to classify a specific lesson's depth of integration. In the first level, substitution, the learning outcome is unchanged, but the mode of task completion is replaced with a technology tool. An example of substitution would be using a tool such as Google Earth to locate a place instead of using an atlas. As the teacher progresses along the continuum, the second level of integration is augmentation. Within augmentation, the task is redesigned and includes the use of a technology tool that provides some form of functional improvement. For example, a teacher could instruct students to use Google Earth to measure the distance between two places on a map as opposed to measuring within an atlas and estimating based on the provided scale. Both substitution and augmentation aim to enhance the lesson objective via technology integration.

At the level of modification, the use of technology transforms learning through a student-centered approach. Within a lesson at the modification level, the lesson has undergone significant redesign. As an example, students can use layers within Google Earth to research locations around the world on a map. Teachers reach optimal technology integration at the level of redefinition (Baz et al., 2018) Within a redefined lesson, students acquire learning that is not feasible without the use of technology. For example, students can use Google Earth to narrate a guided tour of a location with embedded research and share their tour with other students in classrooms around the world.

Within this study's research site, teachers previously participated in professional learning with the SAMR model to analyze lessons and student tasks and develop strategies to transform instruction through purposeful technology integration. This work supports teachers' ability to progress from substitution to modification or redefinition.

For this study, the SAMR Model's acronym will be used during participant interviews and platform analysis for teachers to self-assess their LMS integration and decision-making across various subject areas, units of study, and lessons. While the outcome of teachers' decision-making can be assessed using the SAMR Model, teachers' initial use of a technology tool or platform is impacted by the Technology Acceptance Model's (TAM) Perceived Usefulness (PU) and Perceived Ease of Use (PEoU).

### **Technology Acceptance Model**

Originating from Fishbein and Azjen's (1980) Theory of Reasoned Action (TRA), TAM focuses on an individual's intention to perform a behavior based upon their attitude toward the act and/or social norms. School and district leaders can use the Technology Acceptance Model (TAM) framework to identify the success of technology adoption

based on several causal relationships and two core determinants of acceptance of technology. Perceived Usefulness (PU) describes the possibility that a person gains productivity in an organization by using a specific tool or system (Davis, 1989). Further, Perceived Ease of Use (PEoU) is a person's belief that physical or mental effort will diminish with the use of a particular tool or system (Davis, 1989). Together, TAM claims that PEoU influences PU as users who find a technology "easy to use", then perceive it as useful and therefore gain a positive feeling towards the technology. In turn, users' technological knowledge (TK) as a part of TPACK is likely to increase. Within the TAM, PEoU displays a significant and immediate influence on PU because comfortable systems will improve work performance and integration (Davis, 1986). This concept will be further developed in a later section on professional learning. As the technology becomes more digestible to the user through PEoU and PU, teachers progress to determining appropriate integration by means of instructional delivery. At the very basics of technology integration is the necessity for learning to be accessible by all learners.

### **Universal Design for Learning**

Universal Design for Learning (UDL) is a set of principles for designing curriculum that provides all individuals with equal opportunities to learn (Hitchcock, Meyer, Rose, & Jackson, 2002). Further, UDL aims to serve all learners regardless of ability, disability, age, gender, or cultural background. UDL was first defined by David Rose and the Center for Applied Special Technology (CAST) in the 1990s and was later referred to by name in the Higher Education Opportunity Act (2008). When first introduced, UDL promoted proactive technology-based accommodations for students with disabilities, though it is now emerging as a framework to benefit all learners.

A variety of models exist in research to put pedagogy into practice through application. Universal Design for Learning (UDL) provides guidelines applicable to all disciplines and domains to ensure learners can access and participate in meaningful, challenging learning environments (CAST, 2018). A relationship exists between assistive technology and UDL. Assistive technology (AT) is any item, piece of equipment, software program, or other resource designed to improve the functional capabilities of persons with disabilities. AT, therefore, is designed to help individuals compensate for barriers in accessing their curriculum; whereas UDL aims to leverage technology in initial curriculum design to prevent and reduce barriers. Ultimately, UDL is the proactive approach to equitable access, and AT is the reactive support for pre-existing curricular resources. With an emphasis on improving and optimizing teaching and learning, UDL emphasizes representation, action and expression, and engagement, otherwise known as the what, the how, and the why of learning (CAST, 2018). Effective teaching, according to UDL, prioritizes internalizing, building, and accessing learning through the following nine principles: physical action, expression and communication, executive function, perception, language and symbols, comprehension, recruiting interest, sustaining effort and persistence, and self-regulation (CAST, 2018).

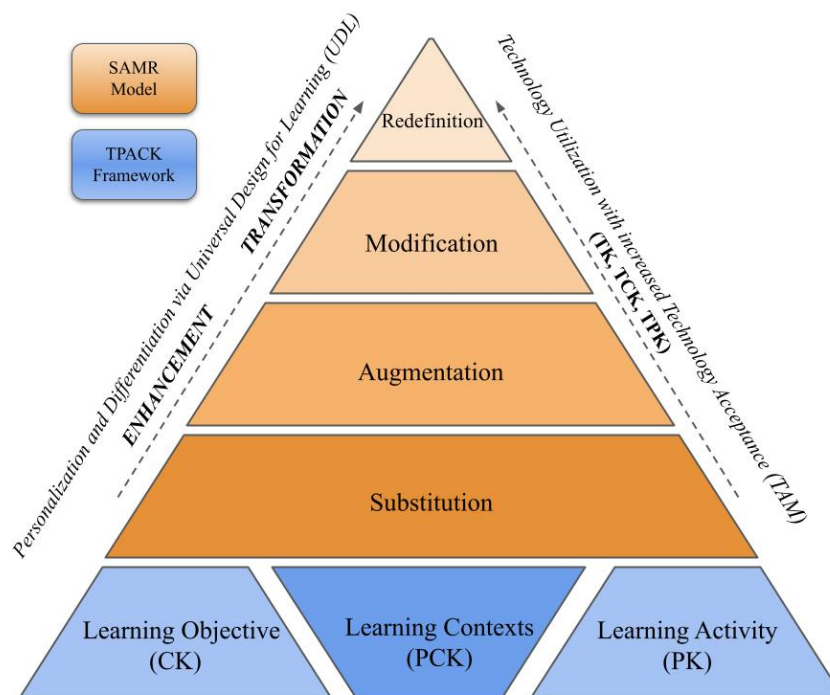
### **Framework for Elementary-Based LMS Integration**

Freire et al. (2012) found that to evaluate an LMS' usability, "The 'users' perspective', not anymore 'the systems perspective', is the main point to look at" (p. 1039). The types of resources and integrated tools utilized by each user within an LMS varies across classrooms. As school and district leadership organize professional learning to support teachers' adoption and purposeful integration of technology tools such as an LMS, teachers' self-awareness of decision-making is imperative. To align the three

frameworks described within this section, I created the *Framework for Elementary-Based LMS Integration* to visually depict a TPACK framework foundation with the SAMR progression of lesson design with the help of Universal Design for Learning (UDL) and Technology Acceptance Model (See Figure 1.2). This framework also provides teachers an applicable resource to support intentional instructional planning with technological, pedagogical, and content knowledge.

**Figure 1.2**

*Framework for Elementary-Based LMS Integration*



*Note:* Adapted from *Blending SAMR and TPACK Together* (Gravel, Mika, and Soger, 2014). Based on TPACK framework (Mishra & Koehler, 2006). Universal Design for Learning (CAST, 2018), SAMR Model (Puentedura, 2006), and Technology Acceptance Model (Davis, 1989).

Through representation of these frameworks within one graphic, they depict alignment that leads to innovative teaching and learning using technology integration. As Universal Design for Learning (UDL) increases to create personalized and differentiated

learning for students, as does the lesson's identification along the SAMR continuum. Additionally, as teachers' acceptance of technology (TAM) increases by means of technological knowledge (TK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK), as does the level of integration along the SAMR continuum. As users' Perceived Usefulness and Perceived Ease of Use increases, they become more willing to integrate at a deeper level, thus enhancing the lesson's SAMR classification. For example, a novice Schoology user may begin with using links and PDF files, though refrain from Google Drive Assignments and assessments. Through successful practice and ease in use, the teacher may advance to greater depths of integration through the use of more complex materials that include student submissions and creation within the LMS. This leads to more innovative teaching and learning because of teacher decision-making, sound pedagogy, and effective technology use.

### **Instructional Technology Infused Instruction**

Digital tools and platforms serve a variety of functions in a K-12 classroom from serving the needs of students with disabilities to enabling transformation of student learning. From a disabilities perspective, assistive technology (AT) is designed to accommodate students' disabilities and provide access for students to engage with tasks and curriculum. From a general education perspective, a variety of technologies allow for transformation of learning through the development of students' "4C's" skills: (1) creativity, (2) collaboration, (3) communication, and (4) critical thinking. Whether it is for the purpose of presentation, lecture, student creation, assessment, or communication, digital tools and resources have expanded their depth and value-added to the classroom environment over time.

There is no shortage of applications, resources, software, and digital tools to engage today's learner; however, a rising need in elementary education in response to the variety of tools and resources is a streamlined platform that supports the organization and ease of access to information, resources, and materials. A Learning Management System (LMS) is a software or internet-based platform designed to assist educational institutions, faculty, staff, and students in the administration, documentation, and delivery of courses.

In March 2020, school administrators had to think creatively and quickly in response to COVID-19 and a need to diminish the interruption to student learning while minimizing learning loss. With the youngest of learners forced to learn remotely, districts had no choice but to hurdle the first digital divide and provide devices and wireless Internet to students' houses to allow for remote teacher to student connection.

The immediate shift to delivering all instruction online required the help of web-conferencing tools and necessitated those resources be modified on the fly and provided digitally to students. The volume of curation and digital resources sparked teachers' need for a Learning Management System (LMS). LMS are often associated with e-learning, therefore they allowed schools to continue learning amidst the lockdown (Raza, 2021; Zwain, 2019). While the demand for LMS integration boomed in response to the COVID-19 pandemic and a necessity for remote instruction, LMS is not a novel concept in the educational sphere.

### ***Learning Management Systems***

An LMS is defined as a web-based technology platform developed to improve the learning process through its proper planning, application, and evaluation in educational institutions (Alias & Sainuddin, 2005). During its initial implementation, LMS aimed to facilitate e-learning and grant students who learn remotely access to educational material

without the constraint of time or place (Ain et al., 2016). With this infrastructure, students and teachers engage with one another via the internet as they share learning in an asynchronous environment.

In 2000, Modular Object-Oriented Dynamic Learning Environment (Moodle) became the first open-source LMS, this opened the door to personalized learning by permitting learners to pick and choose their content to store or export. As they were initially introduced, LMS were designed for training purposes to share anytime-learning with anyone. Over time, LMS became more customizable, user-friendly, secure, efficient, and profit driven.

In 2020, when schools were drastically impacted by COVID-19 and the need for remote instruction, 13 states adopted Canvas as their Learning Management Platform to provide a statewide solution for students, teachers, and families (Edwards, 2020). Though, simply because content is made available online does not mean that it is of high quality (Borup & Archambault, 2017). Poorly designed content can be overwhelming, confusing, and boring for young learners. Graham et al. (2017) stress these important online content design elements: (a) chunk longer content into separate, more manageable pages, (b) use headings and white space to further chunk information on individual pages, (c) use bullet points or numbered lists when possible, (d) left-justify paragraph text, (e) use icons and symbols to cue students' attention to tasks that are commonly repeated, (f) embed video directly into the page so it can be viewed without leaving the LMS, (g) use at least 12-point text, (h) use images purposefully to support content and engage students. That said, adopting an LMS is not enough. Schools need to prioritize professional learning to support teachers in online design and content creation for effective use and appropriate instructional integration.



An additional feature of an LMS is the opportunity for student-to-student discussion and communication of feedback between the teacher and student. Through asynchronous LMS use, students and teachers can leave feedback in the form of a discussion post, assignment comment, or rubric grading to support students in identifying learning goals. Further, the LMS provides students with time to reflect and formulate their ideas before sharing them with others. In terms of modality, LMS and embedded resources such as video discussion tools like Flipgrid also offer different modes of peer engagement and enabling students to demonstrate understanding through text, audio, image, or video response. From a teacher's perspective, an LMS adds depth and transforms feedback as the teacher can record audio or video feedback that allows a student to hear the teacher's tone and voice (Borup & Archambault, 2017).

With the use of an LMS at the elementary level, teachers diversify the way students engage with course content and resources. Instead of physical worksheets or directions provided on the whiteboard for reading workshop, students may self-pace their way through assigned texts, videos, and choice menus to complete independent tasks. The asynchronous nature and variety of resources available for LMS integration expand the ability to access learning from beyond the four walls of a classroom environment.

### ***Blended Learning***

As districts continue to improve the ratio of students to devices and eliminate first-order barriers, schools move to expect that teachers will leverage available technology to create activities that strategically combine in-person and online learning activities, otherwise known as *blended learning* (Borup & Archambault, 2019). Blended learning is described as any time a student learns at least in part at a supervised brick-

and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace (Graham et al., 2017).

Initially introduced at the secondary and higher education level, virtual and hybrid learning during the pandemic highlighted elementary students' ability to engage in blended learning as it increased their level of independence navigating technology tools and resources. The opportunity to institute more blended learning at the elementary level is also supported by the increased availability of student devices. Despite pandemic-based learning and improvement in students' technology skills, students new to online learning require a high level of support as "students not only need to learn a subject online but need to learn how to learn online" (Lowes & Lin, 2015). The role of an LMS platform within blended learning is to provide the organizational structure for students and families to navigate and access learning materials across any setting with ease.

### ***Personalized Learning***

Graham and colleagues (2017) furthered their research around blended learning using the different agents (e.g., students, teachers, and software) that can direct student learning across time, place, pace, and path. According to Borup and Archambault (2019), personalized learning places the student in the driver's seat to determine the control and choice over their learning goals. Within a school setting, teachers, librarians, and administrators often use personalized learning more loosely to describe any personalization to a student's learning regardless of the agent making the decision.

Thanks to learning management systems (LMS), students can access learning materials, activities, and assessments across time, place, and pace. Online content found within an LMS can either be static or dynamic which impacts the degree of personalization available (Borup & Archambault, 2019). Static content refers to text,

images, and videos placed within an LMS that provides students to adjust their learning time, place, and pace, though instruction is not differentiated for the user. In contrast, dynamic content includes games and adaptive-learning software that personalizes a student's learning path based on student behavior, response, understanding, and interest (Borup & Archambault, 2019).

### ***Differentiation***

Differentiation is like personalized learning, though the teacher is the agent making instructional decisions to meet student needs (Borup & Archambault, 2019). Using assessment and observation data, teachers differentiate student learning by adjusting the level of rigor or the mode of instruction to provide necessary accommodation that places learning at the appropriate level for the child. Differentiated instruction focuses on providing students with an equitable, but not equal learning experience as each student's needs are unique. In some instances, a teacher may reduce the quantity of assessment items, while in others the teacher may adjust the numbers within a math word problem to keep the focus on the conceptual understanding of solving word problems but reduce the level of computation skills required to solve. The concept of differentiation provides teacher autonomy as the only specific parameter around differentiation is that it is to include a clear focus on students' academic and social-emotional needs (Westman, 2021).

Personalized learning and differentiated learning provide pathways that enable students to reach their academic potential. Though not solely dependent on technology integration, the purposeful use of tools such as an LMS can make differentiation and personalized learning easier, more efficient, and more effective. To institute more

digitally based differentiation or personalized learning, schools and districts must overcome barriers to technology integration.

### Barriers to Technology Integration

Brickner (1995) and Ertmer (1999) classified the barriers to technology integration as either first-order or second-order (See Table 2.1). First-order barriers emerge as external obstacles that constrain teachers' technology use specifically through a lack of resources, timetabling, or limited administrative support (Hew & Brush, 2007). Second-order barriers are obstacles within the teachers' proximity of control such as their beliefs about teaching and learning and the purpose of technology use in classrooms (Ertmer et al., 2015). First-order barriers are often visible, tangible, or easily apparent, whereas second-order barriers are deep-rooted in teachers' belief systems. Second-order barriers often go unaddressed or challenged unless apparent (Cheng et al., 2020).

**Table 2.1**

*First- and Second- Order Barriers to Technology Integration \**

First-Order Barrier (external)	Second-Order Barrier (internal)
<ul style="list-style-type: none"> <li>● Lack of resources</li> <li>● Institutional infrastructure</li> <li>● Assessment requirements</li> <li>● Professional learning</li> <li>● Technical support</li> </ul>	<ul style="list-style-type: none"> <li>● Attitudes and beliefs about technology and instruction</li> <li>● Knowledge and skills</li> <li>● Confidence and comfort with technology</li> <li>● Established classroom routines</li> </ul>

*Note:* \*From Wheeler (2017) and adapted from Ertmer et al. (1999)

Once schools and districts overcome first-order barriers, Cheng et al. (2020) found, "When teachers believe that technology is valuable for their instruction and feel competent about integrating technology, their tendency to use technology in the classroom will increase" (p. 1).

As school systems address second-order barriers and identify and create opportunities to surmount these barriers, teachers' use, and perception of technology integration improves and the depth of integration increases.

### **Teachers' Beliefs and Perceptions of Technology Integration**

As researchers investigate best instructional practices, they find great disparity in teachers' decision making, beliefs, and skill sets to innovative teaching and learning. Cheng et al. (2020) found that teachers' perceived competence in terms of ability beliefs is a strong predictor of the other teacher beliefs including intrinsic value, attainment value, utility value, and cost. Herold (2015) investigated why educational technology is not transforming student learning and found that, "Case study after case study describes a common pattern in schools: A handful of "early adopters" embrace innovative uses of new technology, while their colleagues make incremental or no changes to what they already do" (p. 1). It is imperative to recognize and prioritize the importance of creating and maintaining a positive value beliefs system to support technology integration (Cheng et al., 2020). Teachers benefit from repeated success in the early stages of learning new instructional tools with timely feedback and opportunities to reflect on implementation. Further, Ertmer and Ottenbreit-Leftwich (2010) suggested that teachers receive time and space in professional learning settings to share success stories of technology integration with their colleagues teaching the same content and grade level to build competence beliefs for technology implementation.

### ***Importance of Beliefs***

Educational leaders can assist teachers in the process of adjusting teacher beliefs with intentional professional learning that provides numerous opportunities over time that engages teachers in learning the technical skills required to use the platform, program, or

device, but also integration planning to promote instructional change (Hew & Brush, 2006). A challenge arises when beliefs and instructional practice do not align which adds another layer of complexity to change (Chen, 2008). When targeting change around teachers' beliefs, Cheng et al. (2020) found that value beliefs include intrinsic value, attainment value, utility value, and costs. Therefore, teachers engage in tasks described as interesting, important, useful, and effortful (Cheng et al., 2020).

There are many contributing factors to a teachers' beliefs regarding technology integration, some of which can be described by their background including gender, age, and teaching experience. In addition to those potential factors, the teaching workforce is also composed of *digital immigrants* who did not, themselves, learn in the digital age, though learned to use technology later in life (Prensky, 2010). In contrast, the students in classrooms today are considered digital natives in that they enter school expecting learning experiences that provide sociability, accessibility, and playability (Facer, 2011; Li et al, 2019). In essence, students anticipate working with social media platforms, accessing information with immediacy, and participating in game-based learning activities. Though research initially depicted a difference in the way digital immigrants and digital natives learn, later research shows that both parties are able to learn to integrate technology within instruction despite differences in generation, experience, or breadth of use with technology (Helsper & Eynon, 2010). This information does, however, inform how schools and districts can bridge the gap between digital immigrants and digital natives.

One way to bridge this gap is through developing a professional learning plan to improve teachers' technology integration practices while combatting a variety of first-order and second-order barriers. An additional layer of barriers includes veteran teachers.

Often these teachers perceive higher barriers and carry lower self-efficacy in integrating technology (Cheng & Xie, 2018). To determine how to engage veteran teachers in this work, Liang, Chai, Koh, Yang, and Tsai (2013) studied the relation between age, years of teaching, education qualifications, and Technological, Pedagogical, and Content Knowledge (TPACK) among in-service teachers in Taiwan. They came to find that age was negatively associated with Technological Knowledge (Liang et al., 2013). Teachers' beliefs are sometimes considered "the final frontier in our quest for technology integration", as they are the gateway to purposeful and effective technology integration (Ertmer, 2005, p. 25).

### ***Deciphering Between Teacher Beliefs***

By the very nature of many second-order barriers and their connection to teachers' pedagogical beliefs, teachers are often resistant to change (Ertmer, 2005). Sheingold (1991) asserted, "Teachers will have to confront squarely the difficult problem of creating a school environment that is fundamentally different from the one they themselves experienced" (p. 23). Some researchers identify teachers' beliefs of instructional technology as their as perceived usefulness of technology in classrooms while others refer to teachers' beliefs as their perceived importance of using technology to facilitate student learning (Chen, 2008; Ottenbreit-Leftwich et al., 2010). Often used interchangeably, these varying definitions create inconsistency and an inability to compare results across studies. In order to shift teachers' beliefs, Bandura's social learning theory applies to educators and the importance of environmental and cognitive factors that influence human learning and behavior, as well as the need to observe, model, and imitate behaviors, attitudes, and emotional reactions. Unifying the past,

present, and future efforts relative to instructional technology while also understanding teacher beliefs allows schools and districts to move integration forward (Chen, 2020).

#### Pedagogical Perspectives

Teachers' pedagogical underpinnings fall along a continuum with most existing somewhere between constructivist and behaviorist in practice. A range of pedagogical beliefs adds complexity to facilitating change in instructional technology usage and planning effective professional learning (Kim, et al., 2013). Over time and throughout their career, teachers develop and refine their pedagogical beliefs about teaching and learning. Constructivist-oriented teachers are student-centered in both planned outcomes and desired engagement as they find that students construct their own learning through experience (Deng et al., 2014). In contrast, behaviorist-oriented teachers are teacher-centered. In this philosophy, teachers are decision makers focused on maintaining order and controlling curriculum delivery (Deng, et al., 2014). One of the greatest second-order barriers to overcome is a teacher-centered pedagogical perspective (Ertmer, 1999). In their meta-analysis study, Tondeur et al. (2016) suggested an alignment between teachers' pedagogical beliefs and technology use. For example, constructivist-oriented teachers perceived technology as important to the learning process as a result of the student-centered motivation to experiment and integrate new technologies (Ertmer et al., 2015). In contrast, behaviorist-oriented teachers integrated technology aligned to their beliefs and within their skills and competence to maintain control (Lim & Chan, 2007).

To better understand the impact of teachers' beliefs on their implementation of educational technology, Tondeur, van Braak, Ertmer, and Ottenbreit-Leftwich (2016) conducted a study that found that pedagogical beliefs are relatively stable and typically require long-term professional learning to change beliefs and practices (Tondeur et al.,



2016). One concern that arose from their research is that despite a teacher's engagement in the professional learning experience, their constructivist pedagogical beliefs continued to regard teaching as a process of knowledge transmission, further emphasizing the importance of embedded technology training with application and planning time for effective use (Tondeur et al., 2016). In contrast to short, sporadic technology-based professional learning, a long-term professional learning plan that is an iterative process aimed at extending and updating the professional knowledge and beliefs of teachers in the context of their work is essential (Tondeur et al., 2016; Sang et al., 2010; Kopcha, 2010).

### **Professional Learning to Support Integration**

One main component found to impact school improvement is an engaged staff with the will and skill to develop effective practice (Leithwood, 1995). Knowing that teachers are the number one indicator of student success allows schools and districts to prioritize professional learning. Researchers often analyze technology integration from a lens of instructional impact and educator decision-making as learning is transformed when teachers understand a tool's capabilities and the confidence in appropriate use and integration aligned to learning objectives (Tucker & Stronge, 2005).

Technological determinist language often frames educational transformation discourse and rhetoric which pairs positive change in schools with the use of technology. Often, assumptions are made that the mere presence of more devices in a classroom equate to improved learning, or that more purchased applications result in higher achievement. Further research has the potential to debunk technology determinist assumptions and analyze the role and impact of the educator in positive change in schools (Fisher, 2006). It is school leaders who carry the responsibility to frame a shared vision

that provides time and space for professional learning to improve teacher quality (Leithwood, 1995). As Bransford (2005) described:

In the research literature on teaching and teacher education, there is a shared understanding that domain-specific and general pedagogical knowledge and skills are important determinants of instructional quality that affect students' learning gains and motivational development (p. 135).

With emphasis and greater research regarding teacher beliefs and instructional practices with educational technology, researchers have identified that “a crucial factor for successful technology integration into the classroom is the teacher, because what directly determines the instruction that takes place behind the classroom door is the teacher rather than the external educational agenda or requirements” (Chen, 2008, p. 65). In tandem with analyzing teacher beliefs and perceptions of technology use, schools and districts acknowledge that the inroads to improving instructional practices is through effective professional learning.

### ***Professional Learning***

For this research, a distinction has been made between professional learning and professional development. Professional development is defined as something which “happens to” teachers in the form of one-time workshops, seminars, or lectures and takes on a one-size fits all approach (Darling-Hammond et al., 2017). In contrast, professional learning is interactive, sustained, and customized to teachers' needs (Darling-Hammond et al., 2017). A strong link between administrative support and professional learning relates to teacher self-efficacy (Pan & Franklin, 2011). Angeli and Valanides (2013) demonstrated the impact of staff professional learning opportunities that determine a teacher's understanding and success with implementing appropriate instructional

technology. Additionally, researchers have suggested that teachers struggle to discern between technical skill development and instructional delivery skills and strategies (Angeli & Valanides, 2013). Under effective leadership, staff professional learning strikes a balance between technical and instructional skills needed for appropriate and effective implementation. When tools are taught in isolation without regard to their instructional use, staff learning is decontextualized, and minimal time remains at the end of staff development to shift focus to the content and pedagogy of designing a task with the help of a specific tool.

In addition to appropriate planning for professional learning, funding is essential to provide teachers with the time and space to learn and grow their practice. Fortunately, ESEA established many block grant initiatives to support its goals. Within Title II funding, schools and districts are allotted funds for staff and principal professional learning. Though research based professional learning is a constraint to permissible funding, there are a plethora of professional learning opportunities that qualify for Title II funding. In return for professional learning, educators receive continuing education credits necessary to maintain their teaching certificate.

### ***Designing Purposeful Professional Learning***

When designing effective professional learning, teachers require time to gain comfort in embedding instructional technology tools such as an LMS within instruction in purposeful ways. This includes gaining an understanding of the educational value of the tool as well as context for authentic design tasks and practice learning the tool itself (Angeli & Valanides, 2013). An influential component to teachers' uses of technology is their value beliefs; therefore, it's imperative that professional learning is placed in context and supports both instructional and technical skill development so teachers gain

confidence in their facilitation and the tool's purpose within instruction (Cheng & Xie, 2018). When teachers perceive that learning and using technology is interesting, important, and useful, their motivation to learn to integrate the technology and improve their technological, pedagogical, and content knowledge (TPACK) increases (Cheng & Xie, 2018). One goal of effective professional learning is to engage the participants and develop meaning and purpose for learning the chosen topic, skill, or tool for implementation.

Angeli and Valanides (2013) developed seven instructional design guidelines to link technical understanding to task design and curriculum. The guidelines emphasize sequencing the educational affordances of the tool from simple to complex as educators demonstrate competency, hands-on learning through a design task with a real curriculum task, and a discussion of the task's adaptability to accomplish learning objectives (Angeli & Valanides, 2013). Researchers have found an emerging trend in education that suggests a focus on spiralizing curricular content so that students receive multiple attempts to reach mastery and depth of understanding; similarly, technology skill development suggests a spiral approach to learning new instructional tools (Angeli & Valanides, 2013). In addition to scheduled, whole staff professional learning, professional learning communities (PLC) are designed to foster collaboration and reflection as teams expand their TPACK understanding (Angeli & Valanides, 2013). Infusing teacher leaders within PLCs to facilitate informal conversation regarding the effective integration of technology and the value added provides real-world examples for colleagues.

### ***Acquiring Feedback on Professional Learning***

Effective professional learning experiences for teachers require considerable time and planning. In Stanford Center for Opportunity Policy Education's (SCOPE) study,

researchers found that American teachers did not often participate in long-term, collaborative professional learning (Darling-Hammond, et al., 2009). To the contrary, American teachers experience professional learning in short, isolated sessions that fail to provide connection between professional learning and growth in student achievement.

A current challenge in education is the contradiction between describing and delivering quality professional learning. Desimone (2011) identified five core features of effective professional learning: (1) content focus, (2) active learning, (3) coherence, (4) duration, (5) collective participation. Teacher feedback concerning these five core features of professional learning provides insight to areas for improvement. Teachers across the United States must accrue a varying quantity of professional learning hours to maintain their teaching certificate depending on the state that holds their certificate. To receive credit for their hours, districts often require that teachers complete a satisfaction survey. Though seeking feedback is the first step to refining professional learning practices, if minimally structured, the depth of feedback teachers provide can lack detail and complexity. Often, teacher professional learning surveys are the best way to produce quantitative statistics about events, behavior, or practice that allows a school or district to compare teacher experiences and analyze trends over time (Desimone, 2011).

### **Summary**

In this literature review, I summarized the role of state and national expectations for technology integration with school and district level implementation of hardware, Wi-Fi, and platforms to support student learning. Through an analysis of different modes of technology-embedded learning and the professional learning to supply teachers with the skills and confidence to deliver instruction, there are clear indicators that teachers span a

wide continuum of readiness and depth of LMS integration because of teacher beliefs, perceptions, and attitudes. This information along with this study's theoretical framework provides the foundation for this mixed methods research study. In the next chapter, I will explain the mixed methods design used to explore teachers' perceptions and use of an LMS in grades 3-5.

## Chapter 3

### Methodology

In the previous chapter, I discussed the importance of teachers' beliefs and perceptions around the integration of a learning management system (LMS). In this chapter I identify and explain a mixed methods case study design to understand teachers' decision-making around LMS integration. In addition to explaining the purpose of selected methodology, I also unpack each selected instrument and its alignment with the study's purpose. This study's two-phase approach allowed for both quantitative data collection to identify potential trends in teacher beliefs, as well as careful examination of specific cases with the ability to conduct cross-case analysis.

#### Research Questions and Design

Once I determined the need for a mixed methods design to balance quantitative and qualitative measures to better understand teachers' perceptions and integration of an LMS, I needed to identify the specific mixed methods design. Creswell and Plano Clark (2007) described the three major decisions concerning selecting a mixed methods design as the timing, weighting, and mixing of the quantitative and qualitative methods.

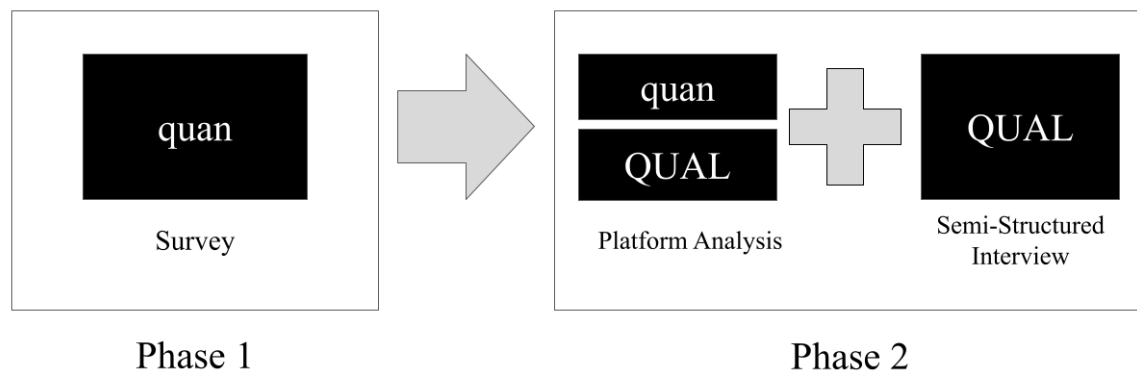
Concerning the timing and weighting of the methods, I selected for the study to follow a sequential order across two phases with a heavier qualitative measure to support and explain the quantitative data. Therefore, this mixed methods study followed an explanatory sequential design, quan→QUAL, as I investigated teachers' perceptions and uses of an LMS through a two-phase approach (See Figure 3.1).

Within an explanatory sequential mixed methods design, a researcher first collects quantitative data and then gathers qualitative data to help explain or elaborate on the quantitative results (Creswell, 2019). From this perspective, I used the quantitative survey

within Phase I to create a general picture of elementary LMS usage in District A, then used the qualitative measures within the platform analysis and semi-structured interview to refine, extend, or explain the general picture (Creswell, 2019). One challenge to utilizing an explanatory sequential design is determining what aspect of the quantitative results to follow up on in the second phase of the study (Creswell, 2019). Further, in this section I review the case selection criteria.

**Figure 3.1**

*Sequential Phases of Research Design*



*Note:* Explanatory sequential mixed methods design contains two phases and three instruments.

The rationale for an explanatory sequential design is that “the quantitative data and results provide a general picture of the research problem; more analysis, specifically through qualitative data collection, is needed to refine, extend, or explain the general quantitative picture” (Creswell, 2019, p. 553). Therefore, I used Phase I’s survey method to gather quantitative data such as Likert scales and rank order questions to provide understanding and generalizability concerning LMS integration across District A while simultaneously conducting data analysis to select participants to proceed to Phase II. Within Phase II, the platform analysis included quantitative measures via the platform analysis checklist as well as qualitative questioning to gain better understanding of



application and integration of the LMS. Also, in Phase II, the semi-structured interviews served as the emphasized qualitative method to gather teachers' perceptions, beliefs, and decision-making after constant comparative analysis after collecting survey data and conducting the platform analysis.

The purpose of this study was to develop greater understanding and awareness of teachers' perceptions and decision-making concerning integration of an LMS in grades 3-5. With that in mind, neither a qualitative nor quantitative design in isolation could address both teachers' LMS perceptions and frequency and ease of use, access to training, and ability to navigate and create. For that purpose, this section outlines both survey research design and case study design.

### ***Survey Research Design***

Creswell (2019) described survey design as “a set of research procedures in which investigators administer a survey to a sample or the entire population of people to describe the attitudes, opinion, behaviors, or characteristics of the population” (p. 385). The survey within Phase I included quantitative items and followed a cross-sectional survey design. In broad terms, cross-sectional designs examine current attitudes, beliefs, opinions, or practices (Creswell, 2019); specific to this study, the focus of the cross-sectional design is of teacher beliefs, attitudes, and practices concerning LMS integration. This study used two instruments of research design: (a) online questionnaire and (b) one-on-one interviews. The online questionnaire maintained anonymity between myself and the participant and yielded quantitative results, whereas the one-on-one interview exposed participants to me as the researcher and resulted in qualitative data (Creswell, 2019).

Carver (2016) designed a study to analyze teacher perception of barriers and benefits to K-12 technology usage. Within that study, the survey included an interval measurement Likert scale to glean data concerning frequency and types of technology utilized in the classroom, such as Likewise, this study utilized Likert scales to assess frequency of LMS material types and instructional integration to increase understanding of teacher decision-making. Additionally, Likert scale questions assessed teachers' perceptions of an LMS' intrinsic value, attainment value, and utility value (Cheng et al., 2020).

### ***Case Study Research Design***

Creswell (2019) articulated that case study design allows researchers to “both describe individuals and identify themes...in order to develop a rich complex picture” (p. 545). Within this study, Merriam's (1998) more flexible perspective places the LMS as the focus of the study with the multiple teacher participants as the cases. This approach keeps the study particularistic by focusing on Schoology integration, descriptive as it develops a thick description of teachers' use and perceptions of the LMS, and heuristic to support the audience's understanding of the LMS at the elementary level. In Phase I I collected teachers' beliefs and perceptions about LMS integration; however, Phase II's case study design targeted the real-world application of LMS decision-making (Yin, 2014). During Phase II, the platform analysis tool assessed teachers' real world LMS application of their perception, beliefs, values, and integration. Donnelly and his colleagues (2011) acknowledged that case study permitted them to expose Ertmer's (1999) first- and second-order barriers to technology integration. Yin (2014) stressed the importance of questioning, listening, adaptability, background knowledge of the

phenomenon investigated, and an unbiased attitude as essential skills to use case study design effectively which tie well into the semi-structured interview instrument.

Through use of case study and semi-structured interview questions, participants' will provide the narrative that explains a potential shift in practice because of the COVID-19 pandemic, therefore, the case represents a contemporary phenomenon within its real-life context (Yin, 1994). This study aims to use each participant's experience with an LMS as an individual case, then use data analysis to identify trends across cases within the research site.

### ***Research Questions***

The purpose of this study was to develop a better understanding of teacher perceptions of the use and effectiveness of LMS integration practices. Through survey research design as well as case study research design, quantitative and qualitative data allowed for a detailed description of teachers' decision-making phenomena (Merriam, 1998) to answer this primary research question: *How do teachers perceive the role of an LMS at the elementary level in supporting instructional practices and student learning?* Further, data collected targeted the following sub-questions:

1. How do intermediate elementary teachers in a technology-rich environment self-assess their integration of a learning management system to align with instructional practices?
2. How do intermediate elementary teachers describe the ease of use and perceived usefulness' of an LMS?
3. In what ways do intermediate elementary teachers' self-assessed comfort level with an LMS correspond with their technology integration decision-making?

### ***Setting***

The setting for this study is a technology-rich public-school district in the mid-Atlantic region of the United States with a total population of approximately 12,000 students (5,300 students in grades K-5). In terms of technological access at the elementary level, each teacher has access to a laptop, iPad, interactive whiteboard, and document camera. All students are also equipped with individually assigned iPads. In addition to hardware access, this district has high-speed Wi-Fi access and technology associates assigned to each building to support daily technology operations.

At the elementary level, third- through fifth-grade classrooms have a maximum class size of 30 students, though the average class size across the district in those grade levels is 24 students. Five miles beyond the urban, high-density housing areas, most of the district is considered suburban with farmland (NCES, 2015).

### ***Establishing the Boundary of the Case***

To guide research decisions and methods, it is important to establish a boundary for the case (Merriam, 1998). Within this study, a case is an elementary teacher's attempt to integrate Schoology as their learning management system (LMS). Multiple cases were selected to create greater depth in understanding teachers' perceptions and use of an LMS. The cases were studied simultaneously as within-case analysis and cross-case analysis strengthened findings while overcoming limitations associated with a single case design for a topic so large as technology integration (Mama & Hennessy, 2013; Coklar & Yurdakal, 2017; Hughes, 2005). As I explored each individual case, I conducted analysis across the seven cases to identify trends in data and evidence of LMS usage, as well as the effectiveness of this study's *Framework for Elementary Based LMS Integration*.

## ***Participants***

The study's eligible participants in District A included all 121 intermediate homeroom teachers in grades 3-5 (See Table 3.1).

**Table 3.1**

### *Phase I Participant Summary*

Role	Total Eligible	Male	Female
Third Grade	41	1	40
Fourth Grade	41	4	37
Fifth Grade	39	9	30

*Note:* The table identifies participants' gender and level of experience in an intermediate elementary setting.

All eligible participants work in technology-rich environments that provide individually assigned iPads to each student and both an iPad and laptop to each elementary teacher. Teachers in grades 3-5 have district expectations to implement and utilize an LMS in the eligible grade levels.

**Inclusion and exclusion criteria.** The inclusion criteria limited study participants to homeroom teachers in grades 3-5 who work at one of District A's 11 elementary schools. The study aims to identify teachers' perceptions and use of an LMS; therefore, teachers with all frequency and usage types were critical to represent the district's population.

In District A's elementary division, teachers in grades 3-5 have access to the district-adopted LMS while K-2 teachers have access to a different, non LMS platform. In addition to K-2 teachers, the study excluded Special Area teachers including art, music, library, and physical education as their curricular needs and quantity of classes results in a different set of LMS expectations.

**Sampling.** Creswell (2019) described a study's sample as "the group of participants in a study selected from the target population from which the researcher generalizes to the target population" (p. 390). With inclusion criteria established, I identified the desired number of cases which represents 10-12% of the study's eligible participants (Merriam, 1998). This study utilized purposeful and convenience sampling as a result of the proximity to an accessible population and the legitimacy of the approach in understanding teachers' decision-making regarding LMS integration (Merriam, 1998). This practice is common in qualitative research design as generalizations are not of greatest priority in this study (Merriam, 1998). Given the potential for researcher bias and subjectivity, the participant's average score across three survey questions that focused on beliefs, values, and perception of LMS integration determined the participants to move to Phase II. To further protect researcher bias, Phase I contained participant anonymity and Phase II included a platform analysis tool and pre-determined set of semi-structured interview questions.

### **Instrumentation**

The primary data sources included a survey, one-on-one interview, and LMS platform analysis to address the study's research questions. From a qualitative standpoint, this study reveals the perception of an LMS as that is the central phenomenon of focus (Creswell, 2015). The varying, mixed methods instruments contributed different perspectives to identifying teachers' beliefs, perceptions, use, and decision-making regarding LMS integration.

### ***Survey***

I gathered numerous data points within 10 to 15 minutes during Phase I's survey method (Warschauer et al., 2004). The survey has four components: (a) teacher

demographics, (b) teacher beliefs about LMS usage, (c) platform skill self-assessment, (d) technology-based professional learning (Cheng et al., 2020).

The survey consisted of 16 web-based questions administered via Qualtrics that included Likert scale items, matrix items, rank order items, checkbox items, and basic demographic items. The survey collected demographic information regarding the participants' teaching experience and gender, though, the primary focus of data collection in the survey method included teachers' LMS decision making and professional learning. Specifically, Likert scale questions specifically targeted teachers' values, beliefs, abilities, and integration. Rank order questions addressed teachers' perceived ease of use and training required to implement the LMS within instruction, while matrix questions identified frequency and familiarity with materials, features, and tools within the LMS. Analysis of survey results informed participant selection for Phase II using case selection criteria (See Table 3.2).

### ***Platform Analysis***

Paired with the teacher interview as a part of Phase II, the platform analysis captured participant decision-making and perceived use of the LMS. I conducted the platform analysis via web conferencing tool, Zoom, which enabled me to record the conversation and screenshare of the participants' LMS courses for transcription purposes.

The platform analysis tool (See Appendix D) guided the virtual walk-through of two different, participant-selected courses. Phase II consisted of seven platform analysis over the course of three weeks (See Table 3.2). This tool includes the UDL framework criteria found on Canvas' "Course Evaluation Checklist v2.0" and served as the foundation for the platform analysis tool (Johnson et al., 2021). Participants provided evidence of selected criteria in the areas of course information, course content, and

assessment of student learning. Each criterion aligned with the Universal Design for Learning (UDL) guidelines to promote equitable access for all learners and included a criteria rating scale from essential to best practice, to exemplary to represent the depth of LMS integration skills. Participants also shared a self-selected integration example and identified its classification within the SAMR model and finished the walk through by providing evidence of different material types. Participants then repeated the use of the platform analysis tool with a second self-selected course.

**Table 3.2**

*Platform Analysis and Interview Schedule*

Participant	Platform Analysis		Semi-Structured Interview	
	Date	Length of Time	Date	Length of Time
A – Ms. Angelo	December 3		December 10	
B – Mr. Barkley	December 7		December 21	
C – Ms. Cleary	December 9		December 22	
D – Mr. Daniels	December 9		December 16	
E – Ms. Ellison	December 22		December 22	
F – Ms. Feese	December 17		December 17	
G – Ms. Garrett	December 22		December 23	

*Note:* Some participants completed both the platform analysis and interview in the same day, though there was a break in between sessions.

The table shows the distribution of platform analysis and observations over the three-week data collection period. Platform Analysis and semi-structured interviews were expected to take approximately 30 minutes.

***Semi-Structured Interviews***

I designed the semi-structured interview to include prepared questions regarding LMS integration while also providing myself autonomy to adjust the interview in



response to the participant's answers. As a result of the explanatory sequential design of this study, the semi-structured questions represent the same main categories found in the Phase I survey, though allow for dialogue and conversation to expand on the teacher's thinking. The categories of interview questions include: (a) teacher beliefs about the use of an LMS, (b) self-assessment of teachers' platform-based skills and integration, and (c) professional learning. The interview contained questions designed to address teachers' use of the LMS for assessment, feedback, or student discourse, as well as organizational structure and teachers' perceived support for effective LMS integration (See Table 3.2).

**Table 3.2**

*Sample Semi-Structured Interview Questions*

Question Number	Question
2	Describe a lesson in which you feel you effectively used Schoology according to your intended use of the platform? Then, describe what the lesson would have been like if you did not have access to the LMS.
3	Do you feel your use of the district's LMS has evolved since its district adoption in 2019?
5	What do you see is the [student, teacher, family] purpose of using Schoology in the grade level you teach?
8	With whom do you seek help from when looking to expand, increase, or deepen your level of Schoology use within your instruction?

*Note:* The table includes sample questions, actual semi-structured questions may expand or differ based on participant responses.

The flexibility to delve deeper into teacher responses to planned semi-structured interview questions is a strength of the instrument to gain greater understanding of the teacher's instructional decision-making (Richardson, Dohrenwend, & Klein, 1965). For example, as teachers provide their evolution of LMS integration since the initial district adoption in 2019, I can probe further to understand the impact of last year's hybrid or

cyber instruction. Additionally, this instrument allowed time to clarify information collected during the platform analysis (Merriam, 1998).

As a result of constant comparative data analysis, information gleaned from the platform analysis helped me to identify questions to delve deeper into the participant's thinking within Phase II's semi-structured interview. The same seven participants who participated in the platform analysis completed a semi-structured interview that took approximately 30 minutes.

### ***Reliability and Validity within Quantitative Measures***

Regarding Phase I's survey method, I ensured reliability of the instrument through internal consistency reliability as each participant completed the same version of the survey (Creswell, 2019). Questions were clearly phrased through the form of matrices, Likert scales, and rank order items; further, the estimated time to complete the survey was 8-10 minutes to ensure participants did not experience fatigue (Creswell, 2019).

Threats to internal and external validity did exist despite the study's specific protocols and measures in place. Merriam (1998) suggested six strategies to increase internal validity of data, and I relied upon three of the strategies: triangulation (e.g., data from multiple methods to confirm a finding), peer examination (e.g., consulting with other educators throughout data analysis), and identification of researcher biases (e.g., establishing the study's theoretical framework at the start). One threat to internal validity is researcher bias to the content of the study due to my prior role within the district's instructional technology department and involvement in Schoology adoption decision-making. Another threat to internal validity role is my current role as supervisor to a portion of the sample population. Despite maintaining participant anonymity throughout Phase I, the semi-structured interview and platform analysis revealed participants'

identities to me. Each participant could have altered LMS resources in anticipation of the platform analysis. To decrease this possibility, the platform analysis had teachers reveal their LMS-generated usage and analytics to see data over time as opposed to one snapshot of a course.

From the lens of external validity, Phase I included 20 participants out of the 121 eligible teachers, and of those who completed the survey, 10-12% were invited to Phase II. This small number of participants may limit the study's generalizability, though the purpose of the explanatory sequential mixed methods design was for the Phase II cases to support and provide greater depth of understanding to the Phase I survey results within District A.

### ***Trustworthiness and Credibility within Qualitative Measures***

Within qualitative research, trustworthiness refers to “the systematic rigor of the research design, the credibility of the researcher, the believability of the findings, and applicability of the research methods” (Rose & Johnson, 2020, p. 3). To ensure the rigor of the research design, the platform analysis and the semi-structured interview provide different opportunities to target participant LMS integration perspective and use, then permit me to triangulate the results with those of the quantitative survey from Phase I to increase trustworthiness. Specifically, with regard to the qualitative instruments, in vivo and pattern coding repeated until a point of saturation to glean validity through clear, established themes.

As the primary researcher and an administrator at the elementary level within District A, proactive measures during qualitative data collection assisted in diminishing researcher bias and subjectivity. As a result of having participant familiarity in Phase II, a

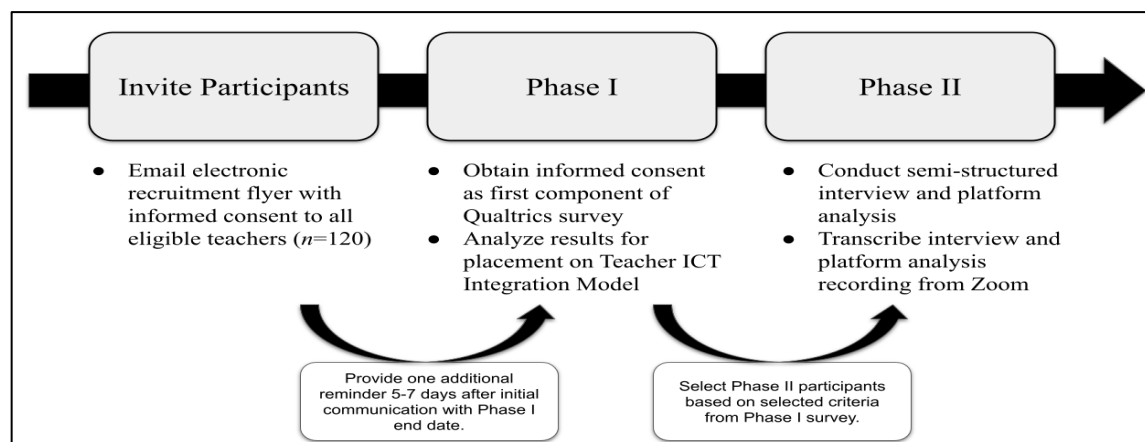
platform analysis checklist and set of semi-structured interview questions provided consistency across participants.

## Procedures

This study includes three procedural elements (See Figure 3.2). Prior to beginning Phase I, I obtained approval from the West Chester University Review Board (See Appendix A). All eligible teachers ( $n=121$ ) received an electronic recruitment flyer and an informed consent form as the first part of the teacher survey in Phase I (See Appendix B).

### Figure 3.2

#### *Overview of the Research Process*



*Note:* There was one recruitment phase and two phases with participants.

All participants' contact information was loaded into Qualtrics, and eligible participants received an email with a unique link to complete Phase I's Qualtrics survey (See Appendix C). The unique link secured participant anonymity during the first phase of the study. In addition to demographics information, Phase I included closed-ended questions regarding current technology integration with an emphasis on teachers' beliefs,

perspectives, and decision-making as well as ease, access, and training with an LMS implementation.

To identify cases to proceed to Phase II, case selection criteria identified participants based on their beliefs and perceptions of LMS usage. Table 3.3 provides an overview of the case selection criteria based on Phase I survey data.

**Table 3.3**

*Overview of Case Selection*

Question #	Survey Item	Case Selection Criteria
4	In general, how useful is Schoology to your teaching goals?	I noted participants who selected low, middle, and high value beliefs.
5	How good are you at using technology in your classroom?	I utilized questions 4 and 5 to identify participants with high expectancy and low beliefs, as well as those with low expectancy and low value beliefs
6	How well do you expect to do in integrating Schoology into your lessons this year?	I examined teachers' intentions for high and low LMS integration.
10	Select the frequency that best describes the specified use of Schoology.	I examined the LMS integration frequency of ratings as sometimes and often across 6 areas.

*Note:* Specific survey items determined case study selection for Phase II participation.

For each of the selected survey items, I transferred participants' Likert-scale responses to a scaled score, one through four, and found the sum of the three questions. Participant scores ranged from 6-11, with a total possible score of 12. The sum of the three questions provided insight into overall value beliefs, ability beliefs, expectancy beliefs, and technology integration (Cheng et al., 2020). Item 10 allowed participants to reflect on their frequency of use pertaining to specific material types. Through selection

of a variety of low, middle, and high-end users based on values, ability, expectancy, and integration, a diverse sample represents those moving to Phase II.

After I identified the 10 participants to enter Phase II of the study, my advisor shared the corresponding participants' names to invite the participants to the next phase. Prior to case selection, each participant was provided with a gender-neutral identifier (i.e., Teacher A). Later during data analysis, the participant's identifier changed to a gender-based pseudonym to gain greater understanding of each participant's experience using Schoology. For data reporting purposes, the first letter of the pseudonym's last name corresponds with the participant's letter identifier given during Phase I. For example, Teacher A was given the pseudonym Ms. Angelo.

Within Phase II, I kept the participant's grade level with their identifier as that information provided context to the amount of familiarity the students and teacher had in their first, second, or third year of LMS integration and use. Phase II began with the platform analysis as participants provided a walkthrough of two selected courses and identified components of an elementary LMS. I utilized the Platform Analysis Tool (See Appendix D) to create consistency across participants and within content analysis.

After the platform analysis, participants took part in the semi-structured interview to provide a deeper understanding of their decision-making and use of the district-adopted LMS. The platform analysis and participant interview each took approximately 30 minutes.

### ***Analysis and Coding Procedures***

According to Merriam (1998), data analysis is “the process of making sense out of the data...[which] involves consolidating, reducing, and interpreting what people have said and what the researcher has seen and read--it is the process of making meaning” (p.

178). Within this study, I made meaning and conducted cross-case synthesis regarding the participants' use and perception of an LMS platform through use of constant comparative data analysis. I analyzed data throughout the collection process, specifically at the close of Phase I to determine Phase II participants, and between the platform analysis and semi-structured interview to determine areas within the participant's decision-making to probe further. Data analysis took place throughout the data collection process as data gathered from the survey in Phase I determined the participants for the observation and platform analysis in Phase II (Merriam, 1998; Stake, 1995).

### ***Constant Comparative Data Analysis***

A constant comparative approach best met the needs of the study due to the multiple phases and both quantity and variety of data. The four stages of constant comparative data analysis include: "(a) comparing incidents applicable to each category, (b) integrating categories and their properties, (c) delimiting the theory, and (d) writing the theory" (Glaser 1965, p. 439). After identifying themes that align with the research questions, I coded the data by key words and phrases (Simmons & Martin, 2016). Analysis of interview and platform analysis transcripts using Dedoose allowed for more quantitative perspectives while adjusting categories for improved alignment to the research questions. I used Dedoose in this study as it allowed me to analyze the qualitative and mixed methods research with text, photos, audio, videos, spreadsheet data and more" (Lieber, n.d.). Throughout analysis of interview and platform analysis data, I compared incidents within each category and consolidated, eliminated, or added categories to increase the clarity of the findings.

### ***Coding***

Merriam (1998) stated, “Our analysis and interpretation--our study’s findings--will reflect the constructs, concepts, language, models, and theories that structured the study in the first place” (p. 48). With a focus on teacher perspective, *in vivo* coding honored the teacher’s voice and phrasing as it uses the direct language of participants as codes rather than researcher-generated words and phrases (Saldana, 2013). Within the study, the observation and platform analysis aimed to identify teachers’ beliefs and perspectives regarding LMS integration, therefore, an exploratory coding method helped to identify emerging themes. This study included two cycles of coding. First, the researcher used *in vivo* coding to identify repetitive phrasing and language. In the second cycle, pattern coding developed the “meta code” as pattern codes permit the researcher to attribute meaning to a cluster of *in vivo* codes that represent teacher voice, beliefs, and perspectives (Saldana, 2013). Using second cycle coding with pattern codes, a more focused and narrow set of themes emerged from teacher interviews and platform analysis that provided insight for future research. The pattern coding will continue until a point of saturation.

### ***Content Analysis***

As a qualitative instrument, the platform analysis provided participants the opportunity to navigate their LMS course and demonstrate teacher decision-making and course design. To increase validity of the instrument, I controlled content analysis through use of the Platform Analysis Tool (See Appendix D). This tool created consistency from one participant to another while evaluating participant courses in accordance with the Technological Pedagogical and Content Knowledge (TPACK) framework and Universal Design for Learning (UDL) framework.



### ***Triangulation***

For this study, a survey, interview, and platform analysis represented the instruments to collect quantitative and qualitative data. Triangulation is essential in case study design so the researcher can better analyze the participants' perceptions and uses of the LMS to support teaching and learning while maintaining data validity (Yin, 2014; Stake, 1995; Merriam 1998). For triangulation purposes, Table 3.3 outlines each instrument and its alignment to the three research questions.

**Table 3.3**

*Alignment Between Instruments and Research Questions*

Research Question	Survey Questions	Interview Questions	Platform Analysis
What role does an LMS play in a technology-rich, intermediate elementary classroom?	6, 7, 10,	1, 2, 6, 7, 8, 12	1, 2, 6
How do intermediate elementary teachers describe the ease of use and perceived usefulness' impact on LMS integration in their classroom?	4, 8, 11, 13	3, 8, 11	3
In what ways do intermediate elementary teachers' comfort level with an LMS correspond with their LMS integration?	5, 9, 12	4, 9	4

*Note:* Portions of each qualitative and quantitative instrument aligned with each research sub-question.

Each of the three instruments utilized in the study connected in some way with each research question. With the help of the constant comparative analysis, the cross-over between instruments and research questions supported the ability to triangulate data.

### **Informed Consent and Protection of Human Subjects**

Participants granted consent to participate in the study prior to completing the Phase I survey. The participant consent form included the purpose of the study, expected

participation, protection of privacy, and identifiable information. During Phase I, participants' identifiable information was not disclosed. Participants identified their gender, years of teaching experience, and grade level; however, their school within the study remained unknown to maintain anonymity.

Phase II selection criteria determined the participants who would proceed to Phase II with an interview and platform analysis. At that time, I was informed of the participant's identity because of the one-on-one interview and platform analysis. Participants were exposed to minimal risk during the study as the data collected was not shared with the participants' school administrator. Only the broad study's findings will be shared with the school district to improve professional learning and LMS integration practices in the future.

### **Limitations of Methodology**

While non-probability sampling does have limitations, it is common in qualitative components of mixed methods research as statistical generalizations are not sought after within the study (Merriam, 1998). To that extent, the focus of the data in this study was to develop understanding and depth of LMS integration. Phase II participants represented a wide range of LMS integration based on survey responses which allowed me to identify trends across the larger district setting. Further, a limitation within this study is the technology-rich setting as it limits the generalizability to schools across the country.

### **Summary**

In this chapter, I reviewed the study's methodology including instruments and processes for data collection. Instruments including a survey, semi-structured interview, and platform analysis, provided insight around teacher decision-making concerning the integration of an LMS in an elementary setting. In the next chapter, the study's findings

are organized according to each research question to expose the results of the explanatory sequential design.

## Chapter 4

### Results

In the last chapter, I outlined the three main components of this research study to gain better understanding of elementary teachers' perceptions and use of a Learning Management System (LMS). Of the 121 eligible participants, 20 participants completed the quantitative survey in Phase I. Per the case selection criteria outline in Chapter 3, Table 3.3, I invited 10 participants to enter Phase II. There were seven participants who accepted the invitation and agreed to conduct a platform analysis and semi-structured interview to provide insight into their instructional decision-making and LMS use. Table 4.1 illustrates the seven participants who represented all three elementary grade levels who are using Schoology in this district and ranged in their number of years of teaching experience.

**Table 4.1**

*Overview of Selected Cases*

Participant	Pseudonym	Years of Teaching Experience	Current Grade Level
A	Ms. Angelo	20+	3
B	Mr. Barkley	20+	5
C	Ms. Cleary	12-15	5
D	Mr. Daniels	8-11	4
E	Ms. Ellison	4-7	4
F	Ms. Fox	4-7	3
G	Ms. Garrett	16-19	5

*Note:* Although all participants' number of years of teaching experience are listed, their number of years' experience with using Schoology may differ due to variables including when they joined the district or a prior teaching role within the same district.

All seven participants who engaged in Phase II had a variety of teaching experience, exposure to LMS professional learning, and number of years using an LMS with students

in grades 3-5. This chapter summarizes key findings and themes that emerged to support the three research questions. The participants' varied experience provided a richer depth to the study and analysis of the three research questions.

### **A Collective Case Study of Teachers Who Integrate Schoology**

With the survey completed and case selection criteria identified, the opportunity to delve deeper into the seven cases provided a lens into seven classrooms with varying teacher perceptions and current usage of LMS integration. Participants uncovered their decision-making throughout the platform analysis process that provided context to while exposing their schema and prior LMS and instructional knowledge. The semi-structured nature of the interview allowed for further questioning regarding elements of the participant's LMS courses exposed during the platform analysis. The case study design for Phase II provided explanation for the initial survey findings.

#### ***Exploration of the Themes***

Within this explanatory sequential study, I used case study research to support and explain the quantitative findings from the Phase I survey. The participants selected for Phase II represented a range of teaching experience and prior experience using an LMS. Despite their different instructional styles and grade levels of instruction, several themes emerged in relation to this study's research questions (see Table 4.2). In this section, I summarize the key findings for each research question as I compare cases against (a) the themes, (b) each other, and (c) the quantitative survey results.

**Table 4.2***Themes and Sub-Themes by Research Question*

Research Question	Significant Theme(s)	Sub-theme(s) if Applicable
What role does an LMS play in a technology-rich, intermediate elementary classroom?	Content Objective	<ul style="list-style-type: none"> <li>English/Language Arts</li> <li>Mathematics</li> </ul>
	Assessment for Learning	<ul style="list-style-type: none"> <li>Formative Assessment</li> <li>Student Feedback</li> </ul>
	Student Access to Resources	
How do intermediate elementary teachers describe the ease of use and perceived usefulness' of an LMS?	Organization and Student Navigation	
	LMS Skill Development	
In what ways do intermediate elementary teachers' comfort level with an LMS correspond with their LMS integration?	Comfort Level	<ul style="list-style-type: none"> <li>Pandemic Impact</li> <li>Teacher Collaboration</li> </ul>

*Note:* Themes and sub-themes are representative of findings from all three instruments: survey, platform analysis tool, and semi-structured interview.

The table identifies the themes and sub-themes related to the three research questions. To identify each theme, I triangulated survey, platform analysis, and interview data.

***Data Triangulation***

I utilized the constant comparative method for data collection to conduct data analysis throughout both phases of the study. At the close of the data collection window, I determined the themes based on quantitative data analysis of the survey results with the coded excerpts from both the platform analysis and semi-structured interview. I used data triangulation for each emerging theme to determine if it was representative of multiple participants and across the three instruments. Additionally, sub-themes emerged as a result of triangulation. An example of this process is outlined in Table 4.3 regarding the content objective theme.

**Table 4.3***Theme Exploration by Means of Triangulation*

Theme	Survey	Platform Analysis	Interview
Content Objective	Lesson objective was the most highly ranked item that influences LMS usage	Math and ELA represented 12/14 courses for walk-through Less LMS materials prevalent in Math than ELA courses	ELA: Google Drive Assignment usage and reading quick-checks Math: quick checks but difficulty showing work Both: discussions in-person

*Note:* This is a sample of process to triangulate data to identify one theme and any resulting sub-themes.

Triangulation of the instruments and resulting data provided the ability to identify trends and findings that emerged across phases of the study. A similar process as demonstrated in Table 4.3 was repeated for the other themes and sub-themes to connect the quantitative survey data with the seven cases.

In the next section, I expand these themes and synthesize the data from all instrument methods and participants to shed greater understanding of elementary teachers' perceptions and use of an LMS.

### **The Role of an LMS in an Intermediate Elementary Classroom**

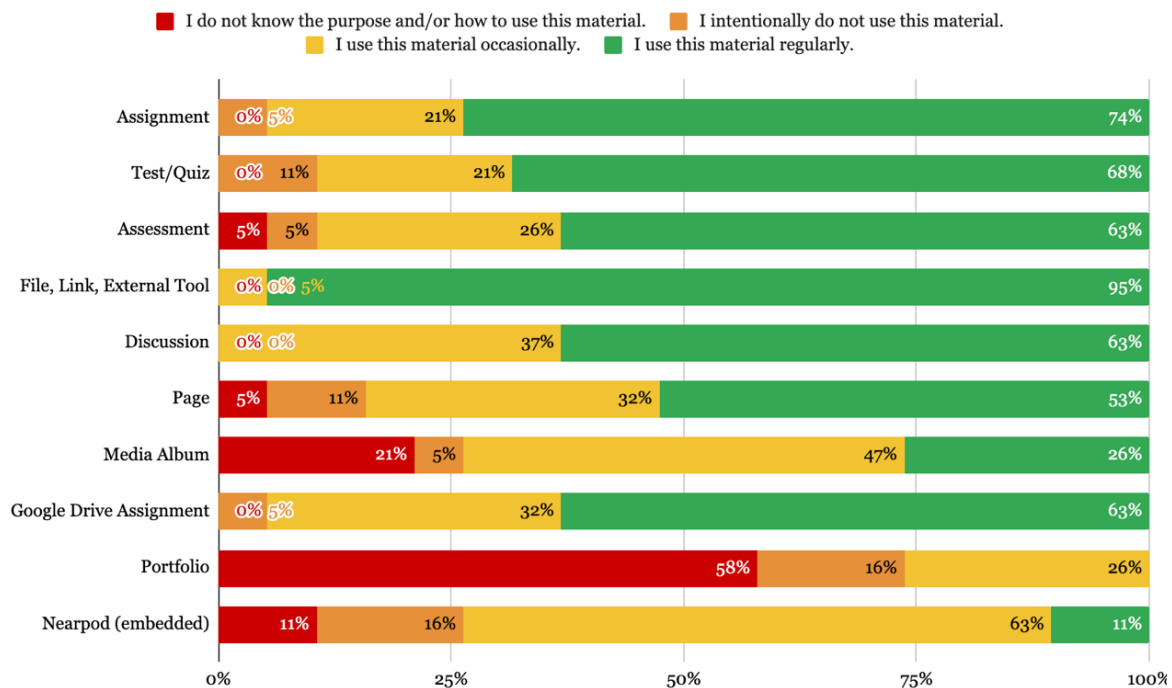
To understand teachers' instructional decision-making, I first analyzed the platform analysis and interview transcripts for key words and phrases (e.g., "I had them...", "We usually use...") that led to forthcoming rationale and insight to how teachers used Schoology material types within instruction. Teachers referenced specific material types and examples of their Schoology use 119 times across all interviews and platform analyses. In addition to a specified material type and instructional example of LMS use, interviews and platform analyses transcripts were coded for the purpose of instructional use. Three themes in use emerged across all of the data to address the

question regarding the role of an LMS in an elementary setting: (a) content objective, (b) assessment for learning, and (c) student access to learning resources.

### ***Content Objective***

In Phase I, participants rank-ordered items that most influence their LMS integration, including: (a) improve student engagement, (b) ease and use of the platform, (c) instructor training, (d) increase student access to resources, and (e) the lesson objective. In response to this question, 37% of participants identified the lesson objective and teaching point as the top priority when determining LMS integration, whereas ease and use and staff training each only had 21% of participants select that item as their top priority in using an LMS. In addition to identifying the purpose of LMS integration, in Phase I, participants also self-assessed the frequency of use for different Schoology material types (see Figure 4.1). From the quantitative data collected within Phase I, the most prevalent material types were files, links, and external tools with 95% of participants using those materials regularly. Assignments, tests/quizzes, discussion posts, and Google Drive assignments all had between 63% and 74% of participants report regular use. While materials such as Nearpod (11%), media albums (26%), and portfolios (0%) had few participants reflect regular use with many participants unaware of how to use the material type or selecting to intentionally not use the material.



**Figure 4.1***Self-Assessed Frequency of LMS Material Type*

*Note:* Participants self-assessed the frequency of each material type in Phase I prior to their platform navigation.

The data collected within Phase I was supported by the findings from the platform analysis tool and semi-structured interview.

**Participant-selected courses for platform analysis.** During the platform analysis, participants self-selected two courses to navigate. As a part of the district's elementary LMS course setup, all participants have a math, reading, writing, social studies, science, and homeroom course. Table 4.3 shows the courses participants selected for platform analysis. Of the 14 courses assessed during the platform analysis in Phase II, 43% were math courses, 43% were reading courses, and 14% were writing courses.

**Table 4.3***Platform Analysis Selected Courses by Participant*

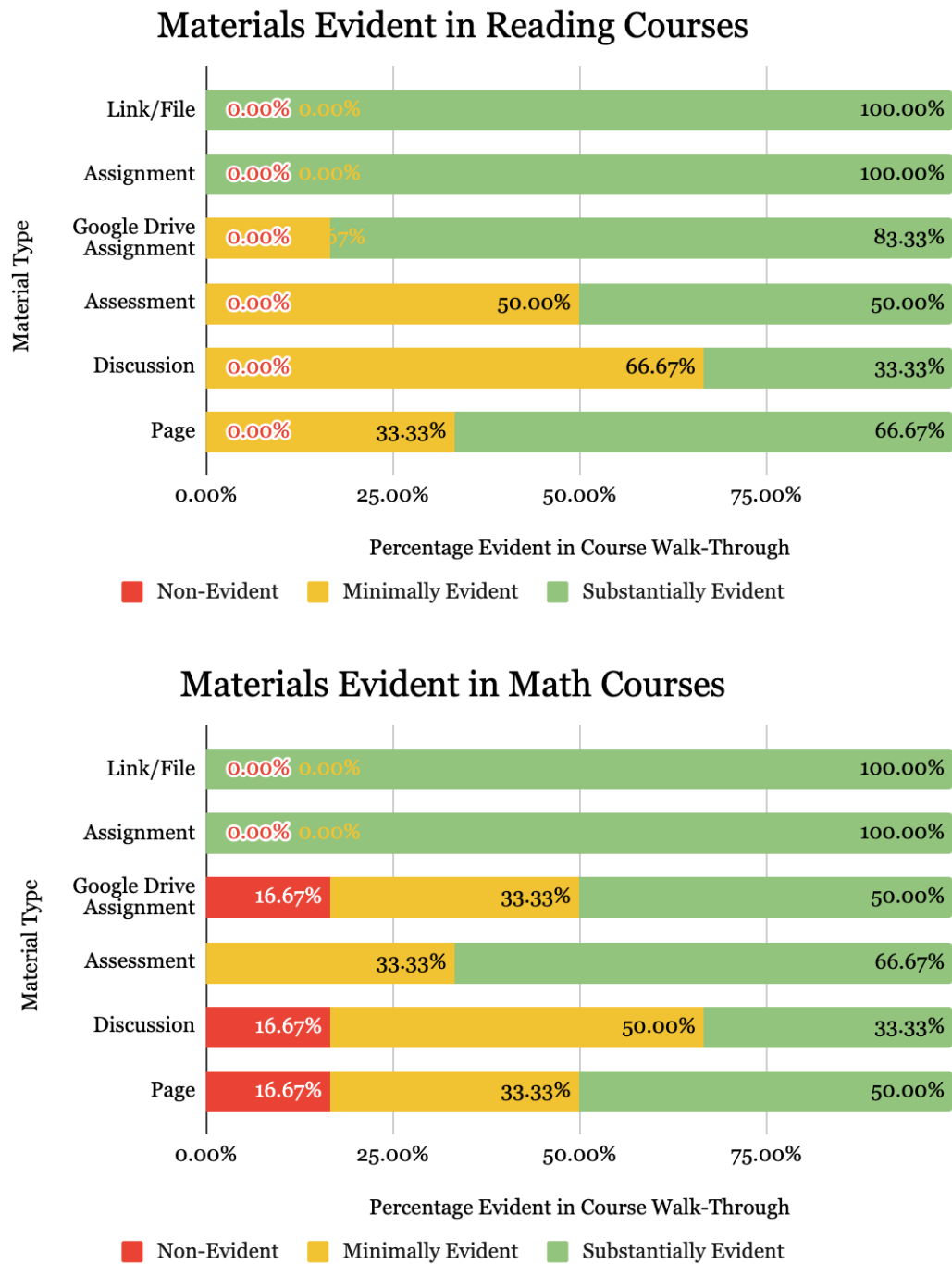
Participant	Math	Reading	Writing
A – Ms. Angelo	X	X	
B – Mr. Barkley	X	X	
C – Ms. Cleary	X	X	
D – Mr. Daniels	X	X	
E – Ms. Ellison	X		X
F – Ms. Fox	X	X	
G – Ms. Garrett		X	X
Totals	6	6	2

*Note:* The only information given to participants prior to selecting the course for the platform analysis was that participants would describe the use and organization of the course.

Participant-selected courses for platform navigation largely aligned with state tested subject areas in grades 3-5. Within the selected math and reading courses, the presence of material types differed slightly (see figure 4.2). All 14 courses in the platform analysis phase had a substantially-evident presence of links and assignments. Figure 4.2 analyzes the presence of different material types by subject area. Between reading and math courses, more material types were substantially present in reading courses than math.

Figure 4.2

*Presence of Material Types by Subject Area*



*Note:* Presence of material types was observed during the platform analysis based on published materials within the course view.

Specifically, Google Drive assignments were more substantially evident in reading and even non-existent in 17% of math courses. Test/quiz was present in both reading and math, and more substantially evident in math. The least substantially evident material type was discussion posts in both reading and math. In fact, 17% of math courses did not contain discussion posts at all. Upon reflection, participants referenced the presence of discussion posts earlier in the school year when they first introduced Schoology. Participants reflected that in the beginning of the year they utilized discussion posts to instruct students how to properly use the material type, though discussions have transitioned to be in-person as opposed to Schoology. Ms. Ellison explained her intentional decision to not use discussion posts as she said, “I do have discussion posts on [Schoology] but we don’t use them too frequently because I prefer them to have the conversation together instead of making sure they have replied to two people on Schoology” (Platform Analysis). In her classroom, she gains more value from in-person discussion as opposed to typed responses on Schoology. Ms. Garrett also makes intentional decisions about when she uses a discussion post. She has limited her discussion post usage to book club work as she shared during her platform analysis that, “I do a lot of student interaction in the classroom, but for reading we did discussion posts when we read *Wonder* and then we’ll do that again when we do our next novel” (Ms. Garrett). Her rationale for novel-based discussion posts is that students across reading groups can share in discussion.

***LMS integration in English language arts courses.*** During the platform analysis, participants’ examples of LMS integration in language arts courses, including reading and writing, focused on student choice, access to resources and texts, and assessment of student learning. A common use in reading courses was the use of the test/quiz function

to assess students' comprehension. In one example of integration, Mr. Barkley provided a practice assessment to allow students to navigate the test/quiz functions prior to taking their larger stake, nonfiction unit assessment. He instructed students on how to locate the text within Schoology, use the markup tool to annotate the text, and submit their answers. In a similar assessment view, Mr. Daniels also had students using the markup tool as students identified the main idea and supporting details of a text within the test/quiz material type. Ms. Fox aligned with both Mr. Daniels and Mr. Barkley as she used the test/quiz material to assess students' comprehension using Scholastic News weekly magazines as a "must do" task within reading workshop. All three of these participants identified the automatic grading functions with their decision-making for using Schoology in their example.

Ms. Cleary and Ms. Ellison shared examples of the Google Drive Assignment feature that issued a template of the project or writing piece to each student. In her reading course, Ms. Cleary described a text features example that used Google Slides as the template which broke the project down by slide and students added their own responses in their LMS created copy of the slides that automatically shares with Ms. Cleary. She described the project during her platform analysis and said,

We did the text structure lesson over a couple days because it is a long lesson.

After I did a few whole group lessons, I had them create their own text structure projects, then I posted my example in Google Slides. I put my example as a page material type on Schoology, and then I had them create their own Google Drive assignment submission. Every student submitted and did their own using Google Docs, but it was all in one spot on Schoology. I was able to grade it with a rubric and when they were done, we created QR codes that linked to their Google Doc

and hung them in the room for them to learn from each other's projects (Ms. Cleary).

Ms. Cleary's lesson example provided a model to students that was accessible on Schoology throughout the duration of the project, allowed her to monitor student progress, and gave students an audience of peers to share their finished product. The lesson was cohesively designed from initial whole group instruction through to assessment of student learning.

Ms. Ellison provided a writing example of using the Google Drive Assignment as she issued an informational writing template to her fourth-grade students to help with their formatting and automatically create a copy for each user as opposed to having students create, share, and format their own document. Other language arts examples of Schoology use included embedded links to external sites for students to navigate to texts and articles that included either current events and/or differentiated reading levels. A trend throughout reading and writing courses was increased ease of student creation and access. Students were able to create Google Drive assignments, submit assignments, or locate resources needed for their learning independently due to the presence of Schoology.

***LMS integration in math courses.*** Similar to language arts courses, participants' LMS integration in math courses varied in purpose including (a) student choice, (b) access to resources, and (c) formative assessment. In math courses, teachers integrated Schoology within instruction to provide student choice during math workshop. Some workshop tasks were completed directly within the platform, and other materials included links to external sites for skill practice. As an example, Ms. Ellison embedded math

challenges from a district supplemental resource, Greg Tang Math, to target students' critical thinking and problem-solving skills.

Ms. Cleary gave an example of Schoology use during her multiplication unit as she said, "I have a whole folder [on Schoology] with videos and different websites that the kids can go on during math workshop or at home. It's essentially their resource folder." Students have supplemental resources readily available on Schoology to support either independent stations during math workshop or home practice. From a home perspective, Ms. Angelo uses Schoology to share resources with parents to support students' understanding at home. She also had the scope and sequence available on Schoology for parents to see where she was headed next (Platform Analysis, Ms. Angelo).

**Math submissions of student work.** Another use of Schoology within math instruction was for the purpose of collecting student projects to grade and provide feedback. Mr. Barkley utilized the LMS as a submission place for a formative assessment. He had students submit their collaborative graphing project which demonstrated students' graphing and data analysis skills. In contrast to submitting group projects, Ms. Ellison and Ms. Fox shared math formative assessments that they described as "quick checks." They each have students complete a test/quiz material to gauge conceptual understanding of the lesson objective. During the platform analysis, Ms. Fox shared that although she collects students' answers via Schoology test/quiz for the benefit of immediate grading, students show all their quick check work on paper. Ms. Fox is not alone in this approach as other participants shared concern for using the test/quiz function within mathematics.

Mr. Daniels captured this concern, “Obviously with math, most of the stuff I try to get the kids to do is paper and pencil so there aren’t many quizzes and tests or anything in there” (Platform Analysis). In grades 3-5, students are learning multi-digit addition, subtraction, multiplication, and division which involves algorithmic problem solving. Some participants identified that mathematical learning was not conducive to using Schoology as material types did not enable students to show their work and for teachers to understand misconceptions. When comparing remote instruction and in-person math learning, Ms. Cleary explained her intentional decision-making to not use Schoology. Last year she leaned on Schoology for student work submission due to remote instruction, however, when they returned to in-person learning this year, she explained, “We don’t do [quick checks on Schoology] anymore because we can easily do in on paper and I can see their work. I could have them take a picture of the work and upload it, but that doesn’t make sense to me. If they’re right next to us, why are they taking time to go on [Schoology] and post the picture?” (Ms. Cleary, Interview). Ms. Cleary aimed to not lose instructional time to post Schoology submissions when she can review student work in-person and provide immediate feedback. Ms. Ellison also elected to not use Schoology as frequently in math, though her rationale differed from Ms. Cleary. Ms. Ellison explained, “I think it’s a personal choice for me that I prefer paper and pencil when I’m taking a math assessment, so I give it to them that way” (Platform Analysis). Ms. Ellison’s personal preference informed her teacher decision-making regarding preferred learning style for demonstrating mathematical understanding.

In math, whether teachers were collecting digital submissions of workbook page photos or having students submit quick checks, much of the use of the LMS caters around assessment for learning. Likewise, in language arts courses, participants used the Google



Drive assignment and test/quiz material types to collect student work to gauge students' level of understanding and inform next instructional steps.

### *Assessment for Learning*

As identified during Phase II, the type of assessment used within an elementary classroom is dependent upon teacher, grade level, subject area, and instructional purpose. Typically, teachers use either formative or summative assessments based on the purpose of the assessment. A formative assessment is a planned, ongoing process teachers use to elicit evidence of student learning to improve understanding of learning outcomes, whereas summative assessments evaluate student learning, skill acquisition at the conclusion of a defined instructional period (Dixson & Worrell, 2016). Table 4.4 demonstrates the parent and child codes applied to assessment-based excerpts.

**Table 4.4**

*Summary of Assessment Coding by Participant Descriptor*

	Summative Assessment	Formative Assessment		
		Differentiation	Student Feedback	Instructional Decision-Making
A – Ms. Angelo	0	5	2	4
B – Mr. Barkley	1	4	8	5
C – Ms. Cleary	0	1	3	0
D – Mr. Daniels	1	2	3	1
E – Ms. Ellison	0	2	5	5
F – Ms. Fox	1	6	5	5
G – Ms. Garrett	0	3	7	0
Total	3	23	33	20

*Note:* Formative assessment refers to data that informs progress towards the learning objective.

Within the parent code of assessment for learning, three child codes were applied to the transcripts within formative assessment: differentiation, feedback, and formative assessment. As the data shows in Table 4.4, only 4% of excerpts were coded as summative assessment, the remaining 96% of excerpts within assessment represented formative assessment. This data, in conjunction, with the Phase I survey data on participants' use of Schoology for instructional purposes.

**Formative assessment.** Formative assessments were overwhelming the focus of assessment conversation during the platform analyses and semi-structured interviews. With a focus on formative assessment, the following three subthemes emerged during data analysis: instructional decision-making, differentiation, and student feedback.

**Instructional decision-making.** During the platform analysis, a common purpose for LMS integration was to glean student assessment data. In 25% of the formative assessment-related excerpts, teachers discussed using the LMS assessment data to inform instructional decision-making.

**Table 4.5**

*Survey Responses for Instructional Use of Schoology*

	Never	Sometimes	About half the time	Most of the time	Very often
I use Schoology to assess student learning.	0	20%	30%	10%	40%
I use Schoology to differentiate instruction.	5%	20%	45%	20%	10%
I use Schoology to communicate feedback.	0	35%	35%	15%	15%

*Note:* Participants self-assessed their use of Schoology within the Phase I survey.

Participants largely agreed in their beliefs regarding the use of an LMS for formative assessment purposes. In fact, within the Phase I survey, 80% of participants identified that they use Schoology to assess student learning at least half of the time, if not more frequently (see Table 4.5). During her interview, Ms. Angelo acknowledged that she is able to see student assessment data more quickly than ever before thanks to the use of the LMS material. Further, Mr. Daniels described that using the LMS for assessment purposes makes it easier for teachers to manage where all student data can be found (Interview).

*Establishing flexible groups.* Once the data is gathered in one place, teachers reported that they utilized test/quiz materials on Schoology to assist in forming small instructional groups for differentiation purposes (Platform Analysis, Angelo, Barkley, Daniels, Ellison, & Fox). For instance, Ms. Ellison described that the LMS platform “can break [the formative assessment] down by question and tell me that 76% of the class got this question wrong, and it allows me to figure out who’s not getting it or what specific concepts they are not understanding. I can also sort the results there too by student or by question” (Interview).

Through data analysis of Schoology-based assessments, teachers can create flexible groups to address misconceptions and misunderstanding. For example, Ms. Fox had students complete a quick check on Schoology after whole-group instruction where the focus of the assessment was the concept from the day before so that she was able to see if students retained the skill from the previous day. The assessment was then automatically graded and provided her with the ability to pull a small group of students who performed below expectations as her intervention group during math workshop (Ms. Fox, Platform Analysis). Five of seven participants all provided similar examples that

described the use of self-grading short quiz/test material on Schoology to reflect on students' understanding then pull small groups to meet students' needs. During his platform analysis, Mr. Barkley described his love of this Schoology feature as he said, "[Students] get real time feedback, and for the first time ever, I'm able to actually form small groups within minutes." He went on to compare the self-grading functionality compared to a more traditional grading practice as he said, "Instead of the process of them completing work, handing it in, I take it home, and maybe I take a day or two to get it graded with feedback, instead, they're getting real time feedback and I'm able to make responsive decisions about what group they should be in" (Platform Analysis). Through self-grading material types, Mr. Barkley decreased the time between assessment and feedback, and increased the use of data to inform instructional steps.

***Differentiation.*** While the assessment data collected from self-grading Schoology assignments was found to inform instructional groups, only 30% of participants identified then using Schoology to deliver differentiated instruction either most of the time or very often. Phase II participants emphasized the use of the LMS for formative assessments for the purpose of gleaning student data and determining upcoming instruction. Despite that 29% of assessment excerpts during Phase II were coded for differentiation, that percentage did not correlate with the frequency or presence of differentiation in LMS courses during the platform analysis. Instead, the differentiation-based excerpts displayed a trend in participant responses showing that LMS-based assessments support teachers in identifying the differentiation needed; however, participants reported that they deliver differentiation in-person through small group instruction without the use of Schoology. 71% of participants reference using test/quiz materials to identify students' understanding

and determine a plan for differentiation, though they deliver differentiated instruction through practices that are not based on Schoology.

Mr. Daniels referenced that his class this year does not demonstrate a need for differentiation within the LMS due to small class size and similar student needs. Instead, he and his intern differentiate in-person for students who have difficulty navigating to a resource or self-starting on a task rather than creating a modified task on Schoology (Interview). Ms. Ellison noted that the learning support teacher sometimes modifies assessments in content areas for students with learning disabilities, but with low frequency as she said, “The only time I do the individualized work is when I give a social studies quiz and I have multiple versions that include a modified version for students in learning support. I will assign it so they only see their version” (Interview). This was the only example provided by participants during the platform analysis that demonstrated differentiated assigned work within Schoology.

All seven participants in Phase II noted that the majority of Schoology materials are accessible to all students. Four of seven participants acknowledged that they used differentiation tools more regularly last school year during the pandemic, but with students in-person this year, they are differentiating without the use of the LMS. Ms. Angelo, for example, references that in the past she liked differentiating the texts on Schoology as it kept students from recognizing who was reading a different level text. She explained her use of differentiated reading passages on Schoology during her platform analysis when she said, “In the past, there may not have been enough copies, or kids wouldn’t see who is reading each passage. What I like now is that it’s right in front of them, and one girl yesterday used a laser tool on the iPad to help her track the words as she read. They’re finding tools to help them succeed”. In her example, students were

using accessibility functions of the iPad to support their learning while reading assigned passages at an assigned Lexile level. Despite this example, Ms. Angelo explained during her interview that with the return to in-person learning, she has reverted to more paper-pencil articles and texts to practice annotating and marking up the text for evidence and text clues.

Mr. Barkley did not individually assign tasks to students on Schoology, though he directed students to external websites such as Freckle, a district-purchased supplemental math program, and Newsela, a current events outlet that adjusts texts by reading level. With this approach, he differentiated instruction to the student's ability level, though it was not done within the LMS platform (Mr. Barkley, Interview). During their platform analysis and interview, all participants demonstrated a thorough understanding of differentiation, though they made intentional decisions to differentiate through other means including other tools, resources, or in-person instruction without technology integration.

**Student feedback.** According to the Phase I survey, 65% of participants use Schoology to communicate feedback at least half the time, if not more (see Table 4.5). Of the 79 assessment excerpts in Phase II, 44% of them were coded for student feedback and eight excerpts had code co-occurrence between feedback and informing instructional steps. Within the LMS, all submission-based materials such as test/quiz, assignment, and discussion posts have the capability of providing feedback to the user. Mr. Barkley and Ms. Ellison both value the immediacy of feedback and the real-time feel on test/quiz material types that do not contain open-ended responses (Platform Analysis).

Ms. Ellison expressed that she intentionally does not include open-ended responses on her quick checks because, "Schoology will prematurely give the student the

score without that question answered, so students think they did badly”. That said, the score students receive will appear low as students see the score before the teacher grades the open-ended response. As an elementary teacher, Ms. Ellison found that students had difficulty understanding their score without all questions graded (Platform Analysis). Ms. Ellison went on to explain that she does value the quick check assessments on Schoology because, “[Schoology] can break it down for me by question and tell me that 76% of my class got this question correct and that allows me to figure out who’s not getting it or what specific concepts they’re not understanding” (Interview). The ability to sort assessment results by question or by student provides a variety of ways to analyze student data.

In five of the seven participants’ interviews, teachers referenced providing students immediate feedback with their score and correct answer choices as a result of using test/quiz material types as a formative assessment. Mr. Barkley referred to students being a part of the “video game generation” (Platform Analysis). He further explained,

“The real-time feedback works well for them. I’ll just say [they] see it almost as a video game where they want their score and they want to achieve a certain score and they don’t want to go back and rework it. So, the use of Schoology is pretty revolutionary” (Mr. Barkley, Platform Analysis).

Unfortunately, however, not all participants feel as though students value the feedback they receive via Schoology.

Ms. Cleary and Ms. Fox aim to balance their feedback between Schoology and in-person student conferencing. They continue to comment on student discussions and utilize rubrics to provide writing feedback; however, Ms. Cleary expressed dissatisfaction with Schoology’s notification system in that it does not draw the student’s attention well

to check for feedback (Ms. Cleary, Platform Analysis). Further, Ms. Cleary explained that when students do check their notifications, she is unsure how many students truly read the feedback (Platform Analysis). Regardless, as a teacher, she is grateful for the writing rubrics as it makes it easier than handwriting feedback on student writing (Ms. Cleary, Platform Analysis). For students who do check their feedback on Schoology, Mrs. Garrett found that students are making the same mistakes repeatedly and not responding to Schoology-based feedback, so she provides both in-person and Schoology-based feedback to ensure it is received (Interview).

Though participants described that teacher feedback is typically given in-person, unless automatically graded test/quiz materials, Mr. Barkley, Ms. Cleary, Ms. Ellison, and Ms. Garrett all noted the benefit to providing feedback in real-time on Google Drive Assignments (see Table 4.6).

**Table 4.6**

*Phase I Schoology Google Drive Assignment Use*

	Never	Rarely	Sometimes	Often
To share and collaborate on Google Slides, Docs or Sheets between teacher and student.	5%	5%	26%	63%

*Note:* There were 19 participant responses on the Phase I survey.

In the Phase I survey, 89% of participants identified that they sometimes or often share and collaborate on Google Slides, Docs, or Sheets between teacher and student. In the examples provided, students use Google Drive Assignments for reading and writing submissions. Mrs. Garrett compared her current use of the Google Drive Assignment material type with past use of Google Docs without the LMS. In the past, Mrs. Garrett described:



I wouldn't see [their work] until they submitted it so I would have no idea what it looked like and I couldn't give feedback while they were completing the assignment which is a nice feature [of Schoology] that I can actually look at what they're doing and ask about what is happening on Slide 3 or why they haven't made edits to my earlier feedback, so I do like that feature [of Schoology Google Drive Assignments]. (Interview)

Mr. Barkley also demonstrated appreciation for real-time feedback with student writing and compared Google Drive Assignments to having students' writing notebooks digitized and accessible within Schoology with the click of a button which allows him to check in on students more regularly throughout the writing process and upon completion of the task (Interview). With the addition of Schoology Google Drive assignments, teachers have increased access to students' writing that are in progress to create more opportunities for student conferencing and ongoing feedback prior to submission.

Student feedback within the LMS looked different based on the material type, age of the learner, and learning objective. Participants who teach fifth-grade provided students with more accountability to check for feedback, whereas Ms. Angelo in third-grade began digital work submissions on Schoology but maintained in-person feedback as students acclimated to the platform (Platform Analysis). Though the delivery of feedback differed from participant to participant based on lesson objective, the use of the LMS as a resource hub was constant across all participants.

### ***Student Access to Resources***

In addition to student assessment, another significant trend in Schoology usage was for student access to resources. In Phase I, 95% of participants surveyed recorded that they often or sometimes use Schoology for students to access materials and

resources. In Figure 4.1, 100% of courses during the platform analysis all contained substantial evidence of files, links, and external tools. These material types provide students access to non-Schoology-created resources (i.e., PDF upload, external website, other district-adopted platform subscription, or external link). Further, in the Phase I survey, 85% of participants stated that they use Schoology to increase access to resources most of the time or very often (see Table 4).

**Table 4.7**

*Schoology Use to Increase Access to Resources*

	Never	Sometimes	About half the time	Most of the time	Very often
I use Schoology to increase access to resources.	0	5%	10%	45%	40%

*Note:* Participants self-assessed their purpose for using Schoology in Phase I.

All seven participants in Phase II referenced the use of Schoology for access to links and files and 26 excerpts were coded for student access to resources. Ms. Angelo navigated her reading course and showcased her “game arcade” that includes an arcade setting within her Schoology course that links to a variety of external websites with reading games that students access during a reading workshop center. She explained, “I think [using Schoology] was more interactive. I saw more excitement, more engagement than I would see with paper and pencil activities” (Ms. Angelo, Platform Analysis). Ms. Angelo also highlighted a link to a website, Epic Books, that her students log into for access to leveled books. She places the link in her reading course as it contains a specific URL for her class login page. Then, after students use Schoology to navigate to the external website, they return to Schoology to complete a discussion post about the text they read (Ms. Angelo, Platform Analysis). In this example, Schoology acts as the central

hub for students to access resources needed during reading workshop, though it also provides a place for student submission upon completion of independent reading.

Another purpose for URL/link usage within Schoology is to minimize the loss of instructional time as a result of student navigation issues. Mr. Daniels had students graphing weather and completing data analysis of locations around the world. As opposed to sending students to Google to search for weather data, he provided direct URLs to a weather website with specific locations for students to cross-examine each other's graphs with consistent data (Mr. Daniels, Platform Analysis). During the lesson, students were able to focus on the graphing task and mathematical skills as opposed to navigating technology. The use of Schoology supported students' ease and access to the necessary resources and allowed for greater focus on the learning objective.

Also in a math course, Ms. Feese gave students a folder in Schoology with videos and websites for students to go to during math workshop or at home. She explained, "It's essentially their resource folder" (Platform Analysis). In addition to providing students links for independent learning during math or reading workshop, Mr. Barkley and Ms. Cleary both post their own instructional slide decks that link to Google Slides for students to reference if they miss instruction (Platform Analysis). In addition to posting resources for students to access at home or when they need additional support, Ms. Angelo also posts many URLs within her homeroom course to provide parents access to necessary curricular materials and scope and sequences to support their children at home (Platform Analysis). While each participant's organizational and instructional approach to providing access to necessary resources differs, they each utilize the ability to post supplemental materials to support student learning.

Mr. Barkley explained that his Schoology courses encompass everything a student needs for learning including his instructional slide deck, instructional video, independent tasks, and links to external websites students need throughout the day. He described the LMS as being revolutionary as it took the benefits of his teacher-created website from 10 years ago and made it an all-inclusive, one-stop shop for student learning (Mr. Barkley, Interview). In Mr. Barkley’s classroom, Schoology has demonstrated its versatile functionality and is recognized as an asset to instruction.

### **Teacher Perceptions of Ease of Use and Access within an LMS**

Elementary teachers are the gatekeepers to instructional materials and resources used within instruction, and they are more likely to use a tool or resource if they perceive ease of use and usefulness (Davis, 1989). In the Phase I survey, participants identified teacher and student ease using and navigating Schoology (see Table 4.8).

**Table 4.8**

#### *Rank-Ordered Factors Contributing to Schoology Integration*

	First	Second	Third	Fourth	Fifth
The belief that using technology increases student engagement of learning.	11%	37%	47%	5%	0%
The ease and use of the LMS platform.	21%	26%	5%	26%	21%
That I feel I am sufficiently trained to use Schoology.	21%	5%	11%	26%	37%
The idea that Schoology increases student access to digital materials.	11%	32%	21%	32%	5%
The lesson objective and teaching point.	37%	0%	16%	11%	37%

*Note:* 19 participants contributed to this question within the Phase I survey.

Participants ranked factors that influence their decision-making regarding Schoology integration. Among the options, 47% of participants placed “The ease and use of the

LMS platform” as first or second in terms of factors that influence their decision to integrate Schoology. Furthermore, 43% of users placed “The idea that Schoology increases student access to digital materials” as first or second in prioritized order of factors that influence their use of Schoology (Survey). With perceived ease of use and usefulness identified in Phase I, the platform analysis and interview transcripts were coded to identify supporting data for ease of use and access. The two emerging sub-themes were: (a) organization and student navigation and (b) LMS skill development.

### ***Organization and Student Navigation***

A student’s navigation of Schoology begins with the landing page after logging into the platform. Third-grade teacher, Ms. Angelo, described that having her students see all seven of their courses in the dashboard view with default, stock images made it harder for students to navigate. She suggested that “having visuals for the math course with number signs or if the reading course has a book icon, it helps” (Ms. Angelo, Interview). Ms. Angelo is not alone in that thinking, as all 14 courses viewed had personalized course profile images that reflected the content area, and sometimes even included the teacher’s name or photo to assist with course selection.

**Organizational style.** To begin the platform analysis, participants described how a student would navigate their course. Regardless of the course’s content, all participants began their platform analysis with an organizational overview. There were 12 platform analysis excerpts coded for folder organization as participants referenced the importance of organization to improve student navigation. Ms. Cleary, Mr. Daniels, and Ms. Feese all noted that their folder structure changed in response to moving back to in-person learning this year. During the pandemic, participants had course materials in folders by week, then by day with a color-coded system; however, upon return to in-person learning,

they found that organizing materials by date made it difficult to remember which week held specific skill resources. Instead, six of the seven participants had courses structured by content or skill. In math, for example, materials were organized by chapter or standard, then by sub-skills within the chapter. Ms. Feese explains the shift in organization from remote instruction to in-person learning during her platform analysis:

When we were fully virtual in March of 2020, that's when I really organized Schoology and changed everything to be organized by week, then by day in folders. Now, I changed it a bit because it doesn't need to be quite that crazy now that we're back in-person and they're not as dependent on Schoology for all instruction. It's pretty simple and there's not too much there that confuses them.

Ms. Feese's decision-making demonstrates her ability to manipulate her course organizationally based on instructional format.

In contrast to the other six participants' organizational structure, Ms. Ellison's organization of materials was more simplistic as she unpublishes all other content to keep the student view as clean and minimalistic as possible. Ms. Ellison described this process, "I unpublish the things they don't need at that time, so it's easy for them to find things. I know it looks messy on my end because it's all unpublished, but it doesn't look disorganized for them because there's only like two things visible there" (Interview). Upon reflection, Ms. Ellison explained that she hoped to better organize her materials on Schoology in the next few years like she had prior to the pandemic as she had activities and folders and more choice board options for early finishers. That said, despite Ms. Ellison's current course organization, she aims to organize content within skill-based folders for ease of navigation in the future, similar to the other six participants' current structure.

**Consistency in organization for ease of navigation.** As participants navigated to their second course during the platform analysis, the organizational layout of the course was much the same as the first, despite the change in content. Mr. Barkley stressed that he tries to keep the structure and naming conventions of his courses similar, “I try to name the assignments so that it is very consistent for them and that they don’t look at Schoology and get surprised by something” (Interview). Mr. Daniels approaches his courses with a similar mentality in that he tries to have all courses set up the same way, “It makes it easier for [students] to know what to expect. Then it’s not something different in math than it is in reading. I try and keep it uniform” (Platform Analysis). Consistency in course design was described by participants as a factor in students’ ease of navigation and use of the LMS.

Ms. Cleary also aims to keep materials and folders streamlined so as to not overload a student. When her class moves on to a new skill, she moves the folder to her “past work folder” and publishes the new content’s folder, noting that she does not unpublish the past content as Schoology would then remove the grade from her gradebook that is visible to students and families.

**Independent student navigation.** A clear indicator of a well-structured Schoology course is a student’s ability to navigate it independently (Edwards, 2020). All seven participants referred to posting links, assignments, or resources for students to access during independent centers as a part of the workshop model. Within this model, Ms. Angelo, Mr. Barklow, Ms. Cleary, Mr. Daniels, and Ms. Garrett all include “must do” and “may do” items within their courses that provide students with choice. Thus, students’ ease in navigating the course to find these resources allows them to maximize their instructional time. Ms. Cleary described the value of Schoology in her classroom:

I honestly don't know what I would do without the ability to have everyone instantly in the same place and spot. The easy access to a link so that they can all be working on the same assignment at the same time is amazing...It's teaching kids a life skill. They are able to respond, stay organized, and keep on track with deadlines...it's all in one place. (Interview)

In addition to making her own life "easier" with grading and providing student feedback, Ms. Cleary noted the importance of Schoology as a life skill. Learning to navigate an LMS was a common sub-theme amongst participants as students acquire essential skills while working within the LMS platform.

### ***LMS Skill Development***

According to the participants in this study, the identified purpose of Schoology in grades 3-5 is to assess student learning and to provide students with access to resources and materials to support instruction. For either of those goals to be successful, students need to learn the skills necessary to navigate the platform with ease. Five of seven participants referenced learning Schoology in their interviews.

**Explicit Schoology instruction.** Ms. Feese described that at the beginning of the year her team used sample quizzes that contained each different type of question that were not focused on content but focused on learning to select responses and submit work effectively (Interview). Five participants all referenced the need for explicit instruction in responding to a discussion post and expanding peer-to-peer comments from stating, "cool." Ms. Angelo and Ms. Feese both teach third-grade which is the first-year students are exposed to an LMS. They, along with Mr. Daniels, referenced district-created resources called *The First 20 Days of Schoology* that helped students to learn skills needed to navigate the LMS independently. Ms. Angelo gave credit to her



technologically savvy students as she explained how quick they are to help one another with a technology-based need rather than interrupt a small group she may be running during reading workshop (Interview). She also acknowledged that in the beginning of the year, she talked out loud and modeled herself navigating the course and describing the steps to find a task or submit a response so that students gained much repetition and familiarity with the platform (Interview).

Even in fifth grade, Mr. Barkley described a “to do list” that his team created to walk students through the lessons on Schoology. He called them “experts on the iPad” but accredited their prior years of using the iPad and Schoology for why it is so easy for them to navigate by the time they reach fifth-grade (Interview). Ms. Garrett, also a fifth-grade teacher, did not need to instruct students on how to use and navigate the platform this year as her students had spent the last two years completing a lot of remote, LMS-based learning. During her interview, Ms. Garrett described that she expects future rising fifth-graders’ LMS skills to drop back to the level of previous years’ experience (Mrs. Garrett, Interview).

**District-wide, vertical LMS adoption.** A driving force behind teachers’ investment in Schoology is that it is a district-adopted platform in grades 3-12. Ms. Cleary, a fifth-grade teacher, said, “All of their work in middle school is online. I don’t want to avoid doing assessments online. I want them to learn and get adjusted to doing that” (Interview). As early as third grade, Ms. Angelo stressed to her students and families that “[Schoology] is going to be something you use from now until 12<sup>th</sup> grade” (Interview). Ms. Angelo was committed to sharing with families that Schoology is a district-adopted platform that is worth their investment of time to learn, navigate, and explore.

Through an early introduction to Schoology and a user-friendly platform, students are learning to transfer their writing to Google Drive documents, fix mistakes from auto-graded assignments prior to having received individualized feedback, and complete self-paced learning before entering middle school (Mr. Barkley, Interview). Mr. Barkley's excitement was evident during his interview, "Students are learning how to prioritize. The students are learning to take control of their own learning" and that is a result of their LMS skill development and ease of navigating the LMS that leads to increased student ownership for their learning.

### **The Importance of Teachers' Comfort Level**

As perceived ease of use and perceived usefulness increases, so does comfort and confidence in utilizing a tool (Davis, 1989). In Phase I, teachers described how well they incorporate technology in their classroom, and Table 4.9 illustrates participants' responses.

**Table 4.9**

#### *Technology Incorporation in the Classroom*

	Not well at all	Slightly well	Moderately well	Very well	Extremely well
How well do you incorporate technology in your classroom?	0	10%	10%	70%	10%

*Note:* Participants assessed technology use broadly, and later assessed their LMS usage.

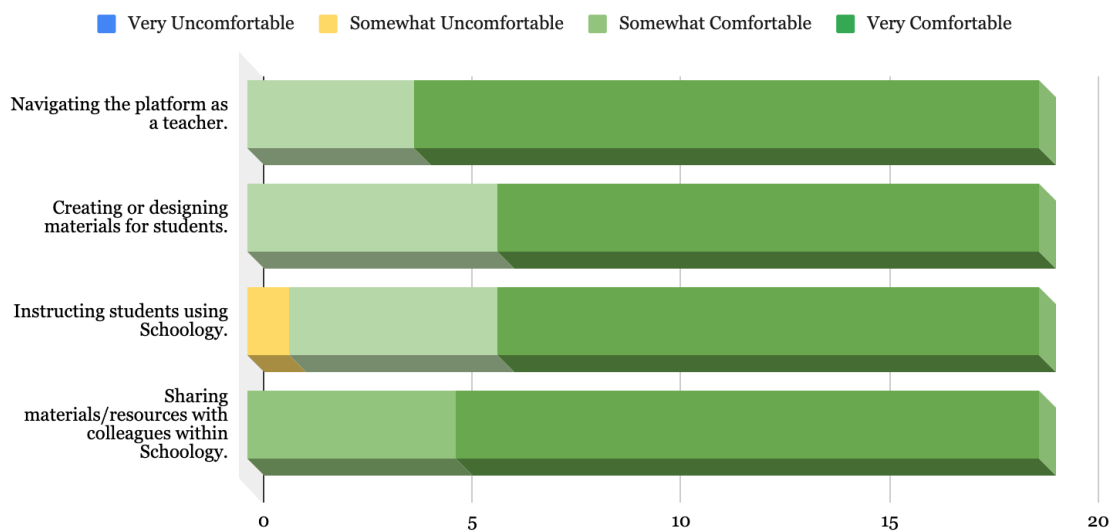
Within the survey, 80% of participants self-assessed that they use technology very well or extremely well, and 10% of participants reported using technology moderately well. This initial data within Phase I assisted in case selection, though it also signaled high levels of confidence in participants using technology.

### *Impact of Comfort Level on LMS Usage*

The final research question of this study focused on teachers' comfort levels with Schoology. Though confidence relates to curricular and instructional use as well as ease and access to the platform, I analyzed comfort level in isolation to understand its impact on teacher decision-making and their use of the LMS. Figure 4.3 reflects teachers' self-assessed comfort levels with both Schoology navigation and use from the Phase I survey. Triangulation of survey data, platform analysis excerpts, and semi-structured interview excerpts allowed for greater understanding of the role comfort level plays with LMS usage at the elementary level.

**Figure 4.3**

#### *Teachers' Self-Assessed Comfort Level with Schoology*



*Note:* Teachers' responses as reported in the Phase I quantitative survey.

In terms of comfort with Schoology, 100% of Phase I participants reported being somewhat comfortable or very comfortable with navigating the platform, creating or designing materials for students, and sharing materials or resources with colleagues within Schoology. Further, 18 out of 19 participants (95%) reported being somewhat or

very comfortable with instructing students using Schoology, while one participant reported feeling somewhat uncomfortable.

**Roles and responsibilities that contribute to increased comfort.** During the semi-structured interviews, some participants shared reasons why their confidence increased in the time since the school district implemented Schoology in 2017. For instance, Ms. Cleary accredited her current role as a technology advocate, who receives supplemental pay for supporting colleagues with technology integration, aided in her increased comfort with Schoology. As a participant in the district's 2017 Schoology pilot program, she reported, "Because I was a part of that pilot since the beginning, I felt like I had a head start on a lot of people" (Ms. Cleary, Interview). Thus, in terms of her comfort level with using Schoology, she self-rated herself as "a nine out of ten. I'm not an expert, but I feel like it's definitely something that I'm very comfortable with" (Ms. Cleary, Interview). Despite Ms. Cleary feeling she had an advantage over her colleagues who were new to Schoology, Ms. Fox describes how her comfort with Schoology grew over time through increased usage with Schoology despite not being a part of the pilot program:

In the beginning I was just trying to figure out how to use it and I was trying to use different pieces like discussion posts, quizzes, and assignments, and just trying to figure out how I could put it all together, but now I am more comfortable to use a quiz or discussion post. I am also more knowledgeable and can use the tools in more meaningful ways now that I have used it for the past couple of years. (Ms. Fox, Interview)

In contrast to Ms. Cleary, Ms. Fox neither participated in the pilot program nor is a technology advocate leading her colleagues in technology adoption; however, in time,

she expanded the types of materials she uses and the way she integrates them into her practice. Ms. Ellison had a similar experience to Ms. Fox with similar prior exposure to LMS. When asked to describe her level of confidence on a 10-point scale, Ms. Ellison said, “I feel like a 7. I feel comfortable with the tools, and I feel comfortable with how I could use them” (Interview). Both participants accredited their self-exploration of the platform and experimentation with materials as a means to developing greater confidence in their usage, which demonstrates the variety of factors leading to increased comfort.

### ***Teacher Comfort Related to Subject Area LMS Integration***

During the platform analysis, participants selected two courses to walk through and describe their organization, materials, and examples of usage. Of the 14 courses viewed during the platform analysis component, 86% of the courses selected were reading and math. This data demonstrates teachers’ confidence in integrating the LMS specifically within reading and math instruction. As a part of the platform analysis, the type of materials found within each course were identified as non-evident, minimally evident (1-2 examples), or substantially evident (3 or more examples). Earlier in this chapter, Figure 4.2 provides the breakdown of the frequency of material type by content area.

Of the 12 math and reading courses viewed during the platform analysis, links/files and assignments were found to be substantially evident in 100% of those courses. Specific to math instruction, the following material types were found to be substantially evident: assessments (67%), Google Drive assignment and pages (50%), and discussions (33%). Within the six reading courses, the following material types were found to be substantially evident: Google Drive assignment (83%), pages (67%), assessment (50%), and discussion (33%).

Teachers are demonstrating confidence in their decision-making as they are identifying appropriate materials for instruction based on course content. While Ms. Ellison rated herself as a 7 on a 10-point confidence scale, she explained, “If I were to go back to a pandemic year, I would feel completely comfortable with uploading my resources, embedding them, creating assessments, and using the data to inform instruction” (Interview). Ms. Ellison gained confidence from prior Schoology usage that enables her to create and curate resources for Schoology implementation while also assessing the results to inform her of her next instructional steps. An interesting component to her interview related her increased use and comfort to pandemic-based learning. When participants discussed their evolution of Schoology use since its initial adoption in 2017, all seven participants made a comparison to the COVID-19 pandemic that caused a drastic change to the traditional elementary learning environment.

### ***Pandemic Impact on Teacher Comfort***

In March 2020, schools around the United States changed their instructional formats to move to remote or hybrid instruction in response to COVID-19. Hybrid learning continued for most of the 2020-2021 school year in District A. The quantitative survey within Phase I did not reference the pandemic when teachers reflected on their use and implementation of an LMS, though the impact of the pandemic on LMS usage did arise in dialogue during participants’ platform analysis and semi-structured interviews. The topic of the pandemic surfaced in all seven participants’ interviews and platform analyses for a total of 44 excerpts or 8% of the study’s total excerpts.

During the platform analysis and interview, participants credited the presence of pandemic learning with increased personal confidence and student confidence with an LMS. Ms. Angelo said, “If it wasn’t for [the pandemic], I don’t think I would have

gained so much unique knowledge of [Schoology] and how it can really help kids in the classroom” (Interview). Through forced hybrid and virtual instruction because of the pandemic, Ms. Angelo gained greater understanding of the role Schoology can play in providing students access to learning.

**Cyber Instructor Experience.** In response to the pandemic, the district that was the setting for this study provided families with different instructional models for learning. Families could select between a cyber program in which all learning was virtual with both synchronous and asynchronous learning or a remote learning option that provided rotating days of in-person learning and asynchronous work. As a result of high enrollment in the cyber program, some teachers transferred from remote instruction to cyber instruction, such as Mr. Barkley.

Prior to teaching in the cyber program last school year, Mr. Barkley shared during his platform analysis that he had limited experience with Schoology and that he used it “sparingly” prior to the pandemic. He “understood very little about it and the potential it had” (Mr. Barkley, Platform Analysis). Despite his limited pre-pandemic LMS experience, teaching in a cyber model propelled his practice forward. During his platform analysis, Mr. Barkley demonstrated continued use of his Schoology materials from cyber instruction last school year as he continues to utilize the video lessons and assignments for those absent from class. Mr. Barkley described his intentionality in continued use of materials he created for cyber instruction, though he reflected on the benefit of now having students present in person to connect and ensure they are on-task, provide feedback, engage learners, and adjust instruction in response to student responses (Mr. Barkley, Interview). As Mr. Barkley reflected on the evolution of his LMS usage since the district’s adoption of Schoology, he had evidence to show his growth in teacher skills

and confidence in decision-making when determining whether to use the LMS within instruction. An example of his improved confidence with the platform came when he shared his three-year plan for continued Schoology integration during his semi-structured interview:

The beauty of being in the classroom is that I'm mixing cyber material with the in-class materials. This year it's great that we don't have a whole lot of extra initiatives because it was such a learning experience for me last year, and now this whole year is about pulling it all together, and then next year a goal will be to find ways to differentiate within Schoology.

**A shift in how teachers provide feedback.** After a year of remote instruction, Mr. Barkley is now planning in-person teaching and learning with Schoology in mind. When determining what materials to keep and what to leave behind within pandemic learning, multiple participants discussed the role of feedback and Schoology. As participants returned to in-person learning, they experienced a shift in how they provide feedback to their learners. Mr. Barkley expressed, "I do give a lot of feedback face to face and some of the feedback comes in the form of calling students up into groups." Mr. Daniels also provides more feedback in-person compared to prior pandemic-based instruction as he described his use of discussion posts, "It's usually 1:1 feedback that isn't on Schoology. Last year it was definitely on Schoology because there was no other choice" (Platform Analysis). The unavoidable dependency on the LMS during remote and cyber instruction equipped teachers with increased confidence in decision-making as to when to utilize the LMS and when to return to in-person, paper-pencil tasks.

**Post-remote instruction intentional decision-making.** During the semi-structured interviews, participants were asked to describe their LMS usage since its initial



district adoption in 2017. In their responses, participants referenced the pandemic and components of their LMS that were either intentionally left behind as a part of hybrid instruction, or the intentional decision-making to bring materials into the 2021-2022 school year for in-person learning. Mr. Daniels described how his Schoology organization method differed between March 2020 and August 2021:

When we went fully virtual in March 2020 that's when I really organized Schoology and changed everything to be organized by week, then by day with folders. It was really easy to direct them to where to find things. Then from there, I changed that a bit because [Schoology] didn't need to be quite that crazy now that we're back to in-person and they're not as dependent on Schoology for all instruction. (Interview).

In addition to Mr. Daniels's organizational changes after the return to in-person learning, Ms. Ellison and Ms. Fox made similar changes to their courses in terms of folder organization as they reduced the quantity of folders and altered the organization to be by unit or chapter for easier reference as opposed to recalling dates of instruction. Decision-making such as that with folder organization and manipulation of the LMS course to match students' ease of use demonstrates participants' confidence navigating the platform. This trend in material organization aligns with teachers' collaboration in the creation and curation of materials to fill the organizational structure while gaining exposure and confidence with a variety of resources and uses of the LMS within instruction.

### ***Teacher Collaboration and Shared Resources***

An emerging trend across all data collection measures was the importance of teacher collaboration in developing resources and expanding teachers' understanding of

the platform and its uses. Within the Phase I survey, 100% of participants were either somewhat comfortable or very comfortable sharing materials and resources with colleagues within Schoology, navigating the platform as a teacher, and creating or designing materials for students. Therefore, teacher confidence was present as participants self-assessed their own navigation, creation, and sharing of materials within the LMS (See Table 4.10).

**Table 4.10**

*Teacher Comfort within an LMS*

	Very Uncomfortable	Somewhat Uncomfortable	Somewhat Comfortable	Very Comfortable
Navigating the platform as a teacher.	0	0	21% (4)	79% (15)
Creating or designing materials for students.	0	0	32% (6)	68% (13)
Instructing students using Schoology.	0	5% (1)	26% (5)	68% (13)
Sharing materials/resources with colleagues within Schoology.	0	0	26% (5)	74% (14)

*Note:* Participants' comfort level was self-assessed within the Phase I survey.

Within the platform analysis and interview, six of eight participants referred to teacher collaboration. Ms. Fox had four excerpts within her semi-structured interview, in one of them she described that it is nice when:

You can add other people to your courses and make them admin so we can copy and paste [materials] from each other all the time, especially because we have a new member on our team this year. And one teammate last year was a cyber teacher, so she has a lot more technology integrated materials.

She continued on in her interview to describe that she was asked by the district's technology department to author curricular content within Schoology as summer work this past year and that it was a "huge advantage" to work with other teachers in her grade level who are using Schoology in the same ways. She described, "I was able to see how they were making authored content for math or reading and see how they were selecting tools for summer content, but then also hear how they are using it in their classrooms" (Ms. Fox, Interview). Ms. Fox explained that she was grateful for the opportunity to author content because it forged work relationships in which she asked other teachers she collaborated with for help in creating new materials. Thus, district curricular work within Schoology does more than provide newly developed resources for all teachers, it creates an opportunity to partner teachers together to grow their LMS skills as they create resources that model better LMS practice for others to replicate.

Mr. Daniels acknowledged the strength of his peers' experience during his interview when he shared, "I was learning from the courses my other grade level partners built because they were using Schoology a lot longer than I have been. I learned a lot through [professional learning communities] and team meetings". Participants shared multiple locations within the LMS that housed shared resources including district and grade-level created "Playground" courses, professional learning community courses, shared admin rights to team members' courses, and teacher-created authored content courses. These shared locations for resources enable teachers to find interactive and Schoology-created resources to embed in instruction. Teachers gain exposure to different material types and instructional uses for Schoology materials which in turn provides greater choices for teacher decision-making while increasing teacher confidence in LMS capabilities.

**Summary**

During the data collection process, I gathered a variety of data from the survey, platform analysis, and semi-structured interviews. Each instrument provided a different lens with which to understand teachers' perception and use of an LMS in an intermediate elementary classroom. This chapter explored several themes that resulted from data analysis in response to the research questions. Similarities and differences across the seven cases showcased the depth and impact of teacher decision-making regarding LMS usage in an elementary setting in alignment with the review of literature. In the next chapter, I discuss the results, limitations, and implications for future research.

## **Chapter 5**

### **Discussion**

The purpose of this study was to gain understanding of elementary teachers' perceptions and use of a learning management system in an intermediate classroom of learners in grades 3-5. The mixed methods, explanatory design provided the opportunity to gather teachers' perceptions of use of an LMS through survey data, then probe more deeply into seven participants' decision-making and use of an LMS to identify commonalities and differences in instructional use. In the previous chapter, data analysis led to the identification of the emerging themes and sub-themes that answer the three research questions. In this chapter, I discuss the application of my conceptual framework and reflect on how this study's findings may recommend opportunities to improve the use of an LMS at the elementary level in grades 3-5. Further, I discuss the limitations of the study and the implications for future research.

### **Summary of the Study**

The prevalence of learning management systems at the elementary level has increased in response to a rise in student to device ratios and the need for remote instruction as a result of the COVID-19 pandemic (Friedman, 2020). Despite more districts adopting LMS since 2020, research regarding the instructional use of the LMS at the elementary level has been underdeveloped. In Chapter 3, I provide a more detailed overview of this study's methodology, though in this section I will aim to summarize the key research design elements that are essential to understanding the results of the study.

This study was comprised of two phases with a total of three instruments for data collection. In Phase I, I administered an online survey via Qualtrics with close-ended questions focusing on teachers' beliefs, perceptions and use of an LMS to all teachers in

grades 3-5 within the study's selected district. Through data analysis and case selection criteria, I identified participants with a range of self-assessed beliefs, perceptions, and uses of an LMS to proceed to Phase II. To understand each teachers' application of the LMS, Phase II consisted of a platform analysis and semi-structured interview.

Ten participants were invited to participate in Phase II, though three invited participants opted not to move on to Phase II of the study. The seven participants who proceeded to Phase II represented a diverse group of teachers based on gender, years of teaching experience, grade level taught, and self-assessed beliefs and perceptions of use. The diverse set of participants within Phase II provided a range of LMS usage to analyze the three sub-research questions:

- What role does an LMS play in a technology-rich, intermediate elementary classroom?
- How do intermediate elementary teachers describe the ease of use and perceived usefulness' of an LMS?
- In what ways do intermediate elementary teachers' comfort level with an LMS correspond with their LMS integration?

During the platform analysis component of Phase II, the participants provided a walk-through of two LMS courses currently in use. A semi-structured interview followed the platform analysis to delve deeper into teachers' decision-making regarding the use of an LMS within their instruction, as well as identify themes aligned to each research sub-question.

The platform analysis and interview data collected across the seven participants within Phase II provided a wealth of data for analysis. Using the constant comparative method, I identified initial categories present in the survey and platform analysis and

collated findings according to the research questions (e.g., role of an LMS, ease of use, and comfort level), then coded transcriptions by key words and phrases (Simmons & Martin, 2016). With each new platform analysis or semi-structured interview, I adjusted categories through consolidation, elimination, or addition to provide greater clarity in the study's findings. Four main findings emerged from this research: (a) Schoology is utilized to increase students' independent access to learning resources and provide a submission place for students' digital work, (b) teachers' instructional use of Schoology is based in substitution and self-grading features, (c) Schoology provides a user-friendly platform conducive to easy navigation for all users, and (d) limitations in Schoology use for student creation is dependent on teachers' confidence in designing instructional technology infused tasks. Across the seven cases, differences in teachers' use of Schoology materials were identified based upon teacher decision-making, course content, grade level, and learning objectives. A trend across cases, however, was improved technological skills and comfort in utilizing an LMS in response to pandemic-based learning for both teachers and students.

### **Conceptual Framework**

There are four main elements to this study's conceptual framework, *Framework for Elementary Based LMS Integration* (see Appendix B). The TPACK framework (Mishra & Koehler, 2006) is a core component of this study as it created a framework to better understand a teacher's decision-making when it comes to instructional practice and technology integration. Within TPACK, the three types of knowledge are identified as technological, pedagogical, and content knowledge, though the more impactful component of the framework is that it delves deeper into how these types of knowledge overlap and influence another (Mishra & Koehler, 2006). Within the study's *Framework*

*for Elementary Based LMS Integration*, TPACK serves as the foundation to understanding teachers' instructional planning. Building upon that foundation is the SAMR model (Puentedura, 2006). The SAMR model focuses more on assessing the specific lesson for its depth of technology integration as opposed to the teacher's decision-making. Within a teacher's day, lessons can vary in terms of SAMR classification as it does not represent the teacher's full practice, but rather assesses individual lessons. The SAMR model provides a reflective tool for teachers to gauge their level of technology integration lesson-by-lesson or unit-by-unit and set goals to progress along the levels from substitution through to redefinition based on lesson objective. To bolster teachers' use of an LMS, the Technology Acceptance Model is used within the framework to demonstrate that as a teacher's Perceived Ease of Use (PEoU) of the platform and Perceived Usefulness (PU) of Schoology increases, as will the depth of integration along the SAMR model (SAMR model: A practical guide for K-12 classroom technology integration, 2021). Further, as the teacher's confidence and use of technology increases, as will their Universal Design for Learning (UDL) and use of technology to support the needs of all learners through an LMS platform, which is a topic for future study and research.

### ***Application of the Conceptual Framework to Findings***

During the case selection process prior to beginning the platform analysis in Phase II, I identified teachers' beliefs regarding technology integration from the quantitative survey data. Case selection criteria aimed to identify a range of users based on Perceived Usefulness (PU) and Perceived Ease of Use (PEoU) rooted within the Technology Acceptance Model. Teachers' responses to three questions regarding (a) PU and PEoU, (b) Schoology's alignment with their teaching goals, (c) incorporation of



technology in their classroom, and (d) personal expectations for Schoology integration in the current school year yielded a range of scores from 6 to 11 with a low score equating to a reluctant technology adopter and a high score representing a comfortable technology integrator. This data informed the level of comfort with technology acceptance through their perceived use and usefulness of the platform with classroom instruction. This data informed case selection for Phase II as a range of users were selected to represent the population of teachers that span in comfort and confidence with technology integration.

During Phase II, participants shared their courses during the platform analysis. When asked to identify an example of LMS integration and classify the type of integration within the SAMR model, participants largely were at substitution with few examples crossing into augmentation. The use of the LMS to enhance the learning resulted from assessment material types that produced self-graded work for differentiation and student feedback as well as Google Drive assignments for shared collaboration between the classroom teacher and student. Despite participants' high self-assessment of their technology skills and usage, their level of integration demonstrated at low levels within Schoology itself. When sharing their integration examples, participants utilized other applications and websites in addition to the LMS, though the direct LMS usage revolved largely around substitution for the purpose of work submission and formative assessments.

In addition to practical application of Schoology within instruction, teachers reported few examples of professional learning with a pedagogical focus. Teachers were asked during the semi-structured interview to reflect on effective professional learning and teachers shared that they learn new about new materials and implementation practices from their colleagues as opposed to school or district-level professional

learning. In regards to TPACK framework, professional learning centers upon technological skill development as opposed to pedagogical practice.

### **Discussion of Results**

The selected district for this research study began a pilot of Schoology with fourth and fifth grade students in 2017, and later adopted the platform for all students in grades 3-5 in 2019. Fullan (2007) describes those teachers often wait for opportune conditions to partake in instructional change, though, the COVID-19 pandemic forced all teachers to increase their instructional technology usage. With the use of a district-supported LMS, teachers navigated remote instruction with limited barriers in access.

Within this study I aimed to identify teachers' perceived use and decision-making regarding the use of an LMS. As a result of data collection and analysis, as well as application of the SAMR Model and Technology Acceptance Model, I analyzed each case study for its perceived role of an LMS, ease and access of the platform, and comfort with the LMS. A summary of the findings pertaining to each sub-research question can be found in the following sections.

#### ***Role of an LMS***

The first research sub-question of this study asked, "What role does an LMS play in a technology-rich, intermediate elementary classroom?" Through survey, platform analysis, and semi-structured interview data collected across both phases of the study, I identified content objective, assessment for learning, and student access to resources as the prioritized uses for LMS integration. Teachers' use of the LMS differed across content areas with less usage in mathematics courses than language arts. The most utilized LMS materials that were substantially evident during the platform analysis were files, links, test/quiz, and assignments.

Of those materials, files and links were utilized to take the user to an alternate website or district-supported resource, while the test/quiz provided self-grading functionality to reduce teacher workload while providing student feedback. Self-grading test/quiz material types also allowed teachers to differentiate instruction in-person, as most participants reported that they do not differentiate through personalized pathways directly on Schoology. Google Drive Assignments were the only substantially evident material type that had students creating and completing the learning task within the LMS, and once initially opened in Schoology, can be completed through Google Drive without Schoology use.

Most participants referenced the use of resources created during the pandemic as a result of the required shift to remote instruction. Participants discussed decision-making around providing assessments and tasks with or without the use of an LMS and device. As a result of the increased use of a device during the pandemic, some participants preferred to return to in-person learning tasks that focus on writing stamina, penmanship, and in-class collaboration, while others continued the use of pandemic-curated resources and have adapted their implementation to fit in-person learning. In terms of teacher feedback on Schoology-based tasks, multiple participants demonstrated using self-graded feedback for test/quiz materials, while some utilized rubrics to communicate reading and writing feedback. Unless the task was self-grading, the most frequent form of feedback teachers provided to students regarding Schoology assignment was delivered in-person whether through one-on-one, small group, or as a whole class review of the assignment or task. Despite a high quantity of materials on Schoology, the use of the materials was based in submission of student work as opposed to Schoology-based student creation.

### *Ease and Access*

The second sub-research question asked, “How do intermediate elementary teachers describe the ease of use and perceived usefulness’ of an LMS?” Participants in the technology-rich district did not identify any first-order barriers. In contrast, participants recognized students’ technological skills in navigating the platform, overcoming unexpected technological challenges, and supporting one another in LMS use. Survey feedback showed that the ease and use of the platform as well as adequate training were prioritized factors in teacher decision-making around LMS use. The greatest priority, though, was the lesson objective and teaching point which supports preferred use of Schoology in language arts courses as opposed to mathematics due to teachers’ belief that elementary students need to solve mathematical problems with pencil and paper to gauge conceptual understanding. This example of decision-making identifies that the rationale for student use of the LMS is dependent upon teacher perceptions of students’ ability to show their work in old-school ways as opposed to instructing new methods to demonstrate mathematical thinking digitally.

Fortunately, organization and student navigation of the LMS do not provide barriers to LMS-based learning as the platform is user-friendly. Teachers reported intentional decision-making regarding folder structure organization of resources by unit or chapter as opposed to by week during in-person learning. In fact, teachers showed versatility in their LMS usage as they adapted structure and organization from remote instruction in 2020-2021 to in-person learning for 2021-2022. Across courses, teachers demonstrated intentional consistency in course layout and design to make for a user-friendly platform experience for students.

A benefit to the district's adoption of Schoology in grades 3-12 is the buy-in from teachers, students, and families to learn the LMS platform as it will travel with the student as they progress from one grade level to the next. Skills learned as early as third grade set fourth- and fifth-grade teachers up for success as they can build on to foundational skills. District-created resources such as the First 20 Days of Schoology Integration and the authored content per grade level provide teachers with examples of materials and resources to choose from when determining to use the LMS. Teachers reported significant ease of use and usefulness in providing students with the ability to access resources from anywhere at any time.

### ***Impact of Comfort Level***

The third sub-research question asked, "In what ways do intermediate elementary teachers' comfort level with an LMS correspond with their LMS integration?" Participants expressed a high level of comfort with incorporating technology, as well as comfort with navigating the platform, creating materials, and sharing materials within the LMS. The area of least confidence and comfort within a given set of statements was on how to instruct students to use Schoology. Fortunately for teachers, students' flexibility and ease in learning new platforms and technology skills as digital natives supports their ability to access digital resources.

Despite all participants self-reporting high levels of comfort with the LMS, participants had prior experience with the LMS through middle school experience, technology advocate responsibilities, or completing a year as a cyber instructor. Meanwhile, some participants were new to the district in the past two to three years and depended completely on district-created resources to learn the platform and create and integrate materials within instruction. Regardless of prior Schoology or technology

experience, all participants attributed growth in LMS usage and comfort to the unanticipated presence of COVID-19 and the need to move to remote instruction. Based on participants' platform analysis, teachers' comfort lies in the use of links, files, and test/quiz materials based on the prevalence of those materials in courses. Participants refer to comfort in uploading resources and embedding teaching slide decks, though student creation within the LMS is limited. With the return to in-person instruction, teachers return to decision-making around the use of an LMS to substitute, enhance, or transform instruction and student tasks that may have been previously completed without an LMS.

Teacher collaboration was a recurring theme prior to, during, and after the pandemic. Teachers' primary source of Schoology integration ideas and new learning came from colleagues by way of informal professional learning at the team level. Teachers referred to the "playground courses" as opportunities to see new ways to integrate Schoology within their grade level and standards, and few teachers reported significant benefit from more formal Schoology professional learning. Rather, teachers gain confidence and comfort in seeing materials modeled through a colleague's courses and time provided to explore and apply new learning to existing courses.

### **Limitations in Methodology**

As a mixed methods study, a combination of quantitative and qualitative instruments provided a variety of data for analysis. The selected district had 121 possible participants who met the criteria to participate in Phase I, though only 17% of the possible participants completed the quantitative survey. The quantity of participants did not change the design of the study, though it provided a smaller number of participants for case selection purposes. Though low in number, the participants in Phase I still

provided enough data to conduct an explanatory sequential mixed methods design. The integrity of the study remained intact as the seven selected cases for deeper review in Phase II provided a wealth of data for insight into teachers' decision-making about LMS usage.

For many teachers, technology integration is an ongoing and ever-evolving practice with new technologies regularly emerging in the field. Therefore, the case study portion of this study within Phase II is a limitation as it delves deeper into participants' practice that is not finite in nature and is continuously growing. Initial interest from participants to engage in LMS research may have been swayed as a result of their comfort and willingness to be vulnerable around a practice for which they lack confidence. Nevertheless, the 20 participants in Phase I and the 7 selected participants to proceed to Phase II allowed for the ability to mitigate methodological limitations.

### **Limitations in Analysis**

Within Phase I, participants self-assessed their comfort level, perceived use, frequency of use, technological skill level, and instructional decision-making regarding an LMS. This data is subjective to the participants' perspectives which may lead to exaggerated or underrated data as participant views may be skewed or limited in comparison to grade-level peers and LMS usage. Further, participants who opted to participate may be more adept in Schoology usage while their colleagues may have selected not to participate due to lower self-confidence in LMS use. The platform analysis in Phase II aimed to mitigate potential discrepancies between actual LMS use and participant-assessed use. The platform analysis provided a limitation as participants self-selected the two courses to walk-through; therefore, participants selected courses out of those they facilitate that they perceived to be their best examples of LMS usage.

### **Limitations in Generalizability**

One limitation to generalizability is the number of participants within the small study (i.e., Phase I survey,  $n=20$ , and Phase II case study,  $n=7$ ). Despite the small size, the opportunity to delve into seven participants' LMS courses to complete a platform analysis and follow-up semi-structured interview provided the ability to identify themes to answer each research question while challenging the conceptual framework that outlines the perception and use of an LMS at the elementary level. An added limitation to generalizability is the non-probability sampling (e.g., purposeful and convenience sampling) due to the accessible population (Merriam, 1998). To navigate bias and subjectivity concerns, I utilized strict protocols for case selection that kept participants anonymous until Phase II. The third generalizability limitation is that the selected school district is high-performing with minimal concern for first-order barriers to technology integration. Access to devices and a robust LMS, as well as an internet connection in most homes, increase the district's ability to depend on technology to support instruction.

### **Implications of Future Educational Research**

The selected district for this study had minimal first- and second-order barriers to instructional technology use as it is a technology-rich educational environment. Despite the ease and access to a robust LMS, the case study component within Phase II identified areas for further development and integration of the LMS within instruction. Through an expansion of teachers' comfort with LMS use, an area for future research would be a study on the professional learning decision-making of educational leaders and its impact on transformative LMS usage in elementary classrooms. Further research to identify strategies, techniques, and approaches to gain efficiency and collaboration in LMS



integration with implementation of ISTE's Standards for Administrators, Teachers, and Learners to provide a framework for technology integration decision-making.

### **Implications for Educational Practice**

The emerging findings from this study inform what can be done in elementary schools to support teachers' developing perception and use of an LMS. A clear district vision for elementary usage of an LMS would support teachers in aligning their practice to the vision while providing consistency in expectation and depth of use. With a clear vision, instructional leaders can provide ongoing feedback to teachers and align professional learning to meet their needs.

Participants demonstrated strong technological skill and ability during their platform analysis and in response to remote instruction during the 2020-2021 school year. The platform analysis yielded instructional examples of LMS use that remained at substitution with minimal augmentation in terms of SAMR model classification. Future work within this district would be to increase teachers' technological pedagogical knowledge to improve decision-making and creative use of the LMS to transform student learning.

Professional learning that models instructional planning with effective use of the LMS to create innovative teaching and learning opportunities for all would be helpful to teachers' practice. Further, providing teachers time to practice planning LMS-integrated instruction with the support of instructional technology coaches and the *Framework for Elementary LMS Integration* would make for a scaffolded approach to effective integration.

## Summary

District-adopted learning management systems at the elementary level propelled in usage in response to pandemic learning environments between March 2020 and June 2021. Out of need, teachers replaced in-person instruction with the use of an LMS to provide increased access regardless of learning location. In the aftermath of pandemic learning, elementary teachers are working to establish appropriate LMS use that balances students' need for concrete, hands-on, and collaborative learning with the ability to transform learning through appropriate instructional technology integration. The work of this study informs the role of an LMS at the elementary level across content areas and for the purpose of assessment and student access to resources. Through appropriate course organization, elementary teachers and students have the ability to access the platform with both comfort and ease to support student learning. The results of this study support districts in understanding the potential of an LMS at the intermediate elementary level in transforming teaching and learning with effective professional learning and district vision.

*Appendix A*

## West Chester University Review Board Approval

Date: 10-13-2021

IRB #: IRB-FY2021-232

**Title:** Intermediate Elementary Teachers' Perception and Use of a Learning Management System in Supporting Effective Teaching and Learning: A Mixed Methods Study

**Creation Date:** 6-20-2021

**End Date:**

**Status:** **Approved**

**Principal Investigator:** Jennifer Southmayd

**Review Board:** West Chester University Institutional Review Board

**Sponsor:**

## Study History

<b>Submission Type</b>	Initial	<b>Review Type</b>	Expedited	<b>Decision</b>	Approved
<b>Submission Type</b>	Modification	<b>Review Type</b>	Expedited	<b>Decision</b>	Approved

## Key Study Contacts

<b>Member</b>	Heather Schugar	<b>Role</b>	Co-Principal Investigator	<b>Contact</b>	HSCHUGAR@WCUPA.EDU
<b>Member</b>	Jennifer Southmayd	<b>Role</b>	Principal Investigator	<b>Contact</b>	js916174@wcupa.edu
<b>Member</b>	Jennifer Southmayd	<b>Role</b>	Primary Contact	<b>Contact</b>	js916174@wcupa.edu

## *Appendix B*

### Participant Consent Form

#### Consent Form

### Participant Consent Form

**Project Title:** Teachers' Perception and Implementation of a Learning Management System in Supporting Teaching and Learning

**Investigator(s):** Jennifer Southmayd; Heather Schugar (faculty sponsor)

**Key Information:**

Participation in this research project is voluntary and is being done by Jennifer Southmayd as part of her Dissertation. This project aims to understand teachers' perception and use of a Learning Management System (LMS) at the intermediate level in grades 3-5. Participation in Phase 1 will take approximately 10-15 minutes and participation in Phase 2 will take approximately 1.5-2 hours. Only a small number of Participants will proceed to Phase 2. Participation in Phase 1 will include a survey. Phase 2 will comprise a platform analysis and interview. There is a minimal risk that Participants may be concerned they will be evaluated based on their answers to the survey. Participants may feel slight discomfort or anxiety while answering the questions. All responses will be gathered through an electronic database that does not record email addresses. Only the faculty sponsor will have access to identifiable information prior to the selection of Phase 2 Participants. There are no benefits to you the participant. Suggestions made by the participants may lead to improvements in instructional technology integration in schools.

The research project is being done by Jennifer Southmayd as a part of her dissertation. This project aims to understand teachers' perception and use of a Learning Management System (LMS) at the intermediate level in grades 3-5. If you would like to take part, West Chester University requires that you agree and sign this consent form.

You may ask Jennifer Southmayd any questions to help you understand this study. If you don't want to be a part of this study, it will not impact the instructional technology support you receive in district. If you choose to be a part of this study, you have the right to change your mind and stop being a part of the study at any time.

**1. What is the purpose of this study?**

- The purpose is to determine teachers' perception and use of the district-selected Learning Management System, Schoology

**2. If you decide to be a part of this study, you will be asked to do the following:**

- Initial Teacher Survey - If you give consent, you will begin the teacher survey. In addition to demographic information, the survey contains questions (matrix, open ended, rank order) on current use of Schoology and your views regarding its integration.
- Based on your responses to the initial survey, you may be asked to participate in Phase 2 of the study. If invited to Phase 2, you will be asked to do the following:
  - Platform Analysis - participate in a platform analysis of the participant's courses on Schoology through an anonymous student view. Invited participants will schedule a 30-40 minute review between October and December 2021.
  - Semi-Structured Interview - the participant will elaborate on instructional decision-making and use of Schoology within mathematics and language arts instruction. The interview can be completed in tandem with the platform analysis and will take 30-40 minutes.

3. Are there any experimental medical treatments?
  - No
4. Is there any risk to me?
  - You may experience some potential discomfort since the lead researcher is a building principal in the district. The researcher will make every attempt to ensure the participant understands that there is no incentive or pressure to participate. Additionally, there will be no repercussions for not participating in the study
  - Throughout the study, the researcher will take proactive measures to protect participants' identities, though there is a minimal risk that your identity is revealed.
  - If you become concerned with the study or wish to speak with someone, you may speak with Dr. Heather Schugar from West Chester University at 443.812.4489 or [hschugar@wcupa.edu](mailto:hschugar@wcupa.edu)
5. Is there any benefit to me?
  - There is no anticipated direct benefit to any study participant. A participant may derive personal satisfaction from being a part of a study focused on integration and use of an LMS.
6. How will you protect my privacy?
  - The semi-structured interview and platform analysis session will be recorded.
  - Your records will be private.
  - Only Jennifer Southmayd, Heather Schugar, and the IRB will have access to your name and responses.
  - Your name will not be used in any reports.
  - Records will be stored:
    - Password Protected File/Computer
  - Records will be destroyed 3 years after study completion.
7. Do I get paid to take part in this study?
  - No
8. Who do I contact in case of research related injury?
  - For any questions with this study, contact:
    - Primary Investigator: Jennifer Southmayd at 484 266 1600 or [jsouthmayd@gmail.com](mailto:jsouthmayd@gmail.com)
    - Faculty Sponsor: Heather Schugar at 443-812-4489 or [hschugar@wcupa.edu](mailto:hschugar@wcupa.edu)
9. What will you do with my Identifiable Information?
  - Your information will not be used or distributed for future research studies.

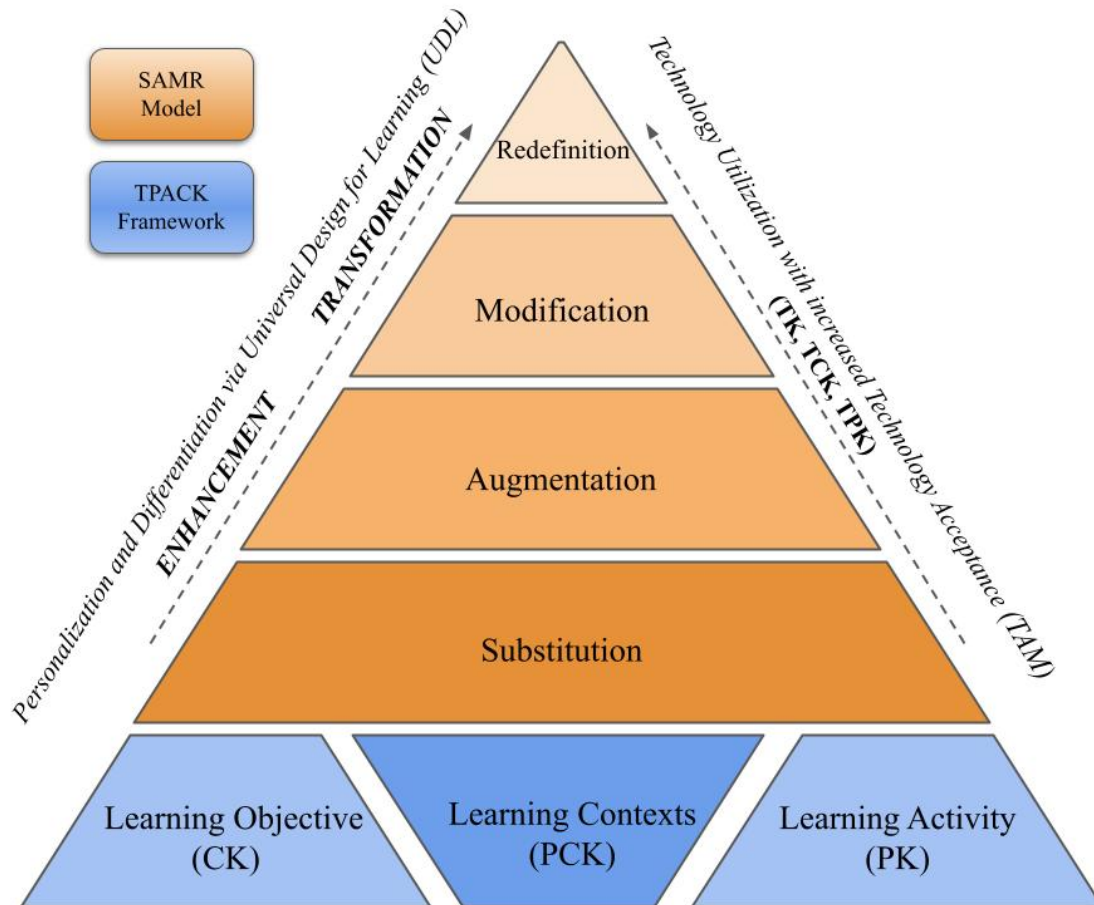
For any questions about your rights in this research study, contact the ORSP at 610-436-3557

***I have read this form and I understand the statements in this form. I know that if I am uncomfortable with this study, I can stop at any time. I know that it is not possible to know all possible risks in a study, and I think that reasonable safety measures have been taken to decrease any risk.***

- I consent to participate in this study.
- I do not consent to participate in this study.

## Appendix B

### Framework for Elementary LMS Integration





5. How well do you incorporate technology in your classroom?

Not well at all      Slightly well      Moderately well      Very well      Extremely well  
                                                                                       

6. How well do you expect to integrate Schoology into your lessons this year?

Not well at all      Slightly well      Moderately well      Very well      Extremely well  
                                                                                       

7. Select the answer that best aligns with the statement.

	Never	Sometimes	About half the time	Most of the time	Very Often
I use Schoology to increase access to resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use Schoology to communicate feedback.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use Schoology to assess student learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use Schoology to differentiate instruction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I use Schoology to personalize student learning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Rank order the factors that influence whether or not you integrate Schoology in a lesson. [Drag factors to organize from the biggest factor to smallest factor].

The ease of use of the LMS platform.

The belief that using technology increases student engagement and learning.

The idea that Schoology increases student access to digital materials.

The feeling that I am sufficiently trained to use Schoology.

The lesson objective and teaching point.



9. Select the statement that best describes your familiarity and use with the Schoology materials and components below.

	I do not know the purpose and/or how to use this material.	I intentionally do not use this material.	I use this material occasionally.	I use this material regularly.
Assignment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Test/Quiz	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Assessment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
File/Link/External Tool	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Discussion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Page	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Media Album	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Google Drive Assignment (Embedded)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Portfolio	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nearpod (Embedded)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. Select the frequency that best describes the specified use of Schoology.

	Never	Rarely	Sometimes	Often
To demonstrate student understanding of a concept or skill.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To share and collaborate on Google docs, slides, or sheets between students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To share and collaborate on Google docs, slides, or sheets between student and teacher.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To engage in discussion with a peer.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To access student materials and resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To communicate student progress with families.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
To provide student feedback.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Rank order your preference in terms of professional development related to instructional technology.

Face-to-face sessions with guided practice and work time.

Online webinars or courses on my own schedule.

Blended learning with some instruction completed asynchronously and some live facilitation.

Drop-in sessions for a mini-lesson and personalized assistance.

Gradual release whereby someone else models first and then provides me with support until I am independent in using the technology.

Opportunities to research technology and practice on my own.

12. Rate your level of confidence using Schoology.

	Very Uncomfortable	Somewhat Uncomfortable	Somewhat Comfortable	Very Comfortable
Navigating the Platform as a Teacher	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Creating or designing materials for students.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instructing students using Schoology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sharing materials/resources with colleagues within Schoology.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. After looking at the Danielson Evaluation Framework, identify *up to 5 subdomain(s)* where you feel Schoology has the ability to impact student learning.

- 1a: Demonstrating Knowledge of Content and Pedagogy
- 1b: Demonstrating Knowledge of Students
- 1c: Setting Instructional Outcomes
- 1d: Demonstrating Knowledge of Resources
- 1e: Designing Coherent Instruction
- 1f: Designing Student Assessments
- 2a: Creating an Environment of Respect and Rapport
- 2b: Establishing a Culture for Learning
- 2c: Managing Classroom Procedures
- 2d: Managing Student Behavior
- 2e: Organizing Physical Space
- 3a: Communicating with Students
- 3b: Using Questioning and Discussion Techniques
- 3c: Engaging Students in Learning
- 3d: Using Assessment in Instruction
- 3e: Demonstrating Flexibility and Responsiveness
- 4a: Reflecting on Teaching
- 4b: Maintaining Accurate Records
- 4c: Communicating with Families
- 4d: Participating in a Professional Community
- 4e: Growing and Developing Professionally
- 4f: Showing Professionalism

## Appendix D

### Platform Analysis Tool

# LMS Platform Analysis Tool

**How To Use:** The legend within each header references what type of criterion is demonstrated. A ★ (1-star) rating indicates an **Essential** and standard design component to online learning. ★★ (2-star) rating is considered **Best Practice** and adds value to a course; and a ★★★ (3-star) rating is **Exemplary** and elevates learning (Canvas, 2021)

COURSE WALK-THROUGH #1: [SUBJECT]	
Course Information	
★ Essential   ★★ Best Practice   ★★★ Exemplary	
Yes ✓	Criteria
<input type="checkbox"/> ★	<b>1.1 Course Navigation</b> is clear and consistent (unused items are hidden). 📍 Mobile Design Consideration 📍 UDL 7.3 Minimize threats and distractions
<input type="checkbox"/> ★	<b>1.2 Instructor has provided key learning information</b> such as goals, learning objectives, and/or standards as well as course materials, supplemental textbooks, and reading lists. 📍 UDL 8.1 Heighten salience of goals and objectives
<input type="checkbox"/> ★	<b>1.3 Instructor has provided class expectations</b> such as participation rules, etiquette expectations, code of conduct; <b>policies</b> for grading, late work, and make-up work; and <b>technology requirements</b> . 📍 UDL 8.1 Heighten salience of goals and objectives + 8.3 Foster collaboration and community
<input type="checkbox"/> ★	<b>1.4 Instructor has provided contact information</b> which may include a biography, availability information, communication preferences, response time, and picture. 📍 8.3 Foster collaboration and community
<input type="checkbox"/> ★	<b>1.5 Course Image</b> provides a visual representation of the subject by adding an image in Course Settings. 📍 UDL 2.5 Illustrate through multiple media
<input type="checkbox"/> ★	<b>1.6 Course contains information and links to institutional resources</b> (e.g. library, institutional services, school's website). 📍 8.3 Foster collaboration and community
Course Content	
★ Essential   ★★ Best Practice   ★★★ Exemplary	
Yes ✓	Criteria
<input type="checkbox"/> ★	<b>2.1 Learning activities include student-student interaction</b> to foster a sense of community (e.g. discussions, constructive collaboration, and peer reviews). 📍 UDL 8.3 Foster collaboration and community
<input type="checkbox"/> ★	<b>2.2 Learning activities include student-teacher interaction</b> (e.g. teacher is actively engaged in authentic conversations and provides quality feedback). 📍 UDL 8.3 Foster collaboration and community
<input type="checkbox"/> ★	<b>2.3 Learning activities include student-content interaction</b> (e.g. students interact with engaging content and resources) and provide opportunities for self-assessment. 📍 UDL 8.3 Foster collaboration and community + UDL 9.3 Develop self-assessment and reflection
<input type="checkbox"/> ★	<b>2.4 Content is "chunked"</b> into manageable pieces by leveraging folders (e.g. organized by units, chapters, topic, or weeks). 📍 Mobile Design Consideration 📍 UDL 3.3 Guide information processing, visualization, and manipulation

<input type="checkbox"/> ★★	<b>2.5 Personalized learning</b> is evident through opportunities for student choice. 📌 UDL 7.1 Optimize individual choice and autonomy <b>Example:</b>
<input type="checkbox"/> ★★	<b>2.6</b> Course materials have a thoughtful <b>naming convention</b> (e.g. name the folder "Chapter 1: Pandas in the News," not just "Chapter 1"). 📌 UDL 2.2 Clarify syntax and structure <b>Participant Description:</b>
<input type="checkbox"/> ★★★	<b>2.7</b> Opportunities for <b>course feedback</b> are present and available to students throughout the duration of the course. The instructor uses formal and informal feedback to improve subsequent course revisions. 📌 UDL 7.3 Minimize threats and distractions <b>Participant Example:</b>
<input type="checkbox"/> ★★★	<b>2.8</b> Course <b>completion requirements</b> and/or <b>prerequisites</b> are utilized to provide course structure, pacing, and flow. 📌 UDL 3.3 Guide information processing and visualization
<input type="checkbox"/> ★★★	<b>2.9 External tools</b> (e.g., Google Drive, Nearpod, Quizlet, etc) are relevant to course content and support active learning techniques. 📌 UDL 5.2 Use multiple tools for construction and composition
<b>Assessment of Student Learning</b> ★ Essential    ★★ Best Practice    ★★★ Exemplary	
Yes ✓	Criteria
<input type="checkbox"/> ★	<b>3.2</b> A variety of <b>assessments</b> is used (e.g., discussions, quizzes, and individual/group assignments) to increase learner engagement and promote active learning. 📌 UDL 4.1 Vary the methods for response and navigation
<input type="checkbox"/> ★	<b>3.3</b> Low-stakes (formative) <b>assessments</b> occur frequently throughout the course to measure knowledge, skills, and attitude and occur before high-stakes assessments. 📌 UDL 8.4 Increase mastery-oriented feedback
<input type="checkbox"/> ★	<b>3.4</b> High-stakes (summative) <b>assessments</b> are clearly aligned with stated goals, learning objectives, and/or standards. 📌 UDL 8.4 Increase mastery-oriented feedback
<input type="checkbox"/> ★★	<b>3.7 Rubrics</b> used to evaluate assignments and/or discussions. 📌 UDL 8.4 Increase mastery-oriented feedback
<b>Participant-Selected Integration Example</b>	
Material/ Focus	
Participant Description	
SAMR Classification	

<b>Course Analytics</b>			
	Non-evident	Minimally Evident (1-2 examples)	Substantially Evident (3+ examples)
Link	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
URL	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Google Drive Assignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assessment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Page	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other:			

## *Appendix E*

### Semi-Structured Interview Questions

1. What are your overall comments on your use of Schoology within your instructional practice?
2. Describe a lesson in which you feel like you effectively used Schoology according to your perceived intended use of the platform.
  - a. What would that lesson have been like if you did not have access to Schoology?
3. Do you feel your use of Schoology has evolved since the district adopted it in 2019?
  - a. If so, how?
  - b. If not, is that intentional?
4. How do you introduce your students to your use of Schoology in your classroom each year?
5. What do you see is the purpose of Schoology at the grade level you teach?
  - a. Student purpose?
  - b. Teacher/instructor purpose?
  - c. Family purpose?
6. What is your thinking around the use of Schoology as an assessment tool?
7. What is your thinking around the use of Schoology as a feedback tool?
8. Do you feel the professional development provided to learn and integrate Schoology has been effective?
  - a. If not, in what ways do you need more support?
9. Do you feel supported in your integration of Schoology?
  - a. Who do you turn to for help from when looking to expand, increase, or deepen your level of Schoology integration?
10. If there was a Schoology Wish List in which you could add a feature or component to LMS to make it better, what would it be?
  - a. What do you feel is missing from the platform for your elementary audience?
11. Aesthetically and visually, describe your students' ease with accessing and navigating the platform.
12. How can/do you differentiate with the help of Schoology?

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