PROFESSIONAL DEVELOPMENT TO ENCOURAGE PEDAGOGICAL USE OF THE SCHOOLOGY LEARNING MANAGEMENT SYSTEM

A Record of Study

by

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ABSTRACT

This purpose of this study was to provide teacher professional development to the Franklin High School science department teachers about the Schoology learning management system purchased by the El Paso ISD. The teachers were engaging minimally with the new technology because of a lack of time to experiment with the new platform and limited opportunities for professional development during their work days. Technology integration at the Franklin High School campus was important because it was a one-to-one computer to student campus.

The participants worked at Franklin High School in the science department, covering all the science courses taught on the campus. They were experienced with technology in general but most did not have experience with Schoology. Six teachers completed the pre-training surveys, 17 to 20 teachers participated in each of the training sessions, and seven were interviewed.

Three training sessions were developed around the basics of the Schoology platform. Pre-training surveys from experienced users provided information about the most useful aspects of the platform to guide planning for the training sessions. Science department teachers selected the topics chosen for the trainings. I observed the teacher engagement and behaviors and recorded them during the sessions. After all three sessions were complete, I individually interviewed seven teachers about the sessions.

I employed a qualitative research method. I coded the interview data and categorized them to generate the common themes. Results indicated that teachers' attitudes towards the Schoology platform improved and their interest in using it in their practice increased. Receiving

participant input about training topics increased their engagement during the training sessions, suggesting that involving teachers in content selection increases interest in the training.

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Contributors

This work was supported by a Record of Study committee consisting of Professor Capraro, advisor, and Professor Yalvac, co-advisor, and Professor Irby and Professor Singleton.

The Franklin High School science department agreed to be participants. They answered a survey, engaged in the trainings, and sat for interviews.

All other work conducted for the Record of Study was completed by the student independently.

Funding Sources

There were no outside funding sources.

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CHAPTER 1

INTRODUCTION

Context

The context of this study was situational. It took place on a single campus and involved a single department within the school. Franklin High School (FHS) is an urban campus with 2,794 students within the El Paso Independent School District (ISD) at the time of the data collection. There are two magnet schools as part of the FHS campus: the New Tech Magnet and the Health Science Magnet. According to the 2015-2016 School Report Card, the student population has been 79.6% Hispanic, 2.3% African American, 14.3% White, 0.2% American Indian, 2.4% Asian, and 0.1% Pacific Islander. Data from the same report revealed that 41.1% of students are economically disadvantaged, 8.7% are English language learners, and 8.7% are special education students. The number of at-risk students increases the importance of teaching practice that includes differentiation. One way of addressing differentiation is through using a learning management system (LMS). Campus educators can use LMS platforms to create and assign individual work that targets the needs of special populations. Teachers can use data collected through LMSs to guide instruction and plan interventions for struggling students. Teachers can also use LMSs to differentiate for the gifted populations. Thus, through this Record of Study (ROS), I examined how a LMS system can address the needs of individual students at one high school's science department.

The Franklin High School science department is a large department. Twenty- one teachers cover multiple science courses. The core sciences, biology, chemistry, and physics are taught as well as advanced placement biology, environmental science, physics I and physics II, and chemistry. The remaining elective science courses are earth and space, anatomy and

physiology, and astronomy. For the school year 2017-2018, one teacher was a first year teacher, five teachers were on year six at the Franklin campus, and the rest had taught at Franklin for more than 10 years.

The El Paso Independent School District (EPISD) rolled out a one to one computer initiative at the beginning of the 2016-2017 school year. The goal of the rollout was to transition from paper and pencil-based practice to technology based practice to improve student learning through increased access to technology-based learning tools and resources that support student-centered learning. Instead of purchasing new textbooks, the district invested in student computers with the intent of providing one computer per student. The first rollout provided computers to all high school students. However, the district had very little technology professional development support in place for teachers at that time. The lack of dependable technology infrastructure and professional development frustrated teachers and discouraged them from engaging in technology tools as teaching tools.

In the past two years, EPISD continued to offer professional development at the beginning of the year but not ongoing training throughout the year. EPISD purchased some technology platforms, like Renaissance Star 360, that were unpopular with teachers because insufficient training was provided in their use and the programs were difficult to set up and maintain. After introducing these programs, the district stopped paying for some of them so teacher investment was lost. This uncertainty and regular changes in technology platforms increased teacher frustration.

Improvements to campus technology continued as the district attempted to provide dependable Internet access to students and staff. During the summer of 2016, Franklin High

School (FHS) received new wiring for both Internet connectivity and phones. Internet access has improved on the campus, alleviating teacher frustrations and encouraging them to try more technology-based lessons.

During the fall of 2017, EPISD introduced a learning management system, Schoology. The interface between EPISD Schoology and the grading program was poor. Students' names dropped out of the system and teachers could not dependably sign onto the platform. The district and Schoology technology personnel worked diligently to correct and rectify the problems. They actively sought user input and provided a process for reporting problems easily. They resolved most of the problems by the winter break. This enabled teachers to more reliably use the platform.

As the district improved Internet connectivity and functionality of the Schoology platform, they also needed to provide professional development to teachers. Teachers needed support developing their technology skills so they could effectively integrate the new technology-based tools into their classroom practice. EPISD did not offer ongoing, targeted PD for teachers as they developed their technology practices. The PD offered was in whole group settings with a brief introduction to the variety of applications offered by Schoology. Through this ROS, I focused on helping teachers develop their technology skills as the district improved technology access and available tools.

The Problem

I had identified a lack of engagement with available technology tools among science department teachers as the problem of practice. During department meetings, I observed conversations about the frustration teachers felt about the computer rollout. New programs were purchased and introduced to teachers without enough training for them to effectively engage with new technology tools. A 14th year science teacher and one of the campus active learning leaders responded to a survey I administered during the fall 2017 internship. Both felt the training on the new technology tools fell short of what teachers actually needed. The teacher, a science teacher who is very comfortable using technology, felt that the district was not taking teacher needs into consideration when planning training for the new technology. She thought that training that showed how to use the tools in a science classroom would be more beneficial than the large group, one size fits all approach that was typically used for professional development. The active learning leader agreed. She felt that the district should differentiate training sessions so teachers could receive the type and level of training they needed. She thought the trainings should be paced to encourage and support reluctant teachers as they learn how to implement the new technology tools. The lack of ongoing professional development support was a significant problem because the district invested a large amount of money into a robust LMS. The Schoology LMS offered teachers a platform to share information like assignments, lesson, videos, and announcements with students. The LMS contains applications to create and administer assignments and capture data about student performance. The LMS can be used to store resources in a single place, and to communicate and share information and resources with other educators. If teachers did not receive appropriate training with the LMS, they would lose

the benefits it offered to them and their students. Proper training, planned around their specific needs, could improve teacher participation with the LMS. Therefore, I focused this study on improving the use of the new LMS the district purchased.

Research Questions

The main research question I asked was: "What were the science teachers' views and opinions on the pedagogical use of the Schoology LMS in general and their experiences with using it during the Professional Development (PD) sessions in particular? To help answer the main question, I posed the following sub-questions:

(1) What were the teachers' views and opinions on the pedagogical use of the Schoology LMS prior to the PD sessions?

(2) What experiences teachers had with the Schoology LMS at the PD sessions?

(3) What type of LMS trainings did the participants prefer?

(4) What were the attitudes of participants toward technology and integrating the LMS into their classroom instruction after the PD activities?

Personal Context

Role and Personal History

I was a high school science teacher with 12 total years of teaching experience: three in Fairfax County, Virginia, four in DeRidder, Louisiana, and five in El Paso, Texas. I taught pre-AP biology, chemistry, and pre-AP chemistry. When I began my teaching career, use of technology as a teaching tool had been in use since the early 1990s (Berlanger, 2002). Computers were installed in a computer lab setting and the room was shared by a group of teachers. During the 1990s, private schools began requiring student ownership of laptop

computers. Public school campuses began moving to portable technology devices like iPads and laptops. Rapid advances in available technology platforms for educational use quickly followed this trend. These tools have been useful for me as a classroom teacher but I had to locate them and learn how to use them on my own time. I have always believed that technology offers many useful tools for data evaluation, differentiation, and innovation in the classroom.

I taught on a one-to-one computer to student campus. I found technology resources to be valuable for instruction so I integrated them regularly into lessons with my students and found that they were more engaged. I taught chemistry and biology. Science concepts challenged my students because of the abstract nature of the material. Much of the content that occurs at a molecular level is difficult for students to visualize. I continuously used science simulations to model chemical concepts – like molecular structure and chemical reactions – in a visual way. Students saw the content so they were able to develop a picture of the content in their minds instead of trying to construct their own mental image. It gave them a much more accurate understanding of the content. In biology, students looked at data from government and university data bases and performed simulations involving biological concepts. Technology became particularly useful for students on either end of the academic spectrum. They referred to the simulations and web sites as needed to help themselves master the material and they could dig deeper and enrich their knowledge about subjects that interested them. Finally, as a teacher, I used my website to communicate with students. They could message me through the website and I could respond. The website provided a space for me to store course documents, web links, and other documents students used to help themselves in their learning process. The technology available to my colleagues and me also allowed for data analysis of student assessments. Most

assessment tools included data analysis functions that could be used to view data by student, by class, or by question. This was much easier to do with a computer program than by hand.

On the Franklin High School campus, I found that many teachers embraced the new technology and actively worked to integrate it into their practice. However, there were a significant number who felt unprepared for the new technology initiatives. Some expressed feelings of being too old to learn new practices and others wanted more training than they were receiving. The teachers who felt unprepared were unlikely to engage with the LMS or engaged with it at a very basic level.

I understood that technology integration for too many teachers was intimidating, time-consuming, or outside their normal practice. I believed that targeted training for teachers resistant to technology integration would remove some of these barriers. If teachers saw increased engagement with their students, I believed they would be encouraged to experiment with different and various technology applications. If these teachers could come to the realization that technology could also streamline their work, they would more than likely use the LMS. Once the systems are established, they only require periodic adjustment to keep them current. Teachers needed training and support as they developed their technology skills and integrated it into their practice. Once teachers saw the value of technology tools for their practice, I believed they would begin the process of integrating it into their everyday practice.

Journey to the Problem

I taught at the same high school for six years and knew the science teachers well. Many had not been willing to devote their personal time to learning about the new LMS and the district had not provided enough training to help teachers engage with the tools. I observed this pattern

during each school year, leading me to wonder how teachers would engage with technology if they had more effective, targeted, and convenient training opportunities with the new tools.

Significant Stakeholders

For this study, the stakeholders were the science department teachers and students of the campus. The teachers were the major stakeholders because they were the focus of the study. The students were secondary stakeholders because improving teachers' pedagogical practices can improve student engagement and outcomes.

Important Terms

Collaborative Learning: an instructional approach that groups students of varying skill levels to work together toward a common academic goal; can increase student interest and promote critical thinking (Gokhale, 1995); using one-to-one computing to promote learning among students/teachers as a group rather than individually (Inserra & Short, 2012)

Differentiated Instruction: a pedagogical approach that aligns the student's learning needs and preparedness with approaches that meet curriculum requirements and support student success by using lessons and activities appropriate to the individual student and different ways to demonstrate what he/she has learned; a teacher's responsibility for students with learning difficulties (Ismajli & Imami-Morina, 2018); teacher use of computer resources to provide instruction prepared specifically for and individual or group of students

Individualized Instruction: instruction that provides an "individual learning path" (p. 440) for students; adjusting lessons to fit the needs of the individual student, allowing the student

to progress at a pace determined by his/her progress (Ghysels & Haelermans, 2018); technology-based instruction that provides individualized learning to students.

One-to-one computing: each student and teacher possesses a wireless technology device

Technology Integration: a curriculum design that combines direct instruction and technology to build student knowledge, creativity, research, and collaboration skills

Learning Management System (LMS): web-based systems that provide a platform for instructors and students to communicate, share materials, and assign and submit assignments on line (Lonn & Teasley, 2009)

Technology Integration Planning Cycle: an instructional planning model that begins by identifying an instructional goal, finding instructional approaches, selecting a learning tool (leave the cycle here if using a traditional approach), identify how digital tool contributes to instruction, determine any barriers or problems (exit if the problems will disrupt instruction), deliver instruction, reflect on the process (Thoma, Hutchison, Johnson, Johnson, & Stromer, 2017)

Technology (defined by me for the purpose of my ROS): digital tools available for instructional use to include computers, the internet, a learning management system, and cloud-based computing tools

Conclusion

I understood that technology integration for too many teachers was intimidating, time-consuming, or outside their normal practice. I believed that targeted training for teachers resistant to technology integration would remove some of these barriers. Once teachers were able to see the increase in engagement with their students, I believed they would be encouraged to try

more technology implementation. Certain technologies could also streamline their work. Once certain systems were set up, they only required adjusting to keep them current. Teachers needed training and support as they developed their technology skills and integrated these skills into their classroom practices. Once teachers were aware of the value of technology tools for their practice, I believed they would begin the process of integrating these technologies into their everyday practice.

CHAPTER II

REVIEW OF SUPPORTING SCHOLARSHIP

Introduction

During the last decade, there has been a rapid increase in the number and types of technology tools available for educational use. These tools could be accessed via computers, smart phones, and tablets if the device had Internet connectivity. The District distributed laptops to every high school student thus students on the study campus had access to an appropriate device.

Background

Research in technology has a long history. In 2017, de la Villa, Garcia, Garcia, and Rodriguez (2017) researched technology use in mathematics over the past 30 years. They found that when technology tools were initially introduced, teachers were hesitant to use them. Teachers hesitated to use a tool that they felt came between them and their usual teaching methods. In 1996, the United States published a technology plan outlining goals for technology integration in public schools (Alnuaman, Shaoqing, & Le, 2015). The goals of this plan were to be achieved by the year 2000. In a survey conducted to determine how well goals were met, the researchers found that while 83% of teachers supported technology integration, teachers indicated in a separate survey that they were not adequately trained to use technology in the classroom. While the policy is being partially implemented and continuing to move forward, educator preparation efforts are falling short.

The Texas Education Agency (TEA) has set forth Texas Essential Knowledge and Skills (TEKS) requirements for Texas schools. The TEKS were updated in August 2014 (TEA, 2014) and include the following technology-based skills: creativity and innovation, communication and

collaboration, research and information fluency, critical thinking, problem-solving and decision making, digital citizenship, and technology operations and concepts. These TEKS were written to prepare students for a future that requires they have well-founded technology skills to communicate, create, collaborate, and manage information.

The EPISD Power Up: Education through Innovation initiative was created to address the educational opportunities offered by technology and its applications. The district portal has links for students, teachers, and other stakeholders to review what the goals of the Power Up initiative are (EPISD, n.d.). District administrators developed the plan to improve student access to technology and its tools by creating the infrastructure necessary to support digital learning. The initiative includes a site for students, teachers, staff and parents to access the technology tools made available by EPISD. The site also explains district efforts to create active learning environments on campuses to encourage growth in student creativity and problem-solving skills and to provide opportunities for individualized educational opportunities based on student needs and abilities. The Power Up initiative was created to fulfill the TEKS in order to advance student achievement.

Benefits of Technology Applications

Technology and its applications offer benefits to teachers, students, and employers. For teachers, it increases sources for the classroom, allows for faster communication with students and other educators, and provides a platform to create assignments and collect student performance data. For students, it provides opportunities for communication, collaboration, creation of original products, and access to simulations and computer models. Employers desire

the skills learned through technology-based teaching (Reynard, 2009). The benefits of technology literacy are evident from the campus to the workplace.

Pedagogical use of technology allows teachers to take advantage of resources outside their home campus and to create engaging lessons and activities. According to An, Aworuwa, Ballard, and Williams (2010), technology-based applications allow the teacher to act as a facilitator as student's research and develop their own knowledge about the content. Instead of giving the information to the students, teachers create lessons that guide the students to online resources and information to take control of their own learning. Technology-based platforms provide a place for teachers to save and share lessons and resources with other teachers. An LMS platform provides flexibility in lesson delivery. The platform contains applications to assign content for multimedia projects, to develop lessons for a flipped classroom, to share web links and sources to enrich required content, and a safe environment for student communication on the internet (An et al., 2010; Lochner, Conrad, & Graham, 2015; Wang, 2017). LMS assessment tools can be used to track student achievement and to differentiate lessons for students at different achievement levels (Lochner et al., 2015). The opportunity to expand existing pedagogical practices makes technology-base tools like an LMS useful for educators.

Technology offers students new ways of acquiring and demonstrating knowledge. As students engage with the vast amount of information available on the Internet, they learn how to determine what information is valid and useful (Reynard, 2009). Students must organize and present the lessons information and data as they progress. They have several platforms for the final product. It could be a formal paper, a slide presentation created in PowerPoint or on a web-based presentation application like Prezi and Emaze, or a multimedia presentation with video and

sound. Students can safely collaborate with their peers and teachers via the discussion board applications on an LMS (Lochner et al., 2015). For students, technology tools and applications broaden their access to information and their options for demonstrating their new knowledge.

Some students leave high school and go straight into the workforce. Employers need graduates who have a solid foundation in workforce skills (Reynard, 2009). Employers need graduates who can read complicated materials and understand them. They want employees who think analytically about a work place need and then apply the information they gathered to solve the problem. Effective communication is also necessary for the modern work place (Reynard, 2009). Thoughtfully integrated technology-based lessons can help students develop these skills.

Evolving technologies show great potential as teaching tools. The applications made available through the Internet and computer-based tools increase the resources and teaching options educators can use to improve student-learning outcomes. Well-trained teachers can leverage these tools to improve their practice.

Professional Development

In order for teachers to integrate technology successfully into their pedagogy, well-designed professional development must be offered to them. Quality professional development considers the needs, attitudes and skills of educators (Hao & Lee, 2015). It continues over a period of time and focuses on the requirements of the content area in which the teacher specializes (Claesgens et al., 2013; Lawless & Pelligrino, 2007). To encourage effective technology integration into classroom practice, teacher preferences and skills must be considered with enough time and follow-up to support teachers as they learn to implement technology-based strategies into their practice.

High quality professional development activities engage educators and enable them to transfer the knowledge they already have to new ideas and tasks. Begin by determining the purpose of the professional development course and selecting an appropriate framework to begin the design process. Several factors influence how well teachers internalize the information from the training to transfer it to new pedagogical efforts: connection to content, clear goals and a common vision for student outcomes, time and follow-up, materials, opportunities for collaboration, presentation format, and stipends for participation.

Trainers need to establish a clear connection between PD and the curriculum and content to gain teacher by-in for the changes. According to Klieger, Ben-Hur, and Bar-Youssef (2010), gaining the support of teachers is one of the most important factors influencing a successful change like technology integration. Teacher attitudes and openness to the new methods determines whether they will actively participate in professional development activities and then apply what they have learned to their classroom practice. Professional development aligned with teachers' curricula and content resulted in better classroom implementation of the pedagogical resource (Penuel, Fishman, Yamaguchi, & Gallagher, 2007). In their study of the GLOBE Program, an earth-science program, the participants were shown how the program aligned with their curriculum and classroom practice, they felt prepared to implement the program and increased use of the program's activities. Quick, Holtzman, and Chaney (2009) also found that PD that "content-focused professional development, including that which addresses subject-area curriculum and assessment" (p.47) supports teacher development. To change teacher practice, Hill (2007), recommends training developed around "specific subject matter, curriculum materials, and teaching methods linked to subject matter and materials" (p. 115). Quick et al.

(2009) and Garet, Porter, Desimone, Birman, and Yoon (2001) found when PD was focused on the content and connections to previous training and larger goals, it had a greater positive effect on teachers' knowledge and skills. They also found that ensuring when PD is aligned with the daily life of the campus it increased teacher knowledge and skills. When teachers understand how new pedagogies fit within their classroom practice, they invest their time in it and produce the change the organization seeks.

Professional development should be designed with enough time to introduce new practices to teachers and to provide follow-up. The traditional approach of one day or less per year of technology training only allows for learning the basic functionality of technology, not how to integrate it into individual practice (Lawless & Pellegrino, 2007). More sustained and longer PD programs were more effective in increasing teacher learning than short workshops because of the complexity of teachers' work (Hill, 2007). More sustained programs allowed teachers extra time to earn new skills. Staff development courses should be followed-up with additional support for as long as necessary to affect changes in classroom practice (Sparks & Loucks-Horsley, 1989). Length of time provided for training and the amount of contact hours had a substantial positive effect on teacher learning (Garet et al., 2001). Providing time for planning, and additional collaboration with other teachers aided in connecting teachers' goals and experiences, aligning lessons with state standards, and increasing interaction with other teachers. According to Barrios (as cited in Klieger et al., 2010), one of the main problems when integrating 1:1 laptop computer systems into the classroom was the lack of guided support provided to teachers as they learned the new practices necessary for effective technology enhanced lessons. In their study on PD for technology integration, Claesgens et al. (2013) found

monthly, face-to-face follow-up support was critical to teachers as they learned to integrate technology in instruction. Lochner et al. (2015) recommended that LMS trainers plan for and provide professional support that is continuous and focused on the needs of the teachers. Training should include strategies that help teachers adjust to the changes the technology will bring to their practice. Providing ongoing opportunities for collaboration also supports technology integration. Assuring that teachers have time to collaborate with each other about their efforts with others in their content area so follow-up sessions are critical to increased technology integration. Follow-up equals, or even exceeds, the importance of the initial training.

The presentation format should include appropriate materials and opportunities for collaboration to create a professional development atmosphere where educators feel assured that their needs are being met. Since teachers must teach with the new techniques they are taught in the course, they should be allowed to interact with the materials they will be using in an authentic manner. Walker, Recker, Robertshaw, Sellers, and Leary (2012) found that large gains in teacher competency resulted when "…teachers are actively engaged with authentic and complex problems in their own teaching, designed solutions, and reflected with their peers on classroom implementation, collaboratively discussing barriers, ways to overcome barriers, best practices, and potential uses of technology" (pp. 426-427). More change in teacher behavior was noted when the training included continuing opportunities to collaborate in the professional group (Penuel et al., 2007). When teachers applied what they learned in PD sessions in their classroom, sharing their efforts and discussing others' experiences aided in effective integration of what was learned. The time and opportunity to reflect with colleagues supported efforts to implement new curricular resources. Klieger et al. (2010) also found that providing infrastructure

resources, technical support, and pedagogical support, encouraged teacher innovation in the classroom. According to Lester (2003), teachers expressed that they wanted their needs to be considered in training development. Including ideas from the teachers provided ownership to the teachers receiving the training, encouraging discussions about new ideas that could improve teaching and learning. Training should offer goal oriented professional development that emphasizes how the technology supports student achievement in order to gain teacher buy-in.

Because professional development for technology integration and innovation requires a large investment of time, offering a stipend, reducing teacher workloads, or using department meeting time provides incentives for teachers to participate. Claesgens et al. (2013) found that the addition of a stipend had a positive impact on teacher participation in continuing to practice the innovation. Kale and Goh (2014) noted that a lack of time negatively impacts information and communication technology integration. It appeared that either additional time during work hours or offering monetary incentives encouraged teacher participation in implementing innovative strategies into their classroom practice.

Alignment with Action Research Traditions

For my Record of Study (ROS), I focused my research on the classroom practices of fellow teachers. I endeavored to determine why they were resistant to the new LMS made available to them by the district. Once I understood their needs, I planned training to improve their technology skills so they could participate more fully with the new resource. I believed this type of research fell into the Teacher Researcher Movement in North America as described by Anderson, Herr, and Nihlen (2007). I viewed my study as a school-based effort to improve practice at the campus level. My goal was to solve a local problem using information from the

people with the problem. I hoped to create positive change in teacher perceptions of the new technology tools they had available to them.

Conceptual Framework

The conceptual framework that I used to design the PD sessions for this ROS was the Technology Integration Planning Cycle (TIPC). The TIPC was a framework for the design of lesson plans during professional training meetings (Thoma et al., 2017). TIPC was an instructional planning framework based on a cycle (Hutchison & Woodward, 2014) that began with an instructional goal as the guide to selecting the instructional approach and pedagogical tools. Once the tools were selected, each was evaluated for how it contributed to the lesson and what limitations it might have offered. If the limitations could be overcome, then the lesson was ready for presentation to students. TIPC provides a basis for designing the professional development presentations to the science department. The cycle began with the goal, allowing teachers to understand why they were learning about the LMS tools and it allowed time for reflection so teachers could use the tools and evaluate the tools value. Figure 1 is a flowchart of the TIPC process. The TIPC framework provided a structure for teacher planning when integrating technology.

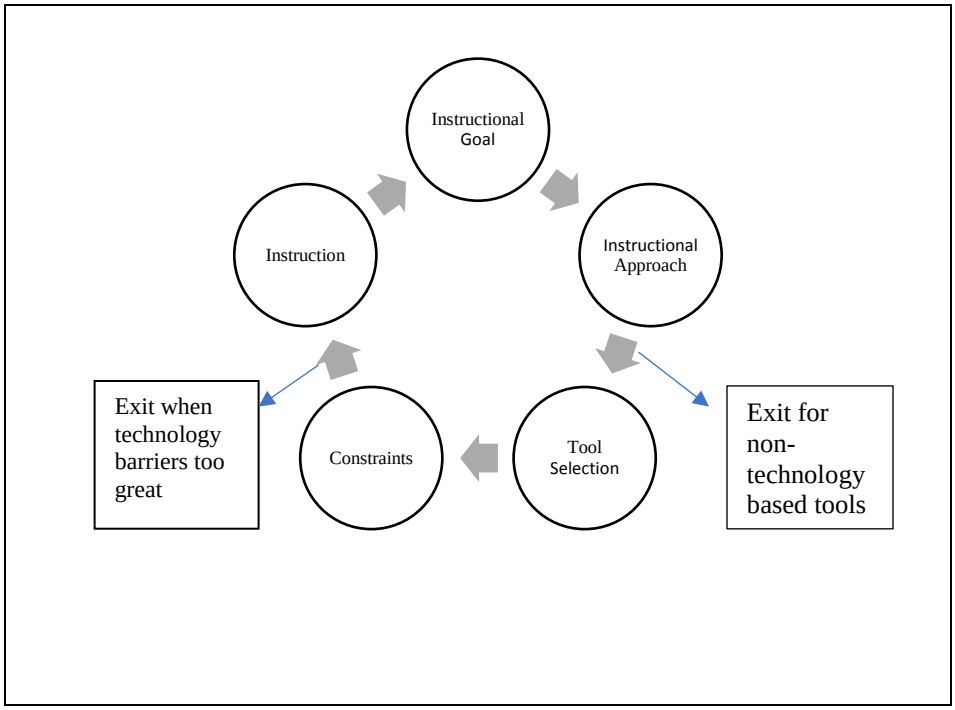

Figure 1. The technology integration planning cycle . Adapted from "A Planning Cycle for Integrating Digital Technology into Literacy Instruction," by A. Hutchison and L. Woodward, 2014, *The Reading Teacher, 67* (6), p. 459. Copyright 2014 by Wiley-Blackwell.

Significant Research and Practice Studies

TIPC studies. Creating appropriate training sessions for the science department required understanding the nature of the group and presenting a logical system for integrating the targeted pedagogical tool. Thoma et al. (2017) conducted a study on integrating technology into literacy instruction. They designed technology-based literacy training for a PLC with three fifth-grade teachers. These researchers followed the TIPC model created by Hutchison and Woodward (2014) to draw on teachers technological, pedagogical, and content knowledge (TPACK), the model designed by Mishra and Koehler (as cited in Thoma et al., 2017) as a framework for teachers to understand the connections between content, technology and pedagogical practice. Thoma et al. (2017) recognized the value of the seven-step cycle of the TIPC as a tool to help

teachers determine how the technology part of TPACK interacts with the content and pedagogy parts, noting the importance of the two exit points from the cycle. The first exit point occurs during the selection of instructional tools. If traditional tools like pencil and paper are more effective for a lesson, the teacher exits the TIPC here. The second exit point concerns barriers in using the tool. If the obstacles involved in using the tool are too difficult to overcome, the teacher can exit the cycle and choose a different instructional approach. In a follow-up study in 2018, Hutchison and Woodward found that exposure to selected digital tools, collaborative groups, and opportunities for teachers to reflect on technology integration were the most important aspects of using the TIPC framework. Hutchison and Woodward (2018) performed a follow-up study of the TIPC PD model. They described TIPC as a model of technology integration allowing teachers to evaluate technology tools to determine if the tools were pedagogically appropriate for the content they wanted to teach. TIPC placed "…PD within a reflective cycle that prioritizes instructional goals and student outcomes, and clarifies that technology is a possible tool to achieve that goal" (Hutchison & Woodward, 2018, p.4). Students of the teachers who participated in the TIPC PD performed better on pre-test and posttest assessments than students of the control group who did not receive the training. They posited that TIPC PD helped teachers understand the potential of technology tools for a variety of pedagogical needs rather than creating lessons based on a specific digital tool. TIPC changed the way the teachers viewed classroom instruction and they were able to internalize the cycle after participating in the TIPC-based PD sessions.

LMS studies. LMS platforms have become more popular in school systems as tools for communication, data collection and analysis, and lesson delivery. Lonn and Teasley (2009)

investigated the use and benefits of LMS platforms. They evaluated two years of survey data specifically focusing on efficiency and interactive practices for teaching and learning. These researchers found students and teachers valued the efficiency of communication via the LMS platform. Over two years, the students' and teachers' positive view of the LMS as a communication tool increased. The researchers posited that as teachers and students gained experience with the platform, their ability to use the LMS for teaching and learning would improve. The authors ended by recommending more in-depth studies of the LMS as a teaching and learning tool. Ulker and Yilmaz (2016) evaluated and compared LMS platforms. They described LMS functions as options to organize student data, include multimedia content, share lessons, and administer assessments and assignments. LMS platforms are based on specific types of modules: course, user, exam, assignment, and reporting. These modules can be set up by the administrator of the course to reflect the requirements of the course. The LMS allowed teachers to manage course content and communication effectively.

Other functions on the platform included the ability to share web links and create wikis, chat rooms, and polls, and set up live videoconferences. Cavus and Alhih (2014) found student access to science through the LMS allowed them to work at their own pace, communicate with other students and instructors, and access a variety of learning activities. The LMS also allowed for individualization of education because the course manager can differentiate assignments for their students. Watson and Watson (2007) suggested the goal of achieving student mastery learning will require technology integration. They posited that technology tools can be leveraged to offer individualized learning to every student. An LMS could be used to track each student's

progress and provide access to materials that move them towards mastery at their own pace. The LMS could be a powerful tool for teachers as they move toward student-centered learning.

Conclusion

The use of technology has grown more quickly than teachers' understanding of how to use it effectively. Modern educational software has been made available to educators but they need training in order to begin to integrate these tools into their practice. Training based on a cycle like TIPC can assist teachers in making effective pedagogical decisions about lesson delivery methods. Developing courses for students in the LMS can help streamline assignments and aid in data collection and communication.

CHAPTER III

SOLUTION AND METHOD

Solution

To remedy the lack of engagement with the learning management system (LMS), I developed a series of professional development sessions. I asked the science department what topics they would like to cover. We discussed the LMS and what types of tools it offered. I demonstrated how the LMS could support their efforts to create assignments, track student learning, communicate with students and other teachers, and provide a safe space for online discussion and Internet research. Science teachers made the final decision about what topics would be covered in the three PD sessions. The sessions covered setting up courses, creating assignments for both whole class and special populations, and creating resources and data banks. I studied these three features so I could develop short training sessions for each one. One feature was taught per 30- minute session followed by the request that teachers use the feature before the next department meeting. Approximately three science teachers were asked to share their experiences with the LMS feature at the next meeting before we began the next training session. The goal of the solution was to provide practical training over a period of time so teachers become more proficient in integrating the LMS into their classroom instructional pedagogical practices.

Justification

For teachers to engage in new tools, the tools needed to provide opportunities to improve the way they conducted their practice. The LMS purchased by the District could be a useful tool for differentiation, assessment, creating and assigning online activities, and collecting student

data. According to Watson and Watson (2007), an LMS can provide the tools educators need to coordinate and evaluate individualized student learning, helping teachers improve their practice to raise student learning outcomes. Cavus and Alhih (2014) argued that LMS platforms integrate effectively into science pedagogy as tools for experimental studies using models and problem-solving tools. However, learning how to use these features of the LMS required time and teacher motivation. The training sessions for my ROS occurred during the whole group science department meetings, a time which set aside for professional development and other collaborative activities. I presented training about setting up the course, creating assignments using the platform, and creating resources and data bases within the platform. Each was presented at separate meetings to enable teachers to engage with each tool individually. This allowed teachers to develop their skills with the platform incrementally and encouraged growth in their skill with it, reducing the level of frustration generated when all the features are demonstrated during one session limiting teachers' opportunities for engagement and reflection with the platform. This solution provided time and opportunity for teachers to engage in the individual tools within the LMS platform and seek assistance as they needed it. Working with the tools one at a time encouraged teachers to use the LMS more often and effectively within their pedagogical teaching practices.

Study Context and Participants

Context. Franklin High School (FHS), a campus within EPISD had a student population of 2743 for the 2017-2018 school year. There were182 staff members including 19 administrative personnel and 163 teachers. FHS offered two magnet campuses along with the traditional main campus. The two magnets were the New Tech Academy and the STEAM

Program. The science department on the main campus had 20 science teachers. The science teachers were proficient at using science-based technology but were not fully engaged with the new LMS.

The El Paso Independent School District (EPISD) rolled out the one to one computer initiative in the fall of 2016. The District had very little technology support in place at that time. The lack of dependable technology infrastructure and professional development frustrated teachers and discouraged them from engaging in technology tools as pedagogical teaching tools.

In the past two years, EPISD continued to offer professional development for teachers at the beginning of the year but not ongoing training throughout the year. EPISD purchased some technology platforms that were unpopular with teachers, partially because no training was provided about how to effectively use and seamlessly integrate the LMS into classroom teaching practices. After introducing these programs, the district let them expire. This uncertainty and regular changes in technology platforms has continued to increase teacher frustration.

Improvements to campus technology continue as the district attempts to provide dependable Internet access to students and staff. During the summer of 2017, Franklin High School (FHS) received new wiring for both Internet connectivity and phones. Internet access improved enough that teachers began trying new technology-based lessons.

During the 2017-2018 school year, EPISD introduced an LMS. The interface between EPISD Schoology and the grading program was poor. Students' names drop out of the system and teachers could not dependably sign onto the platform. The district and Schoology technology personnel have since fixed these problems, but teachers were frustrated and easily gave up on the platform. This initial period negatively affected teacher engagement with the new system.

The Schoology LMS platform contained many useful tools for educators. Courses could be developed within the platform and shared with students. The courses could store documents relevant to the course content. Assignments could be posted and collected through the platform. Teachers had the ability to create differentiated lessons and assign them to specific student groups to accommodate their individual needs. District-wide resources were easily shared within the platform and teachers could also save their own resources and data banks within the system, then easily access their resources to create assignments and share them with students and colleagues at a later date. The LMS platform appeared to be a powerful tool for classroom teachers.

As the district improved Internet connectivity, teachers needed support developing their technology skills so they could effectively integrate technology practices into their classroom practice. Now that the problems with the LMS have been addressed, teachers needed to be shown the value of the platform. As EPISD did not offer ongoing, targeted PD to help teachers develop their technology practices with the LMS, the purpose of this study was to help teachers develop their understanding of the LMS so they could use it effectively.

Participants. The science department at Franklin High School in the EPISD agreed to participate in the study. The participants used technology effectively in their practice. They employed web-based tools and create their own technology-based lessons. The teachers had not embraced the new LMS because they did not have the time necessary to experiment with it. There were a total of 20 science teachers. Six of these teachers used the Schoology LMS regularly. Two teachers used the free Edmodo LMS exclusively and the rest either did not use an LMS or used the Schoology LMS on a very limited basis. The teachers who did not use the LMS

did not know how to use it and did not have time to experiment with it. The two teachers who used different LMSs said they might possibly switch to the Schoology LMS if they could learn how to use it.

Research Paradigm

I followed a qualitative action research design for my ROS. As a form of practitioner research, action research is employed to evaluate a problem within a workplace and strive find a solution (Merriam & Tisdell, 2016). Participants were engaged in the problem-solving process. The design began with an evaluation of the needs of the participants as they learned to use the LMS. An action research approach was appropriate for this study because I was an insider and sought feedback from the participants after each of three training sessions. I focused the training sessions on a single problem of practice and as each session was completed, I collected information to help guide planning for the next session. As a member of the group, my role was as an insider researcher.

Data Collection Methods

The methods of data collection included a combination of surveys, observations, and interviews. The Pre-Training Survey (see Appendix A), Professional Development Observation Instrument (See Appendix B), and the LMS Interview Instrument (See Appendix C) were used to collect data for the study. The survey was used first, then the observation instrument, and two weeks after the last session, the interviews were conducted.

The Pre-Training surveys were completed and returned it to me. The surveys were distributed to six teachers who used the LMS consistently in their practice. The purpose of the

surveys was to gather information about how and why they engaged with the LMS. The information provided was used to help shape the development of the PD sessions.

I recorded my observations of the professional development sessions, including my observations of teacher behaviors as they participated in training sessions using the Professional Development Observation Instrument (see Appendix A). This instrument was created by me to aid in documenting observations during the training sessions. It was used to track the number of teachers present and their behaviors during the session. At the beginning of the second and third sessions, I asked teachers to share their efforts in their individual classrooms using the LMS. I recorded their discussions on the Professional Development Observation Instrument. Collection of participant feedback occurred at the end of each session using the Professional Development Observation Instrument. I asked for teachers' perceptions about what they thought was helpful about the structure of the training and for suggestions that would help me improve the lesson for the next session. Review of the feedback was necessary after sessions one and two to provide guidance for the structure of the following sessions.

I individually interviewed seven teachers who were not currently engaging with the LMS following a semi-structured format (Merriam & Tisdell, 2016) to gather specific information and to allow for open-ended questions about the value of the PD sessions as an aid to higher levels of engagement with the LMS using the LMS Interview Instrument (see Appendix B). The responses to the interview questions were written on the interview document by the researcher and reviewed by the participant to ensure their thoughts were accurately recorded. Should the participant prefer not to be interviewed in person, the interview questions would be given to them to answer. They were asked to return their responses to the researcher.

Data Analysis Strategy

Data analysis for action research design involved collecting observational data from the PD sessions and interview data from participants. These data were coded based on recurring words and ideas, then categorized to determine patterns in participant responses. Once the categories were created, each was evaluated to ensure it covered the important information and that the data within the different categories did not overlap (Merriam & Tisdell, 2016). For an action research design, I focused my analysis on the outcomes of the training process.

Science department meetings occur once every two weeks. Before beginning the PD sessions, the teachers who had integrated the LMS into their practice and use it regularly were surveyed using the Pre-Training Survey. The purpose of these surveys was to determine why the teachers used the platform regularly and what tools they found most useful for their practice. These initial surveys were distributed to the teachers who used the LMS platform consistently in their practice. They answered the questions on the document. Their responses included the LMS tools they found most useful in their classroom practice. I presented these tools to the science department and we decided as a group which tools to cover in the training sessions. Using the feedback from the survey, the group jointly decided what LMS presentations we would cover during the PD sessions.

Beginning in April, the first PD session was offered at a science department meeting. During the following week, data about teacher perspectives about the training and the LMS were collected from the science department members. Two weeks later at the next PD session, teachers shared their use of the LMS and the second training was offered. Observation data were collected during the second training using the Professional Development Observation

Instrument. The third training session occurred two weeks later in the beginning of May, followed by the final round of teacher discussion about their LMS use and the final training observation.

During the training, the researcher observed how teachers engaged in the session by noting how many tried the tools being taught in the session and how many of the experienced teachers helped the other participants as they developed their skills with the tools. At the beginning of the second and third sessions, the researcher asked if anyone used the tools with their students and asked them to share their experiences. During the second session, four participants were observed helping others and three participants shared the images they added to their courses. The PD observation data were used to gauge teacher engagement in the training session and to guide development of the following session.

At the end of May, two weeks after the sessions were complete, individual interviews were conducted and then transcribed by the researcher. Participants who were interviewed were asked to review the transcripts to ensure their thoughts were accurately reflected. Once the responses were coded and categorized, the interview data were used to determine if the training sessions were effective in improving teacher engagement with the platform. The categories were selected based on similarities in participant responses. The questions were written to elicit participant perspectives about the use of an LMS both before and after the training sessions. This information about their perspectives was used to determine if the training sessions were effective at encouraging engagement with the LMS.

Validity Criteria in Research Design

Validity in qualitative research ensures that the research was performed in a rigorous manner and the analysis of the results was methodical. Feldman (2007) stated that action research reports must include descriptions of how and why data were collected to support the validity of the study. Anderson et al. (2007) and Heikkinen, Huttunen, and Syrjala (2007) stated that validity terminology for qualitative research was still being developed. To explain the purposes of data collection for this study and to show trustworthiness of the data, dialogic validity, process validity, dialogic validity, and catalytic validity, as defined by Anderson et al. (2007) for the purpose of action research, were addressed.

Democratic Validity

A researcher achieved democratic validity (Anderson et al., 2007) by considering stakeholder points of view. Collaboration with others during the research process to ensure a purposeful effort to gather information with participants of varying perspectives, aided in ensuring democratic validity. Heikkenen et al. (2007) stated the need to include participants' ideas and feedback in the research. For my ROS, I had already collected information from one of the campus active learning leaders and three science teachers. I was seeking to determine if my ROS idea made sense in the context of our campus. The science department chair and the science department were willing to receive professional development sessions from me and to provide feedback. The campus active learning leaders were willing to advise me as I developed the sessions for the science department. I believe this ensured that I gathered information from multiple perspectives about the study.

Outcome Validity

Demonstrating outcome validity (Anderson et al., 2007) meant showing that the actions taken moved the issue forward. While this type of validity did not require a complete solution to the problem, it implied that the problem has been studied and resolved to the limits of the research site. Some solutions may be found while other issues may emerge from the study. During the process of this ROS, I created PD sessions that aided teachers in their efforts to engage more fully with available technology tools to enrich their practice. I gathered feedback about the trainings and the efforts of teachers as they interacted with the technology tools which enabled me to tailor the sessions to the needs of teachers as those needs were exposed. For this study, my goal was to move teachers in the direction of using technology more effectively and more often. If that results, outcome validity will be upheld.

Process Validity

To achieve process validity (Anderson et al., 2007), the researcher needs to ensure that the research process appropriately fits the site, participants, and topic. The researcher must clearly define the methodology, its implementation and adaptation as the study progresses. The researcher must engage fully in the process to be an agent of change at the location. I expected to learn as much or more from the participants as they did from me. I planned sessions according to their needs. I presented lessons that focused their attention on what the LMS technology had to offer. During this process, I interacted with the participants on a level that allowed me to see what issues most concerned them and how they responded to different approaches to adult learning. By listening to the participants and adjusting according to their needs, the process should have been properly oriented toward the needs of the site.

Dialogic Validity

To ensure dialogic validity (Anderson et al., 2007), the researcher needs to elicit feedback about the study's process and outcome as they relate to the location. This can be accomplished by recruiting others to review the processes and results of the study as they unfold. This person should be able to critically evaluate the efforts and findings of the researcher. The research should ask if the results make sense. Does it fit what they see as reflected in their experience? I had two experienced teachers, one a department chair, and the active learning leader as help for this issue. I had already tapped their ideas and experience for the pilot study and they were willing to continue to help me in this regard. With their assistance, my study had dialogic validity.

Catalytic Validity

Catalytic validity (Anderson et al., 2007) is achieved when new understanding and change occurs over time. It occurs as the research winds back onto itself to improve knowledge about the theme of the study. If it is accomplished, the researcher and the participants will have undergone changes in their view of the issue. Heikkenen et al. (2007) referred to this as workability. Did the research create change in teachers use of the LMS? I expected changes to be small but noticeable. At the end of the study, if teachers viewed the LMS more positively and engaged with it more effectively and more often, I would have successfully shown catalytic validity.

CHAPTER IV

RESULTS/FINDINGS

The purpose of this study was to determine the effect of smaller sustained PD sessions on teachers' engagement with and pedagogical use of the Schoology LMS. Seven teachers were interviewed about the three training sessions and their answers were recorded. The responses were coded and categorized to determine if there was consistent improvement in teacher understanding and willingness to engage with the LMS.

During this action research project for my Record of Study (ROS), data were gathered before implementation of the PD, during the PD sessions, and after the PD sessions were complete. I gathered information about six teachers' experiences with the use of the LMS. I analyzed these data for similarities in the use of the LMS. During the PD sessions, observations about teacher engagement were recorded. After the sessions were complete, interviews were conducted to determine the effectiveness of the training sessions. The responses were evaluated question-by-question focusing on similarities among them to determine themes and categories within the data.

Findings of the Pre-training Surveys

The researcher began by administering a survey to six science teachers at FHS who regularly used the Schoology LMS. Prior experience of the teachers with the LMS ranged from eight months to four years. In the past, the teachers have used the LMS mainly for communication and resource storage. Table 1 displays data concerning the LMS features these six teachers used most often with students and with other educators.

Table 1

Teacher Use of LMS Features with Students or with Other Educators

Feature	Number of Teachers (n = 6)
With Students	
Agendas	6
Assignments	6
Resource Storage for Teacher	6
Quizzes/Exams	4
Resources for Students	6
Office 365	1
With Other Educators	
Professional Groups	2
Shared Resources	5
Training Courses	2

Before the 2018-2019 school year, the district had not purchased any LMSs. When asked why these six high implementation teachers chose to use the Schoology LMS over other free platforms, three reasons were often provided. Three of the teachers stated that they used Schoology because it was easy to use and two teachers used it because it was linked to Office 365 and CK12, the district's text book site. Survey Teacher 1 said, "It (the Schoology LMS) was easy to use and attach files." Survey Teacher 2 said she switched to Schoology because "it was linked to CK12." Two teachers used it because the district purchased it and began introducing it into their classroom pedagogies at the beginning of the 2018 school year.

Findings from the Professional Development Observations

There were 20 teachers in the science department at FHS at the time of the data collection. During days 1 and 2 of the PD sessions, all teachers were in attendance while four teachers were absent for the PD on Day 3. Table 2 shows the observations I conducted during PD sessions. Teachers helped each other at all three sessions. I observed the teachers asking questions of one another and sharing their computer screens with the LMS open. I observed teachers ask each other questions and share their efforts with the LMS. Teachers also shared their efforts with the group: on Day 2, three teachers showed their new course settings to the group and on Day 3, two teachers showed the group how they managed their resources. On Day 1, a request was made for a document with screen captures of the menu selections for LMS course set-up.

Table 2

Professional Development Observations

Behavior Observed	Day 1	Day 2	Day 3
Number of teachers present	20	20	16
Number of teachers engaged with the LMS	15	19	16
Are they engaged in the tool on which the lesson is focused?	Yes	Yes	Yes
Are any teachers helping others?	Yes	4	Yes
How many teachers shared their LMS efforts?		3	2
Suggestions for adjustments to the next training	Drop down menu guide		

Post-training Interviews

I conducted individual interview sessions with seven teachers who participated in the training sessions. The seven teachers were selected because of their availability to the researcher (Merriam & Tisdell, 2016). During the interviews, I wrote participant responses on the LMS Interview Instrument (see Appendix C). Once the interviews were completed, I analyzed the transcripts by looking for common themes among the responses. After analyzing the interviews, it was determined that all seven teachers found the training helpful and engaging.

The design of the training aided in their active engagement during each session according to the teachers. Six of the teachers reported that they had a more positive view of the Schoology LMS after the training sessions. Table 3 contains the responses to the interview questions.

Table 3

Post-training Interview Responses

Question	Responses	Number of Responses (n = 7)
1. Why do you use an LMS?	Communicate with students	3
	Post assignments	3
	Online discussions	1
	Ease of Grading	1
	Organizational tool	4
	No copies needed, saves money	3
	Outside web links for enrichment	2
	Ease of modernizing course	1
2a. How helpful was Training Session 1 (2, 3) for you in developing your courses on Schoology?	Helpful	7
2b. Was the design of the PD helpful in engaging you in the topics presented?	Sessions built on each other	3
	Topics were relevant to teachers	2
	Increased teacher efficacy	1
3. What are the differences in your opinion about the LMS after the training?	More positive	6
4. How often do you plan to use the LMS now as compared to the past or prior to the training?	Increase use	5
	Create a flipped classroom	1

Results

The data from the interviews, shown in Table 3, were reviewed for themes. My analyses of the responses to Question 1 generated the following codes: communicate with students, post assignments, online discussions, organizational tool, no copies needed so saves money, outside web links for enrichment, and/or ease of modernization of course. The coded themes were then grouped into two categories: Communication and Course Management. Participants responded to Question 2a affirmatively. Responses to Question 2b were coded and reduced to three main themes: sessions built on each other, topics were relevant to teachers, and increased teacher efficacy. These were placed in the Session Design category. Results from Question 3 showed that five of the seven teachers interviewed had an improved view of the LMS after the sessions. These were categorized as Change in opinion of the LMS. Question 4 had three main themes about frequency of Schoology LMS use: everyday, increase use, or create a flipped classroom. These responses were categorized as Change in frequency of use of the LMS. Table 4 contains the themes and number of participant responses for each category.

Table 4

Categories

Category	Number of Teachers (n = 7)
Communication	6
Course management	6
Helpful for developing courses	6
Session design	6
Change in opinion of LMS	5
Change in frequency of use of LMS	6

The seven teachers who agreed to be interviewed were the members of the science department. Teacher 1 was primarily a physics teacher who had been teaching at FHS for six years at the time of the data collection. He was also teaching integrated physics and chemistry during the study. He had done very little with the LMS. Teacher 2 taught advanced placement environmental science, physics and advanced placement physics I at the time of the data collection. She had been teaching at FHS for 14 years and was the science department chair. She was using the free version of the Edmodo LMS during the study and had integrated it deeply into her practice. Teacher 3 was a physics, advanced placement physics I and II teacher who had taught at FHS for 12 years at the time of the data collection. He used the Schoology LMS for posting assignment updates and documents. Teacher 4 taught forensics and has taught at FHS for six years at the time of the data collection. His use of Schoology was limited to document sharing with students. Teacher 5 taught earth and space and has taught at FHS for 16 years. He used Edmodo during the study and was interested in Schoology. Teacher 6 taught physics,

advanced placement physics I, and OnRamps physics. He taught at FHS for 6 years. He used Schoology to post assignments. Teacher 7 taught biology, earth and space, and OnRamps geosciences and has taught at Franklin for 6 years and used Schoology regularly for updates and assignments. OnRamps was a program run by the University of Texas (UT) that enabled students to take an online college level course through UT while receiving classroom support from a high school teacher. The group sampled represents LMS users from those who almost never used the LMS to high users of their chosen LMS, not Schoology.

All seven teachers interviewed used an LMS: two used Edmodo and five used Schoology. They used the LMS as a tool for communication by posting assignments, sharing resources, conducting online discussions, and sharing outside enrichment resources. The ability to create assignments that are graded within the LMS and the ability to share documents without making copies were stated as reasons for the LMS use. Teacher 7 said, "It allows me to quickly and easily share information with students without worrying about printing." Finally, Teacher 4 felt the platform "helps with preparations for modernizing my course." All seven teachers interviewed used an LMS as a tool for their courses.

When asked if the trainings were helpful, all seven teachers responded positively. The two teachers who used Edmodo were considering switching to Schoology. The current users all found new applications within the LMS. One of the teachers stopped me in the hall and told me he "learned some things he didn't know even though he was using Schoology." They felt the training saved them time because they did not have to find these applications and learn how to use them on their own time. Teacher 3 said, "I have limited time to explore the full capability of

the Schoology LMS on my own." The training content was relevant to all the teachers interviewed.

The training sessions were developed in three parts: course set-up, course materials, and resource management. All seven teachers felt the design was effective. They commented that they liked the way one built on the other. Teacher 2 stated, "The three-part design, each one building on the previous one, was easy to follow and implement." The topics covered were relevant to teachers and increased teacher efficacy with the platform. "…the design of the trainings were chosen, I believe, to address topics that are extremely helpful to teachers," Teacher 3. Beginning with the basics of course set-up and progressing through course design to resource storage and management was a logical system to follow.

Six of the teachers stated that their view of the Schoology platform improved because of the training sessions. Teacher 2 felt changing to Schoology was not worth her time but after the training, she said, "I have changed my mind because of the presentations and I plan to explore it more over the summer." The problems encountered during the roll out at the beginning of the year discouraged teacher use of the platform. Teacher 1 said he "used Edmodo because it's what I know and the Schoology roll-out had so many problems." After participating in the training sessions, Teacher 1 said he had "an improved view of Schoology." Sharing experienced teacher perspectives and showing how the platform works convinced six of the teachers to try to use Schoology more, with the two Edmodo users planning to roll over to Schoology during the summer. The opportunity to learn how to use the platform and hear about others' successes with it improved teachers' views of the LMS.

The science teachers generally used LMS platforms with their students. Of the seven interviewed, three have planed to use the LMS every day. Teacher 6 planned to use Schoology every day. He said it "looks like it could simplify" his work. One Edmodo user planned to switch to Schoology completely while the other Edmodo user planned to move all materials but quizzes because her quiz bank on Edmodo was very robust. She said that her "plan was to use the best from both systems." One teacher who did not use the quizzes and test tool planned to use them and another teacher wanted to flip his classroom using the Schoology LMS. Teacher 3 planned "…to widen the scope of my use to include summative and formative assessments due to the trainings provided." Teacher 4 said, "Next year I plan to flip my classroom, so having all these lessons and folders on Schoology will really be a big help." The trainings provided skills and ideas for LMS use that encouraged teachers to use it more often than they previously were.

Technology: How to Keep Up with Changes

While conducting this study, some additional ideas for research emerged. One issue was mentioned by some of the teachers. EPISD tended to purchase a program only to drop it within a year or two. Teacher 5 did not use the Schoology LMS because he feared the "effort I put into an LMS will be lost." Because of this history, teachers wanted to know how to preserve their courses if that happens with Schoology. Also, most teachers already used an LMS and the concern about moving their resources to a new one was daunting. They did not want to invest the time to find that the district decided to end the Schoology contract. To allay their concerns, I contacted the Schoology help desk and received the instructions for preserving courses in the event the LMS contract was terminated. Because Schoology also had a free LMS offering, they provided a way to download the resource files teacher created on the EPISD supported platform.

The downloaded file could then be uploaded to the free version, preserving the teacher's resources and allowing for continued use of the Schoology LMS. Further research can also be done with other technology tools purchased by the district. There are several other programs, like Nearpod and Edgenuity, that are available for teachers but there has not been enough training about how to use them. Would this type of training expand use of other technology tools on campuses within the district? Would the rapid change seen in technology advances discourage teacher engagement with it because it required time to learn, develop, and implement?

Research and Context

Teachers' responses to the pre-training surveys provided information that was used to develop the PD training sessions. Because most of the surveyed teachers used the LMS as a communication tool for their courses, those functions were highlighted during the training sessions. The sessions were also designed to show the ease of use of the Schoology platform to encourage teachers to try it with their students.

During the training sessions, teachers present were engaged with the lessons. On Day 1, the PD was focused on setting up courses. Session topics included the basic account settings, how to set notification preferences, how to add an image for course identification, how to set course options like privacy and post moderation, and how to use external tools like Office 365. During that session, teachers asked questions about the different ways to set up their courses. Four teachers asked specific questions about the tools as they were presented. Two teachers asked to go through the process of handling notifications again and one teacher asked for more information about the course presentation options. Finally, one teacher asked for a document that included screen captures of the drop-down menus so she could use it in the fall to set up her new

courses. The group liked that idea and asked me to create one and post it in the science department group site created for this study.

On Day 2, the PD was focused on how to add materials to their courses. Twenty teachers were initially present, however, three teachers left and then returned, while one teacher had to leave partially through the session. During the session, teachers asked that menu choices be demonstrated again. In the add materials part of the LMS, there are nine options for types of materials. Each has a set of menu selections. Time was taken to repeat these menu selections as teachers asked to see the options again. While working on adding assignments, a teacher asked, "Can we make two versions?" That process was presented and a discussion about the ability to differentiate ensued. The capability of setting time limits for assessments led to a discussion about how to set up the LMS so the assessment stops within a certain time limit or how to set the time so the student can go over time while recording extra time for teacher records. Three teachers shared their efforts with setting up their courses and a follow-up question about notification settings was asked. After the session, one teacher approached me and said how much she appreciated these targeted training sessions because she did not know anything about Schoology. Two other teachers stated that they liked the sessions and that while they are Schoology users, they were learning new applications for the LMS. Teacher 1 stated, "Each training session was helpful because, as a teacher, I have limited time to explore the full capability of the Schoology LMS on my own." Teacher 4 said, "The sessions were very helpful to me, a recent neophyte to the LMS." The feedback received from the participants indicated that the sessions were helpful to them.

During Day 3 of the PD sessions, I focused on how to create resource files. Sixteen teachers were present during this session resulting in a highly interactive session. As the resource tools were presented, teachers set up their own files in the resources section of the LMS and asked questions as they progressed. Teachers shared their screens and asked each other for ideas and help. Teacher 1 commented, "The personal resources tools seemed really useful since I like to store materials as I find or create them." The most experienced Schoology teacher showed us how to export ExamView tests in a format that can be uploaded to Schoology. This was not part of my planned training session because many science teachers do not have access to ExamView. She also showed the group how to acquire the basic ExamView program. Two other teachers shared how they handled their resources. The amount of discussion made this a robust session.

Summary

The action research design of this study created an atmosphere for teacher input and questioning. The sessions began with the basics of LMS use and progressed through course development and resource management. The design allowed teachers to participate as the information was presented, to ask questions, and to share their ideas and efforts. The participatory format encouraged input from teachers with experience with the LMS, highlighting the platform's usefulness. Overall, the PD sessions were successful in improving seven science teachers' attitudes about the Schoology LMS and their skills in using it, substantiated through the themes presented in my results and presented in Tables 2-4 and also verified through the quotations from the teachers.

CHAPTER V

SUMMARY

The PD training sessions on Schoology planned in concert with the participants were effective. The participants (science teachers at Franklin High School in EPISD) in the study worked together to determine what content and information should be covered during the PD so that they could feel more comfortable with the technology and LMS. The experienced teachers shared their knowledge about the utility of the LMS. During the PD training sessions, teachers were engaged, asked questions, shared their efforts and knowledge, and showed improved attitudes about the LMS.

Current Study Situated Within the Current Literature

Small group, action research can be an effective approach for teacher professional development. vanOosten (2017) designed a collaborative action research study with two teams of four teachers which promoted teacher collaboration and control over their training. Results from vanOosten's (2017) study revealed that the teaching environment and teacher experience should be considered when planning professional development. Lochner et al. (2015) recommended that professional development should address teacher concerns. The research conducted through this study relied on teacher input to develop the training sessions, making teacher needs the focus of the sessions. Teachers helped determine what the sessions would cover so they felt that their needs were being considered. Further results demonstrated that within a collaborative setting, teachers should share their experiences and create a source of information for the group. Gradel and Edson (2011) recommended that trainers have participants use the tools during training sessions where they can interact with each other and receive modeling from the trainer. During the training sessions for the science department, the same behaviors were encouraged and

observed. During the sessions, as I demonstrated how the LMS tools functioned, participants tried the LMS tools, asked each other and the facilitator questions, and shared their efforts with the new LMS tools. This resulted in a collaborative work environment.

Time and ongoing support are two additional factors to consider when planning professional development. Learning to use the LMS should not place an extra time burden on teachers. According to Lochner et al. (2015), teachers need time to and continuing support to learn how to effectively use an LMS. Kleiger et al. (2009) found that teachers are willing to participate in LMS training if appropriate time is allowed. They suggested that administrators use creative methods to afford teachers the time they need. I was able to use meeting time that was set aside for this type of training so there were no demands outside of the school day. Teachers also need ongoing training and support as they learn how to use the LMS (Kleiger et al., 2009; Lochner et al., 2015). This study provided only three sessions but the participants came to the second and third sessions with new ideas and follow-up questions from the previous sessions. This study followed guidelines and format for very similar to suggestions provided in previous current research on this topic.

Using the TIPC model helped the participants of the study begin to visualize how they might use the LMS platform in their classroom practice. The sessions taught the participants how to use the basic tools available on the LMS. As teachers practiced with the tools, they began to determine ways they could use them with their students. They also shared their ideas and collaborated on new ideas, like flipping the classroom. Teacher 4 stated that in the next year, he "plans to flip his classroom" using the Schoology platform. The TIPC model (Hutchison & Woodward, 2014) is a useful model for teachers to use as they plan technology integration into

their classroom practice because it encourages teachers to determine the best lesson presentation method rather than depending entirely on technology-based lessons. During the PD sessions, participants were shown a variety of tools, several that could be used multiple ways. This showed the flexibility of the platform as a lesson planning and presentation tool.

Using an LMS can enable teachers to differentiate lessons and provide resources supporting student learning. Watson and Watson (2007) found LMSs should provide opportunities for individualized instruction, enhanced collaborative learning, and assessment tools with effective feedback mechanisms. During the PD sessions for the FHS science department, several tools for individualizing materials and assessment were presented. Participants also learned about the online discussion tools and how those can be set up to control who participates, how often, and what content can be attached to posts. During the second PD presentation, the assessment tools within the Schoology platform were modelled. These assessment tools provide data about each question: which answer choice was chosen most often and the median and average scores on the assessment. These data can be used to track student learning progress. The Schoology LMS provides the tools Watson and Watson (2007) suggested are needed in a robust system while PD provided the skills necessary to take advantage of the tools.

Personal Lessons Learned

While working through my preliminary action research during the fall semester of 2017, I learned three major lessons: how to plan professional development, the importance of well-prepared sessions, and how teachers respond to active training opportunities. Because I had no experience with preparing training for fellow educators, I appreciated this opportunity to work

with other teachers to plan and present training sessions. I gained insights and ideas as I collaborated with two of my fellow AVID site team members. As we planned, we built on each other's ideas, developing a solid collection of PD topics for the teachers. Listening to their ideas and hearing their comments about mine broadened my understanding of how to create active, interesting lessons for fellow teachers. I particularly appreciated the department chair. She has many good ideas and she is very creative. Listening to her brainstorm taught me several approaches that I did not previously have in my tool kit. Once we settled on the PD lesson topics and how we planned to deliver them, we had to determine what materials we needed, how much, and who could provide them to us. This part was similar to planning for the classroom so I had more familiarity with it. I learned who to ask if we needed supplies. I set up all the sessions myself. I prepared PowerPoint presentations for each session so I needed the proper equipment in order to demonstrate the LMS for them. During the first presentation, I showed the presentation to the other presenters so they were familiar with their part of it. Finally, I observed teachers as they participated in the sessions I developed. For three, I solicited direct feedback from the science teachers about the training so I could find ways to improve my presentations. For the fourth, I had them brainstorm solutions and I observed their behaviors during the session. There was 100% engagement in the first three sessions. Teachers were actively engaged in strategies they could use in their classrooms. For the fourth session, they took a few minutes to engage. Because they viewed and discussed videos, I was glad they seemed truly interested in the topics of the presentation. The few distracted teachers began to pay attention as the first video played. As we broke for discussions, they became quite animated and it was interesting to hear their ideas as they shared and built on them. Overall, I feel that my experience along with

the science teachers at Franklin HS was positive. Of course, I do wonder if the teachers were only nice to me because they know me because I did not receive any negative feedback or constructive feedback about what could be done differently. I did receive helpful feedback from two of the sessions and the opportunities to observe teachers as they participate in training was beneficial. During the sessions, I observed how the participants interacted with each other and I circulated around the room so I could listen to their conversations as they worked on the activities presented during the training. These observations allowed me to observe participant behaviors as a presenter rather than as one of the participants. I experienced first-hand how the training was received. What I learned could be applied to any future training sessions I might prepare. I enjoyed all four opportunities and would like to continue providing professional development to fellow educators. I applied some of the lessons learned during the preliminary action research to preparation for the professional development sessions for the research project.

During this process, I learned more about the Schoology LMS and some of my ideas about PD were confirmed. To prepare for the training sessions, I practiced with the LMS tools so I could present all aspects effectively to the participants. I strengthened my skills with the tools I use regularly and learned how to manage the tools with which I was not familiar. Observing the participants during the sessions, I heard a variety of ideas from the participants about different ways they could use the LMS tools. When I chose this project, I had some ideas about how PD can be most effective in engaging teachers. One new idea that I gained was that small group PD sessions are better than large group sessions in capturing and holding teacher attention. The second idea was to involve teachers in the content of the sessions. If the participants selected the topics, they would be more invested in the sessions. The experience I had planning and

presenting these sessions confirmed these two ideas. During the sessions, teachers observed me, asked questions, worked with the tools as I presented them, and helped each other with the tools. The presentation of some of the tools generated discussions about how it could be used in the classroom to support student learning. This project helped me grow in my understanding of how to select PD topics and present them in an engaging way to teacher participants.

Implications for Practice

The context of this study was a small group of teachers, the science department, in a district that has provided one to one computers to the student body and a robust LMS for facilitating teaching, learning, and communication. The purpose of this study was to train teachers to effectively use the new LMS platform to take advantage of the technology available to students and teachers. The training improved teacher attitudes about the LMS and encouraged them to try to use and implement into their classroom practices it more effectively within their own pedagogies. Within the setting of the study, participants selected the topics for the training sessions, so they received training that was meaningful to them. Science teachers involved in this study were comfortable using technology but did not have the time to research how to use an LMS. Time that was already set aside and designated for training during science department trainings was used to implement the PD intervention for this study. Understanding the needs and time constraints of the participants was critical in designing a study that improved the technological skills of the science teachers without imposing on their time.

The field of study for this project was general high school science. The members of the FHS science department used technology-based tools regularly in their practice. Adding the tools available with the LMS enhanced their efforts at technology integration into their professional

practice. The tools included ways to link to outside sites to share content-based material that enriches understanding, creating online discussions where students can share their internet sources easily, and teachers can differentiate assignments for different groups of students. Hutchison and Woodward (2018) noted that … "teachers are inundated with new and constantly changing possibilities for instructional technology in their classrooms" (p. 4). As teachers receive new technology resources, training that shows them how to use the new resources is critical for true integration into their practice.

Lessons Learned

The purpose of this study was to familiarize the participants on how to use the tools of the Schoology LMS platform purchased by the district. In the process of preparing and presenting the material, two important lessons were learned. First, asking the participants what they wanted to learn provided a basis for training that was relevant to them. Soliciting ideas from teachers who actively used the LMS helped in development of the presentations. The value of small group training sessions was the second lesson learned. The teachers were able to ask questions and receive immediate answers. They were able to participate fully in the training as the presentations progressed, supporting their learning. During my current ROS study, I involved PD participants (science teachers) in the planning process and engaged them in learning content about the Schoology LMS to in small group settings ensuring relevant and useful PD training sessions.

Recommendations

The results of this study show that PD planned with teachers and presented to small groups in short sessions with time in between for practice and reflection was beneficial to the

teacher participants. It is recommended that in planning and implementing for a technology focused PD, providers follow three main steps. First, determine teacher knowledge about the topic and what needs they have concerning the topic. Enlist skilled teachers to provide input about the topic: how they use the information and best practices within the topic. Second, plan the session(s) around teacher needs. Finally, allow teachers to work and practice hands on with the content of the presentation as it unfolds. The participants can interact with the content in real time, support each other as they learn new skills, and receive immediate feedback from the presenter. If the PD is planned over more than one session, it is useful to solicit teacher feedback about the training format so adjustments and adaptations can be made to the presentation process as necessary to improve the training sessions. Engaging teachers throughout the process ensures that their needs are being met.

Conclusions

The problem-solving process followed throughout this study helped with determining the focus of the study and how best to approach PD trainings for teachers. Before the sessions began, input was sought from the science department teachers about what they hoped to gain from the training. The surveys of teachers who used the LMS regularly provided ideas to motivate teachers to use the LMS. Observations of teacher behaviors during the shorter, small-group, interactive session showed higher teacher engagement than sessions presented to large groups where participant interaction usually appeared limited. On the FHS campus, department meetings are held regularly providing plenty of opportunities for small-group training. This format for PD sessions is valuable, time efficient, and attractive for teachers. In closing, EPISD should leverage the professional skills of campus teachers by encouraging departments to

participate in the smaller more focused types of training sessions conducted during this project. One suggestion would be that others, i.e. curriculum specialists, technology resource teachers work with their school's administration to present PDs in this format to groups of teachers during their professional learning community times, planning times, or at other flexible and convenient times for teachers. It is important to talk to administrators about whether trainings should be grade, community, or subject focused as a PD is presented.

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APPENDIX A

PRE-TRAINING SURVEY

1. How long have you used the Schoology LMS?

2. Which features do you use most often?

    - With students

    - With fellow educators

3. When the district did not have an LMS and you could choose any free LMS platform you wanted to use. Why did you choose this one?

APPENDIX B

PROFESSIONAL DEVELOPMENT OBSERVATION INSTRUMENT

		Descriptive Observations
Number of teachers present		
Number of teachers engaged with the LMS		
Are they engaged in the tool the lesson is focused on?		
Are any teachers providing assistance to others?		
How many teachers shared their LMS efforts?		
Suggestions for adjustments to the next training session		

APPENDIX C

LMS INTERVIEW INSTRUMENT

1. Why do you use an LMS? If you do not use one, why not?
2. How helpful was Training Session 1 (2, 3) for you in developing your courses on the Schoology LMS?
    a. Was the design of the PD helpful in engaging you in the topics presented during the workshops?
3. What are the differences in your opinion about the LMS after the training?
4. How often do you plan to use the LMS now as compared to the past or prior to the training? Why or why not?

APPENDIX D

RESEARCH ARTIFACTS

Professional Development Session 1

1. Greeting
2. Drop down with Account Settings (go through tabs)
3. Notifications Box
4. Setting up the course
    a. Adding a picture
        i. Hover over the image on the top left
        ii. Click on the Edit Picture Box
        iii. In the box that opens, click Attach File
        iv. Select a picture from your files
        v. The picture will populate the space
        vi. Close the Edit Picture Box
5. Course Options
    a. Select Edit Info (go through tabs)
    b. Edit Privacy/Course Settings goes straight to privacy tab
        i. Default Landing page selection at the bottom
    c. External Tool Providers goes straight to External Tools Tab
    d. Moderate Posts goes straight to the Moderate Tab
    e. Recycle Bin goes straight to the Recycle Bin Tab
6. Demonstrate Rest of the Menu options
7. Add Materials

SCORM – One Minute SCORM Overview for Anyone - SCORM -
https://scorm.com/scorm-explained/one-minute-scorm-overview/

The One Minute **SCORM** Overview for Anyone. **SCORM** Explained. This is an old article to which many people have linked, so we kept it in place as we moved to a new version of the website. Frankly, though, there are far better resources available here now.
Visit **SCORM** Explained for more information. QUESTIONS ...

APPENDIX B

Professional Development Observation Instrument

		Descriptive Observations
Number of teachers present	20	
Number of teachers engaged with the LMS	19 (one had to leave) 3 were in & out	looking at my projector & back to Computers, asked me to show clicks again
Are they engaged in the tool the lesson is focused on?	yes	Q: Can we make 2 versions? discussions can be set up for specific students or all?
Are any teachers providing assistance to others?	4 helped	will show over time & when students go over time but will let them finish
How many teachers shared their LMS efforts?	3 pictures for themselves and for each course	worked on setting notifications
Suggestions for adjustments to the next training session	none today	

Teacher one teacher came to speak to me personally. She's really appreciating the targeted training because she knows nothing

teacher stopped me in the hall to say she likes the training. He's learned some things he didn't know even though he uses Schoology

LMS Interview Instrument

1. Why do you use an LMS? If you do not use one, why not?

yes. I use edmodo because it's what I know and the schoology roll out had so many problems.

2. How helpful was Training Session 1 (2, 3) for you in developing your courses on the Schoology LMS? it was pretty helpful. I saw a lot of useful ways to use it with my students

   a. Was the design of the PD helpful in engaging you in the topics presented during the workshops?

yes. Since it started with the basics and ~~added~~ built on from there. The personal resources tools seemed really useful since I like to store materials as I find or create them

3. What are the differences in your opinion about the LMS after the training?

I have an improved view of Schoology

4. How often do you plan to use the LMS now as compared to the past or prior to the training?

   Why or why not?

I may stay with edmodo because all of my stuff is already there and I'm not sure if the district will continue to pay for Schoology. I'm worried about losing my content if that happens.

LMS Interview Instrument

1. Why do you use an LMS? If you do not use one, why not?

The primary reason is the access away from school that it provides for children. They can depend on consistent postings of assignments, notes, and links for enrichment. It also helps with preparations for modernizing your course every year.

2. How helpful was Training Session 1 (2, 3) for you in developing your courses on the Schoology LMS? They were very helpful for me, a recent neophyte to LMS. The student (Hbaine ~~Hne~~) shared many efficacious routines and what seemed like "insider" tips. The most helpful was session 2.

   a. Was the design of the PD helpful in engaging you in the topics presented during the workshops? That was my least favorite thing. Maybe some pre-set ~~so~~ notes to look at before and we work on a project/assignment while you (Hmg ~~me~~) facilitate it.

3. What are the differences in your opinion about the LMS after the training?

It was more positive for sure because of the increased functionality of the software for me. However, many times having students on our LMS simultaneously caused severe slowing or freezing of machines. This really creates a barrier to more effective use of the Software.

4. How often do you plan to use the LMS now as compared to the past or prior to the training? Why or why not?

I am going to use it a lot more. Next year I plan to flip my classroom. So having all these lessons and folders online will really be a big help.