A CASE STUDY OF THE INTEGRATION OF TECHNOLOGY AND INSTRUCTION
IN A RURAL MIDWESTERN SCHOOL DISTRICT

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IN A RURAL MIDWESTERN SCHOOL DISTRICT

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TABLE OF CONTENTS

ACKNOWLEDGEMENTS ................................................................. ii

LIST OF TABLES ................................................................. vii

LIST OF FIGURES ................................................................. viii

ABSTRACT ................................................................................ ix

CHAPTER

1. INTRODUCTION TO THE STUDY ............................................. 1
   Conceptual Framework
   Constructivist Research Paradigm
   Review of Related Literature
      Adult Learning Theory
      Professional Development
      Integration of Instruction and Technology
      Knowing-Doing Gap
   Problem Statement
   Research Purpose
   Research Questions
   Design and Methods
   Assumptions
   Definition of Key Terms
   Significance of the Study
   Summary

2. REVIEW OF RELATED LITERATURE .......................................... 18
   Adult Learning Theory
   Professional Development
      Effective Professional Development
      Professional Development and Adult Learning
   The Integration of Instruction and Technology
   The Knowing-Doing Gap
   Summary

3. RESEARCH DESIGN AND METHODOLOGY .............................. 46
   Research Purpose
   Research Questions
   Design for the Study
Participants and Sampling Procedures
Data Collection
   Data Collection Procedures
   Interviews
   Focus Group
   Observation
   Document Collection
Human Subjects Protection and Other Ethical Considerations
Data Analysis
Role of the Researcher
   Trustworthiness
   Credibility
   Dependability
   Transferability
   Confirmability
Limitations and Delimitations
Assumptions
Ethical Principles
Summary

4. RESEARCH FINDINGS

Garden Metaphor
Setting for the Case Study
Relationship of Researcher to Research
Description of Participants
   Teachers
   Directors
   Administrators
Interview Setting
Interviews and Focus Group
Document Collection
Data Analysis
Findings from the Data
   Theme 1: Integration of technology and instruction
   Theme 2: Professional Development
   Theme 3: Accountability
   Theme 4: Barriers Contributing to the Knowing-Doing Gap
Follow-up Questions
Research Findings
   Time
   Professional Development
   Hardware
   Personal Instruction
   Relevancy
   Support
Answering the Research Questions
Summary

5. DISCUSSION AND IMPLICATIONS .......................................................... 124

Discussion of Findings
Adult Learning Theory
Professional Development
The Knowing-Doing Gap
Limitations of the Study
Implications for Practice
Implications for Future Research
Conclusion

REFERENCES .................................................................................................. 141

APPENDIXES

A. SUPERINTENDENT'S LETTER OF PERMISSION .......................... 154
B. SUPERINTENDENT'S LETTER TO STAFF ................................. 155
C. INITIAL CONTACT EMAIL .............................................................. 156
D. INFORMED LETTER OF CONSENT .................................................... 157
E. TEACHER INTERVIEW QUESTIONS .............................................. 160
F. ADMINISTRATORS' FOCUS GROUP QUESTIONS ..................... 163
G. DIRECTORS' INTERVIEW QUESTIONS ........................................... 164
H. FOLLOW-UP QUESTIONS ................................................................. 165
I. TECHNOLOGY DEPARTMENT INFORMATION .......................... 166
J. PROMETHEAN BOARD DISTRICT INVENTORY ....................... 167
K. APPLE TECHNOLOGY PROFILE SURVEY ................................. 170
L. THREE YEAR HISTORY OF PROFESSIONAL DEVELOPMENT .... 176
M. 2012-2014 DISTRICT STRATEGIC PLAN .................................. 177
N. 2014-2016 DISTRICT STRATEGIC PLAN ................................. 180
O. INSTRUCTIONAL ROUNDS PROTOCOL ............................................... 184

P. COLLECTION OF ARTIFACTS ....................................................... 188

VITA ................................................................................................................... 189
LIST OF TABLES

Table

1. Levels of Technology Integration ..........................................................50
2. Number of teachers and administrators in District A...............................66
3. Description of participants......................................................................69
4. SAMR table with definitions, explanations, and examples of implementation...84
5. Themes and Subthemes........................................................................126
LIST OF FIGURES

Figure

1. Concept map of the case study regarding integration of technology and instruction………………………………………………………………….12

2. Characteristics of adults as learners (CAL) model……………………………………..21

3. Guskey's alternative model of teacher change………………………………………29

4. Triangulation to support the data……………………………………………………74
A CASE STUDY OF THE INTEGRATION OF TECHNOLOGY AND INSTRUCTION IN A RURAL MIDWESTERN SCHOOL DISTRICT

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ABSTRACT

The purpose of this qualitative case study was to examine teachers' and administrators' perceptions of the integration of instruction and technology in a small Midwestern school district and to discover factors that impede or contribute to this process. A review of literature provides information on the importance of adhering to the principles of adult learning when delivering professional development for integrating technology and instruction to teachers. An examination of professional development practices found the needs of adult learners were not always considered during delivery. Literature about the knowing-doing gap revealed ways to assist teachers in adopting new processes with confidence and motivation, thus alleviating barriers to implementation. This study used semi-structured interviews with teachers, a focus group of administrators, document review, and observation with field notes to determine themes district leaders can use to understand how teachers and administrators view and experience professional development and practices concerning technology. The themes were: a) Integration of Technology and Instruction; (b) Professional Development; (c) Accountability; and (d) Barriers Contributing to the Knowing-Doing Gap. The findings provided district administration with implications for practice, which will allow teachers and leaders to develop a shared vision of the technological practices in the classroom and may aid in decisions regarding software, hardware, professional development, and level of support.
CHAPTER ONE

INTRODUCTION TO THE STUDY

Few could argue technology has affected each and every aspect of our lives. Twenty years ago, who would ever have thought one would be able to talk with someone in another country via a small, electronic box while carrying out mundane tasks, like filling the car with gas or walking out to get the mail? Or that one could email, surf the Internet, send messages, and take pictures and videos with a phone and then upload them to a place where anyone and everyone in the world can view them? Technology has dramatically changed the way we live and work, and most would agree the ability to use technology is critical not just in our personal and work lives, but also in our children’s classrooms.

Why is the task of changing pedagogy with the use of technology often begun with high expectations, but in actual practice often becomes disappointing and frustrating? To effect change, schools across the nation boast of increasing Internet accessibility, computer labs, and one-to-one iPad or laptop initiatives for students’ use. Livingston (2006) estimated that around 14,000 public schools have implemented one-to-one programs. But simply adding hardware and software is not enough; real reform calls for using educational technology to improve teaching and learning.

The purpose of this case study is to examine the integration of instruction and technology in a small Midwestern school district. Chapter one provides background information about adult learning theory, professional development, history of the integration of instruction and technology, the knowing-doing gap; statement of the problem and purpose of the research; research questions and methodologies used to
answer the research questions; significance of the study; definition of key terms used in
the research; and limitations and delimitations of the study.

Conceptual Framework

Creswell (2009) wrote that researchers typically use a theoretical lens or
perspective when conducting qualitative research. This lens then shapes the form
questions will take, determines the method of data collection and analysis, and results in a
recommendation for change. The conceptual framework for this study relied upon the
constructivist research paradigm, adult learning theory, professional development in K-
12, history of the integration of instruction and technology, and the knowing-doing gap.

Constructivist Research Paradigm

A constructivist researcher believes multiple realities are constructed by
individuals from their personal experiences in the world (Hatch, 2002). Knowledge
gained within a constructivist paradigm is often in the form of a case study that describes
the participants’ interpretations and accounts (Hatch, 2002). While conducting this case
study, the researcher connected with the participants by interviewing and observing them
in a natural setting. In addition, the researcher looked for disparate, complex viewpoints
and relied upon the participants’ views (Creswell, 2009). The researcher’s intent was to
make sense of the participants’ views by personally gathering information and
interpreting the findings using an inductive approach (Creswell, 2009).

Review of Related Literature

Adult Learning Theory

Andragogy, or the study of adult learners, was originally pioneered by Malcolm
Knowles and is a relatively new field of study (Galbraith & Fouch, 2007). Knowles
identified adults as individuals who perform roles associated with adults and who believe they are responsible for their own lives (Knowles, 1984). Knowles indicated that trainers of adults should incorporate the following characteristics of adults into professional development: autonomous and self-directed, accumulation of life experiences, goal-oriented, relevancy-oriented/immediacy, practical, and respect. Knowles (1984) also outlined six core principles of andragogy based on characteristics found in his study of adult learners:

1. It is important adults understand why they need to learn something before attempting to learn it.

2. Adult learners view themselves as being responsible for their own decisions.

3. Experiences of adults play a large role in determining final outcomes.

4. Adults are ready to learn things that can be applied to their real life situations.

5. Adults exhibit more motivation and orientation to learning when the learning is applicable to their own problems or life tasks.

6. Motivation to learn is a response to external situations. (p. 57-63)

Henschke (2011) wrote that andragogy has much to contribute to understanding how adults learn. Adults are able to analyze learning material and make connections between their own lives and the material. Other areas to be aware of include: adult awareness of the need for learning; the learner’s self-concept; the learner’s experiences; the adult learner's motivation; and the feeling of safety in the learning environment.

McGrath (2009) stated it is imperative adult educators become aware of the needs of adult learners in instruction and make learning more attractive for them. Adult learning theory was used in this case study, as the participants are adults who participate
in professional development related to new technologies available in their school district. This researcher examined the perceptions and beliefs of the participants about their professional development to use and access available technology and their willingness to change their instruction by integrating technology.

Fullan (2001) indicated change fails unless infrastructures and processes are developed that engage teachers in deep meanings concerning new approaches to teaching and learning. These infrastructures and processes have a powerful influence on teachers as adult learners. The process of learning is defined as a “permanent change in behavior or as knowledge acquired by study,” according to Galbraith and Fouch (2007, p. 35). Many learning organizations use some type of professional development to enhance productivity or to train and promote employees, hoping this will result in permanent changes in their behavior or knowledge.

Often, adult educators understand the content to be presented, but they are sometimes unsure of the most effective ways to deliver the information. Educators of adults need to understand the adult learning process to ensure goals are achieved; this requires educators to be aware of what motivates adults to learn, know how adults learn, and be familiar with the varying methods best used to ensure learning (Pereira & Aherne, 2009). Different perspectives on adult learning abound; this researcher focused on andragogy, an adult learning theory which views the individual adult learner as one who is autonomous, free, and growth-oriented (Merriam, 2001a; McGrath, 2009).

**Professional Development**

Professional development – opportunities to enhance knowledge and learn new strategies – is used in schools to enable teachers to investigate, experiment, reflect, discuss, and collaborate with others (Little, 2006). For many decades, teachers (adult learners) have
been asked, as well as required, to acquire knowledge concerning educational reforms, changes in curriculum, state standards and assessments, authentic activities in the classroom, and to integrate technology into their instruction. Geringer (2003) asserted it is not often that teachers are able to assist in selecting and planning these required professional development activities, even though teachers are being asked to change their practice. These changes also include deepening their content knowledge and learning new strategies to use in the classroom.

Despite the importance of staying current on all demands, current methods of professional development are fairly inadequate (Borko, 2004). "Few teachers gain access to…intensive professional learning opportunities" (Little, 2006, p. 1). Teachers are adult learners, and designers of professional development should keep their needs in mind. Knowles, Holton, and Swanson (2005) generated several assumptions about adult learners: adults generally learn what they need to know, so they should be actively engaged in planning their own professional development; adults have a concept of their own life direction, are responsible for their own learning, and they should be active contributors to their own learning; teachers' experiences, backgrounds, learning styles, motivation, and needs must be considered in the learning process; adult learners must be ready to learn, so the stages of a teacher's development should be taken into consideration; adults are problem-oriented, so they will be more motivated to learn if they can readily apply the new information to their current situation; and an atmosphere of collegiality, inclusion, respect, and relevancy will do much to promote internal motivation during professional development.

Guskey (2003) examined thirteen lists of characteristics of effective professional development and concluded there is much variance, and supportive research is somewhat contradictory. Many of the lists included: focusing on content and pedagogical knowledge, sufficient time and resources, collegiality and collaboration, inclusion of evaluation
procedures, alignment with reform initiatives, and site-based, while few listed the importance of analyzing student data to suggest further professional development, or that professional development should be based on research-based evidence of what works. Hunzicker (2010) found "once support for teacher commitment and intrinsic motivation is established, effective professional development engages teachers in learning opportunities that are job-embedded, instructionally-focused, collaborative, and ongoing" (p. 4).

**Integration of Instruction and Technology**

Schools in the United States underwent significant growth in the use of computers throughout the 1980s (Bialo & Sivin-Kachala, 1996). The percentage of schools with one or more computers grew from approximately 18% in 1981 to 95% in 1987 (“U.S. Congress”, 1988). Some of the earliest educational computers used by this researcher were the Apple II and Radio Shack’s TRS-80. These “primitive” machines had no networking capability, nor were they in color or video-ready. The monitors were very small, one had to know some computer language to operate, and the computers supported very basic tasks such as typing or playing a game like Hangman (in black and white). Software was loaded onto one of these early computers through the use of one or several floppy disks into a disk drive. These early educational software programs were primarily for drill and practice; an example would be learning math facts or parts of speech. In the researcher's experience, teachers’ roles in technology primarily consisted of sending students to computer labs to practice answering questions by selecting correct answers in such programs or permitting one student at a time to use a classroom computer.

By the 1990s, educators began to see computers as part of a combination of technology resources, including media, instructional systems, and computer-based support systems. At that point, educational computing became known as educational
technology (Robyler & Doering, 2009). The advent of the Internet in classrooms brought many changes in the nineties. By 1994, 30% of all public elementary schools and 3% of public elementary classrooms had Internet connectivity, and by the year 2001, those numbers increased to 99% of all public schools and 87% of public classrooms ("Science and engineering," 2004). This connectivity allowed students to change their processes and products as their opportunities to research and communicate became synchronous and asynchronous with sources and peers around the world (Goldsworthy, 1999). Global communication spurs educational change, even if many educators are not ready for it. The use of the Internet expanded throughout the world, and it soon became an invaluable database for education. According to Byous (2007), teachers first learned to use computer hardware, then software applications, and are now at the juncture of learning to integrate technology into their content areas.

Whether or not technology should be used in the classroom is no longer debated; instead, the emphasis is ensuring that technology is integrated into instruction to promote student achievement and future success. This requires educators who are able to learn and apply their knowledge about technology consistently in the classroom. Teachers have identified various barriers to meeting this goal, such as “vision, access, time, assessment, and professional development” (Semary, 2011, p. 1). Additionally, Mueller, Wood, Willoughby, Ross, and Specht (2008) found environmental barriers might include having too few computers in the classroom, equipment issues, and a lack of technical support. Continual advances in computer technology spur a constant change in availability of hardware and software, which challenges teachers to stay abreast of these changes. Even though teachers may seem to be more familiar with technology, they may
not be wholly prepared or may be unable to fully integrate technology into their instruction (Mueller et al., 2008).

Today’s teachers are challenged to prepare the students of today for a world not yet created, for future unknown jobs, and for using technologies yet unheard of. Rather than being the disseminators of knowledge, teachers are being asked to become facilitators and coaches, so they can lead their students through the constant barrage of new technologies and access information in this new learning environment. As adult learners, teachers must learn and understand themselves how to best integrate technology into their curriculum and practice. They must be able to change as they grow in their knowledge of understanding and using technology, adopt best practices in using technology, learn how to embed technology into the curriculum, and facilitate the use of technology in the learning process.

**Knowing-Doing Gap**

Angehern (2004) found “being aware and interested in potential change, and knowing that it would be feasible doesn’t appear to be a sufficient condition to engage a person into action” (p. 3). Even if an adult learner is interested in changing due to knowledge gained, it does not always follow that change will occur. Confidence, as well as motivation, should be considered. Pfeffer and Sutton (2000) discussed a staff’s failure to implement practices that teachers know will help all students and review attempts to overcome these barriers. They believed the gap between knowing and doing is more important than the gap between ignorance and knowing (Pfeffer & Sutton, 2000). Addressing the Knowing-Doing Gap can be key to transformation and is linked to acknowledging basic needs people may have (Angehern, 2004). The basic needs that
should be considered are: confidence and competence; distributive justice/fairness; and procedural justice/fairness. Awareness, understanding, and addressing these needs that may impede progress will enable school leaders to assist teachers in adopting new processes with increased confidence and motivation (Angehern, 2004). This also encourages teachers to identify barriers to learning and doing.

**Problem Statement**

Individuals who ultimately control how technology is used in any classroom are the teachers. Understanding the needs and issues of educators as they endeavor to change their pedagogy to include technology is crucial to understanding the use of technology in education.

Cuban, Fitzpatrick, and Peck (2001) spent seven months conducting a study in two high-tech schools in Silicon Valley during the 1998-1999 school year in an effort to ascertain a complete picture of computer use for instruction. At that time, they found nearly two-thirds to three-fourths of academic teachers in both schools were non-users of technological resources. The researchers concluded that most teachers integrated technology infrequently and in limited ways. They mainly used technology to sustain their common teaching practices.

Judson (2006) wrote the primary research on technology integration in education has focused on the level of computer skills and availability of technology, while there has been limited research on the method and frequency of technology use. A technology-rich district does not necessarily imply a more student-centered technological environment (Cuban et al., 2001). The world has evolved rapidly, and access to technology, technology tools, and professional development in schools has changed. Use of
technology at home has grown, and more and more students who are graduating from college to become teachers grew up in a digital age. As McConnell (2011) suggested, current literature has given us some answers as to how and why teachers use technology, but more research is needed.

With a clientele of technologically savvy students entering their doors, why is it that some teachers effectively use these existing technology tools for teaching and learning and some do not? Why do some teachers in a technology rich school environment choose to effectively integrate technology into the curriculum and others in the same district do not? As the Technology Director of District A commented,

I am so frustrated! If a teacher just asks for a new piece of hardware for students, I get it for them! As long as they’re going to use it in their instruction, I will go to the end of the earth to get them what they need! But I have some teachers who have never even attempted to use the Smartboard in their classroom! Why? Why won’t they just use it? (Technology Director of District A, personal communication, February 10, 2013).

It is important to understand how teachers as adult learners acquire and use knowledge to integrate technology into the curriculum. In this way, school leaders, such as the Technology Director, will be able to determine more effective professional development to assist teachers in the use of educational technology. After further discussion, the district asked this researcher to embark on a journey to discover why, in this small Midwestern school district with cutting edge technology, some teachers readily integrate technology into their instruction, and some teachers are still reluctant to use available software, hardware, or the Internet throughout their curriculum.
Research Purpose

The purpose of this study was to provide a rural Midwestern school district with information regarding the perceptions of teachers and administrators about the integration of technology and instruction. This study sought to discover barriers and supports regarding the integration of technology and instruction. Knowledge of these factors may assist school leaders in guiding teachers as adult learners to increase integration of technology in the curriculum to further student education. The researcher conducted teacher and central office staff interviews and an administrator focus group to better understand current practice and beliefs about the use of technology in this district. School documents were also analyzed to increase the scope of the study. Although this study was limited to one small Midwestern district, these findings may add and strengthen the body of current literature on technology integration in education. Figure 1 portrays the components of the study.
For the past several decades, an emphasis in education has been on providing professional development to teachers in integrating technology and instruction. Teachers in District A have had many forms of professional development in embedding technology, as well as access to hardware, software, and the Internet, but some still choose not to embed it in their instruction.

Student achievement has been directly correlated with using technology in the classroom to supplement good instruction. Students who do not receive this type of instruction will not be prepared for success after high school.

The district asked this researcher to embark on a journey to discover why, in a district with cutting edge technology, some teachers readily integrate technology into their instruction, and some teachers are still reluctant to use software, hardware, or the Internet throughout their curriculum.

The purpose of this qualitative case study was to identify factors that impede or contribute to the integration of technology and instruction in a rural Midwestern school district and also to identify teachers’ desired supports in integrating technology and instruction.

Central office administrators and teachers will be interviewed, and building administrators will be part of a focus group.

Data on beliefs, attitudes, preferences, and practices about using technology to supplement instruction will be gathered through interviews, a focus group, and document analysis.

All data will be triangulated, and open coding will be used to uncover specific themes and conclusions.

The overall focus is on adult learning, while professional development, integrating technology and instruction, and the knowing-doing gap are examined in light of their effect on why teachers do or do not integrate instruction and technology.

A limitation is the self-selection process, as gender and age may not be represented.

**Figure 1.** Concept map of the case study regarding integration of technology and instruction.
Research Questions

To address the purpose of the study, the overarching question was “What are teachers’ and administrators' perceptions of effective integration of technology and instruction?” Two additional research questions were used to guide the study and access knowledge about teachers’ and administrators’ views on the integration of technology and instruction.

1. What factors impede or contribute to teachers effectively integrating technology and instruction in District A?
2. What are the needs of K-12 teachers in District A in effectively integrating technology and instruction?

Design and Methods

A qualitative study was conducted because it explores and attempts to understand meaning ascribed to a social or human problem (Creswell, 2009). This process involves questions and procedures involving data collected in the participant’s setting, inductively examining data, and then interpreting the meaning of the data (Creswell, 2009). The research design of a descriptive case study emerged due to a request from the district concerning a problem of practice in integrating technology and instruction. The district wanted to know teachers' and administrators' perceptions of the integration of instruction and technology, and what supports were needed to improve integration. In a case study, “the researcher explores in depth a program, event, activity, process, or one or more individuals,” (Creswell, 2009, p. 13). Yin (2009) recommended using the case study method if the researcher wanted to “understand a real-life phenomenon in depth” (p. 18).
The researcher used semi-structured interviews, a focus group, and observation with field notes. These were triangulated with analysis of unobtrusive documents, and all data was coded to allow for emerging themes in an inductive approach (Creswell, 2009).

Assumptions

Every researcher begins a study with a certain number of assumptions. In this study, an assumption was that district faculty would be interested in the study, would be willing to give of their time, and would participate honestly in focus groups and interviews due to the confidential, risk-free nature of the setting. Also, the researcher made the assumption that she would be able to carry out the study in an objective, unbiased manner, even though integrating technology in curriculum has been a lifelong commitment of hers. Another assumption was the research would encourage District A to embrace changes that could alleviate barriers to integration of technology and instruction and meet needs of teachers in the process.

Definition of Key Terms

Creswell (2009) indicated that identifying and defining terms to assist readers in understanding a proposed research project adds precision to a study.

**Andragogy.** Andragogy is the art and science of helping adults learn (Knowles, 1980, p. 43).

**Axial coding.** Identification of connecting patterns within data (Creswell, 2009).

**Coding.** "Coding is the process of organizing the material into chunks or segments of text in order to develop a general meaning of each segment" (Creswell, 2009, p. 227).
Educational technology. For this study, educational technology includes desktop computers or laptops, iPads or iPhones, peripherals, such as scanners, digital cameras, mice, printers, software, and the Internet and the various websites it encompasses.

Integration of technology and instruction. This involves the infusion of technology as a tool to enhance the learning in a content area or multidisciplinary setting that allows students to obtain information in a timely manner, analyze and synthesize the information, and present it professionally (“Technology in schools,” 2002).

One-to-one program. School systems purchase laptop computers or iPads for every student (Goodwin, 2008).

Open coding. Organizing material into smaller segments before determining meaning from the text (Creswell, 2009).

Podstock. A three-day technology integration conference presented by Essdack, held each summer in Wichita, KS (Essdack, 2014).

Promethean Board. An interactive whiteboard system designed to focus attention and increase engagement in the lesson ("Interactive whiteboards", 2014).

Significance of the Study

The experiences of students – how they learn, communicate, and engage in the community and the world – are extremely different than those of generations past (Kleiman, 2004). How do we meet the needs of these students who have grown up in a technology-rich world, with the Internet, email, instant messaging, cell phones, DVDs, and digital music/videos at their fingertips?
In many places across the United States, progress in integrating technology and instruction has been limited, and much technology lies unused in schools (Kleiman, 2004). This study may provide school leaders one view of the complex relationship between teachers’ beliefs about technology integration and their actual practice in technology-rich classrooms. It is important that district leaders understand how teachers view and experience educational training and practices concerning technology. It will allow teachers and leaders to develop a shared vision of the technological practices in the classroom throughout the district, which will aid in future decision-making regarding software, hardware, professional development, and the level of support needed by teachers.

The realities of teacher and student experiences must be considered when making decisions about technology tools that innovate and improve the classroom experience. School leadership can significantly affect the effective use of technology for every teacher (Bill and Melinda Gates Foundation, 2012). The evidence gathered in this case study added to the small body of literature concerning successful integration of technology in K-12 classrooms.

**Summary**

Integration of technology and instruction is needed in schools today to ensure student success and achievement. Adult learning theory, professional development, the integration of technology and instruction, and the knowing-doing gap were examined. The leaders in a small, Midwestern public school district benefited from a case study conducted to understand factors contributing to use or nonuse of the integration of instruction and technology and teachers’ needs in integrating technology into the
curriculum. Assumptions were identified and explained along with definitions of key terms. The significance of the study was explained; the study contributed to the goal of local administrators to assist their teachers in integrating technology into their instruction, as well as contributed to the body of literature regarding this topic.
"Implementing computers in the classroom requires more than mechanical change by the teacher. There is the extremely important element of personal change" (Adams, 1985, pg. 52).

The purpose of this study was to explore the perceptions of teachers and administrators in a small Midwestern school district that pertain to integrating instruction and technology. This literature review begins by examining adult learning theory, which is then followed by a review of professional development, the integration of instruction and technology, and the knowing-doing gap.

**Adult Learning Theory**

Andragogy, or the study of adult learners, was originally pioneered by Malcolm Knowles and is a relatively new field of study (Galbraith & Fouch, 2007). Knowles (1984) identified adults as individuals who perform roles commonly associated with adults and who believe they are responsible for their own lives. Knowles (1980) believed andragogy defined adult learners as being autonomous, free, and growth-oriented. He made six basic assumptions about adult learners:

1. **Self-concept:** Adults have moved from being dependent to being self-directed. Teachers of adult learners should encourage and nurture this movement. Although adult learners may be temporarily dependent in specific situations, they typically have a deep need to be self-direction.

2. **Experience:** Adults have amassed experiences that contribute to learning. This reservoir of experiences makes learning more meaningful. Teachers
should provide adult learners with hands-on experiences, such as lab experiments, group discussion, problem-solving, and field experiences.

3. Readiness to learn: Adults are more interested in accumulating knowledge that has immediate relevance to their personal lives or jobs. The teacher should provide an environment and tools and procedures that encourage adult learners to discover their need to know. Learning situations should be based on life-application and sequenced according to readiness.

4. Orientation to learning: Adults are more problem-centered than subject-centered. Adult learners want to apply their performance-centered learning to life problems in order to be more effective.

5. Motivation to learn: Mature adults are more motivated internally due to a need for self-esteem, curiosity, their desire to achieve, and their satisfaction due to accomplishments.

6. Relevance: Adults wish to know why they need to learn.

The learner, the context of the learning experience, and the nature of learning itself should always be considered when teaching adult learners.

Teachers of adults should incorporate the following characteristics of adults into training: autonomous and self-directed, accumulation of life experiences, goal-oriented, relevancy-oriented/immediacy, practical, and respect (Galbraith & Fouch, 2007).

1. Autonomous and self-directed. Adult should be involved in their own learning; the discerning instructor seeks the participants’ perspectives on the topics and understands their interests (Pereira & Aherne, 2009). The adult learners should understand how the instruction would help them achieve their
own learning goals. Merriam (2001a) believed adult learners are capable of
directing, “or at least assisting in planning their own learning” (p. 5).

2. Accumulation of life experiences. Each adult learner should be able to
connect his/her past experiences and knowledge that are relevant to the
current topic of instruction. They should also be able to “relate theories and
concepts...recognize the value of experience in learning” (Pereira & Aherne,
p. 126). Caffarella (2002) indicated adults learn best when their background
of experience and knowledge is appreciated and recognized.

3. Goal orientated. It is important that an educational program for adults be well
organized and defined. The goals for learning as well as the course objective
should be explicitly explained to adult learners (Pereira & Aherne, 2009).

4. Relevancy orientated. Pereira and Aherne (2009) indicated that adults must be
able to see how learning is applicable to their work and relayed in a familiar
setting.

5. Practical. Learning must be practical and useful for adults, and they must be
made aware of how the knowledge will be used in their “daily practice”
pragmatic in their learning and want to apply learning to their present
situation.

6. Need to be respected. The instructor should acknowledge the immense
amount of experiences the adult learner brings to the learning. Adult learners
should always be treated as equals in this experience, and they must be
allowed free expression of their opinions (Pereira & Aherne, 2009).
Cross (1981) created the Characteristics of Adults as Learners (CAL) when she analyzed lifelong learning programs and integrated Knowles’ framework of andragogy. The principles of CAL reflected that adult learning programs should 1) use the experience of participants to positively affect the program; 2) be able to adapt to the age of participants; 3) challenge adult learners to advance in personal development; and 4) offer choices as to availability and organization of learning programs. In analyzing lifelong adult learning programs, Cross devised the following model for depicting the characteristics of adult learners:

![Figure 2. Characteristics of adults as learners (CAL) model (Cross, 1981).](image)

This figure illustrates two classes of variables and is used to provide guidelines for adult learning programs. Cross believed the characteristics of adults at different ages should be taken into consideration when providing professional development. In Figure 2, the first dimension of personal characteristics, aging, could result in decreased physical capabilities, such as reaction time, but could result in increased intelligence abilities, such as decision-making or reasoning. The life phases and developmental stages of adults...
involve plateaus and many transitions that should be considered. The situational characteristic, part-time vs. full-time learning, should be taken into consideration when deciding schedules, locations, and procedures, while the second variable, voluntary vs. compulsory learning, pertains to the self-directed, problem-centered aspect of most adult learning (Cross, 1981).

Cross (1981) attempted to integrate the CAL model with andragogy, citing four principles for teaching adults: 1) capitalize on the experience of the adult participants; 2) adapt to any limitations due to the age of the participants; 3) challenge adult learners to move to advance their own personal development; and 4) give as much choice as possible in availability and organization of the learning program.

While there are some critics of andragogy, Henschke (2011) wrote that andragogy has much to contribute to understanding how adults learn. Vella (2002) maintained twelve principles are important in the dialogue with adults:

1. It is important to consider the relevance and application of the content to adults, as part of an initial needs assessment.
2. A safe context for learning is an absolute necessity.
3. The third principle, a sound relationship between trainer and student, leads to establishing an atmosphere of curiosity and inquiry.
4. The sequence of the information and reinforcement must be worthwhile.
5. The fifth principle indicates that learning should be action coupled with reflection, a form of praxis.
6. The adult learner as a decision maker must be respected.
7. Adult learning should involve ideas, feelings, and actions.
8. Adult learning should be immediate.

9. Roles and role development should be clear.

10. Teamwork allows adults to work and learn collaboratively.

11. Engagement allows adult learners to be involved in strategic planning sessions.

12. Demonstrating that knowledge has been gained through demonstration of language and reasoning encourages accountability.

Researchers have examined and re-examined adult learning theory, especially the work of Knowles. Merriam (2008) encapsulated much of the recent thinking on adult learning theory by stating adult learning theory is so complex, it cannot be reduced to a single or simple explanation. There must be increased attention paid to the context of learning for adults, as it is “a multidimensional phenomenon, not just a cognitive activity” (Merriam, 2008, p. 98), so the spotlight has shifted from researching the individual learning process to including the context of learning as well. "Adult learning takes place in context, where tools and the context intersect with interaction among people" (Merriam, 2001b, p. 43).

Based on the recognition that adult learning takes place in various contexts, Merriam (2008) recommended several strategies when working with adult learners. These include: 1) encourage reflection and dialogue; 2) connecting new information with prior knowledge; and 3) expand instruction to include “creative and artistic modes of inquiry” (p. 98).
Professional Development

Professional development in education generally refers to "ongoing learning opportunities available to teachers and other education personnel through their schools and districts" ("Professional development," 2004). Guskey (2002) stated professional development consisted of "systematic efforts to bring about change in the classroom practices of teachers, in their attitudes and beliefs, and in the learning outcomes of students" (p. 1). These efforts have not always been in existence.

Teachers in the 19th century were poorly educated and were required to attend institutes on motivation or subject matter (Neil, 1986). At the turn of the century, teaching was beginning to be professionalized as teacher education schools gradually appeared. In the 20s and 40s, teacher in-service was focused on rectifying deficits in teachers' personal cultures and background. Neil (1986) described professional development in the 1950s as consisting primarily of workshops conducted with a "resource person and a curriculum director" (p. 6) that were directed at returning to academic content from what was known as progressive education.

The need to assist school staff in teaching a diverse student population came to the forefront in the 1960s. Lyndon Johnson's War on Poverty began, and the Head Start program was initiated to work with poor preschool children to help them catch up with their more affluent counterparts (Neil, 1986). The Elementary and Secondary Education Act, also passed in this decade, provided funding to attract young teachers to high-poverty areas and for professional development. Even with federal funding available, in-service education for teachers declined during this time in quality and quantity. Connelly and Elbaz (1980) attributed this to a change in emphasis from classroom practice to
programming on a large scale, emphasizing curriculum planning rather than teacher evaluation, being ignorant of what a teacher's role truly is, and management that ignores underlying value assumptions.

According to Grant, Young, and Montbriand (2001), emphasis on professional development during the 1970s and 1980s was associated with B. F. Skinner's behaviorist principles. Learning was divided into discrete skills, and immediate feedback was given after extensive practice. This common approach to professional development “requires little in the way of intellectual struggle or emotional engagement, and takes only superficial account of teachers’ histories or circumstances” (Little, 1993, p. 22).

This type of teaching gave way to packaged programs that built on individual skills. Students moved through these level by level, improving skills in specific areas. The emphasis on behaviorism dwindled towards the end of the 1970s. After *A Nation at Risk* (National Commission of Excellence in Education, 1983) was published, the importance of improving quality of instruction became one of the primary focuses (Grant, et al., 2001).

Improving quality of instruction and student learning through teacher professional development has long been recognized as an important piece of the effort by the federal government, states, districts, schools, and other groups (Choy, Chen, Buggarin, & Broughman, 2006). During the 1990s, experts began to believe the commonly held short, stand-alone workshops lacked focus, intensity, and continuity needed to actually change practice in the classroom and inadequately prepared teachers (Little, 1993). Hawley and Valli (2001) asserted professional development should consist of an overall plan, encourage teacher collaboration at the building level, involve teachers in planning, reflect
the needs of students and teachers, and be evaluated as to teaching practice and student learning.

Teaching in the 21st century demands that teachers are prepared to teach and ignite a love of learning in the diverse learners found in today's classrooms. Reform efforts and standards-based instruction have raised the expectations for students, and consequently, for teachers (Corcoran, 1995). As a result, teachers are being asked to acquire new skills and change some of their practices. Professional development is critical to acquiring new knowledge and producing new knowledge in the field of education. This process begins in educator preparation programs and continues throughout a teacher's career. Geringer (2003) asserted effective professional development bridges the gap between "schools of education and the needs of 21st-century teachers" and "requires the purposeful development of communities of professionals who work together as a force for continuing growth and change" (p. 380).

Professional development is a vital component of any policy that affects teaching and learning. The factor that is most important for student learning is teacher quality (Darling-Hammond & Berry, 1998). Geringer (2003) also believed having a good teacher was crucial to student learning and stated a quality teacher was more important than standards, class size, or amount of funding. Teachers have to increase their content knowledge and become skilled at using new teaching strategies. A way to improve teacher quality is through professional development (Colbert, Brown, Choi, & Thomas, 2008).

Teachers are required to participate frequently in professional development, although they are not always involved in the selection and planning of topics and
activities, and the professional development is not always tied to actual practice. Professional development for teachers typically was activities during a few in-service days each year, but Corcoran (1995) reported this type of professional development was not effective in enhancing teaching. Most professional development was a classic, one size fits all type of model where the information presented was not based on the needs of each teacher (Little, 1995). Lecturing for a few hours was common, and teachers left feeling they had wasted their time. This was a typical response to professional development, and it became the norm over time (Sparks & Hirsh, 2000).

Corcoran (1995) found most districts dispensed professional development activities through formal courses or workshops. For instance, students would be released for a half or full day, and an in-service program that may or may not be relevant to teachers' needs would be held. A guest speaker would speak on a "hot" topic, or several "trainers" would offer a menu of workshops. Teachers generally spent their time listening and may have gleaned a few practical tips or useful materials (Corcoran, 2003). Seldom was there follow-up, and the next in-service may have consisted of totally different topics (Corcoran, 2003). In 2003, Richardson found most professional development in K-12 was a short-term transmission model, which paid little attention to current practices in the school district or classroom, offered little opportunity for teachers to be engaged in the planning of the professional development, and provided little to no follow-up.

Professional development was usually conducted by an outside expert and was considered an efficient and cost-effective way to share a knowledge base and a common vocabulary with a large group of educators (Guskey, 2000). Teachers did generally not
hold this view of professional development. Even though they were contractually obligated to attend in-service days, many considered it to be ineffective and felt their time could be better spent working in their classrooms (Fullan, 1995; Guskey, 1995). In 1995, Little believed passive professional development was ineffective in changing teaching practices, and Killion (2002) asserted only a small percentage of knowledge from training programs is ever brought to bear in the classroom.

Little (2006) asserted professional development has gone through many changes over the last twenty years and has deepened and broadened for many schools and districts. Rather than a model that emphasized acquisition of specific skills and behaviors, today's professional development in many districts has moved to a more complex system of teacher thinking, learning, and practice in specific content. The individualistic view of teacher growth has changed to a view that encourages a collective capacity and strong professional community. The importance of the workplace environment has been re-evaluated. A school that fails to provide an environment conducive to professional learning bears the cost in high teacher turnover and poor instruction. Linking student learning goals to expending professional development resources is often considered in planning professional development (Little, 2006).

As early as 1986, Guskey suggested most professional development efforts were ineffective because they failed to consider: 1) what motivates teachers to engage in professional development; and 2) the process by which change in teachers occurs. Being pragmatic, most teachers tend to desire specific and concrete ideas that relate directly to the daily operation of their classrooms (Fullan & Miles, 1992). Guskey (2002) emphasized a somewhat different model to initiate teacher change. This model suggested
change in teachers' beliefs comes about after they have evidence of improved student learning.

![Diagram](Image)

*Figure 3. Adapted from "Professional Development and Teacher Change," by T. Guskey, 2002, *Teachers and Teaching: Theory and Practice, 8*, p. 383.*

Professional development has been typically held to initiate some kind of change, either in teachers' beliefs, curriculum, or instruction, which will, in turn, result in improved student learning (Guskey, 2002). Little (2006) believed professional development is more effective when the school plays "a powerful, deliberate, and consequential role in teacher learning" (p. 2).

**Effective Professional Development**

Before the implementation of the No Child Left Behind (NCLB) legislation, professional development was typically a "sit and get" model that was provided for teachers in a top-down, non-collaborative manner (Colbert, et al., 2008). NCLB did not encourage teachers to determine their own professional needs or to make decisions regarding the relevancy of professional development to their classrooms. Currently, a two-tiered system existed in professional development (Sparks, 2004). Tier 1 focused on professional learning communities, and Tier 2 consisted of scripts and mandates. Tier 2 included a tightly structured format that was used in many low-performing schools, while
high performing schools offered teachers some flexibility in their professional
development experiences.

Tier 1 professional development reflected critical characteristics identified by
recent studies, such as focusing on content knowledge, active learning, and coherence
with other learning activities, while traditional Tier 2 structural features such as
workshop and seminars were replaced with new models such as collaborating,
networking, mentoring, peer observation and coaching (Garet, Porter, Desimone, Birman,
& Yoon, 2001).

Birman, Desimone, Porter, and Garet (2000) conducted a national survey in 1999
to determine the effectiveness of professional development with over 1000 teachers who
participated in the Eisenhower Professional Development Program. The program was
part of Title II and was funded at $335 million in 1999. The researchers also conducted
six exploratory case studies in five different states. Their national evaluation focused on
developing teachers' knowledge and skills in math and science, in particular. From the
literature and survey data, the researchers discovered three structural features that set the
stage for professional development: form, duration, and participation. Form
encompasses the structure of the activity, i.e., study group, mentoring relationship,
committee. Duration is the number of hours and days teachers are involved in the
activity. Participation asks if the teachers are from different schools or the same school,
department, or grade, and did they participate collectively or individually.

Three features were also identified that assisted in identifying the processes that
take place during professional development: content focus, active learning, and coherence
(Birman, et al., 2000). Content focus tells how much the activity focused on improving
content knowledge. Active learning involves the opportunity for teachers to become engaged in meaningfully analyzing their own teaching and learning through reviewing student work or obtaining feedback on their teaching. Coherence is determined by the amount of communication among teachers and whether or not they are encouraged to incorporate experiences that are consistent with their goals and are aligned with state standards and assessments. The researchers hypothesized that professional development that included the previous six features would "enhance the knowledge and skills of participating teachers and improve their classroom teaching practice" (Birman, et al., 2000, p. 29.)

Birman et al. (2000) found the structural features affect the core features and, in turn, the core features determine how successful the professional development experience is in "increasing teacher-reported growth in knowledge and skills and changes in teaching practice" (p. 29). They discovered when traditional forms of activities, such as workshops, are longer, they have better core features and are more effective. The researchers also found several advantages of collective participation. Teachers are able to discuss ideas and problems that arise during the professional development activity and integrate their learning with other instructional content. Collective participation also enables teachers in the same school or same grade to develop common understandings.

One form of professional development studied was half to full day in-service activities by grade level. Teacher-leaders served as mentors in teachers' classrooms and aided them with instructional practices and hands-on activities to improve their skills. The leaders planned with the teachers, team taught, and assisted in gathering supplies. The leaders and teachers had time during the school day to provide and receive feedback
Professional development that included active learning opportunities like these was reported by teachers to lead to increased knowledge and skills and changed their classroom practice. Another form of professional development that showed increased learning by teachers included in-house facilitators who coached and supported teachers in the classroom by demonstrating lessons and assisting with planning. This led to pre-lesson discussion and post-lesson feedback (Birman, et al., 2000).

The researchers found activities of a reform type are more effective just because they are longer, have more focus on content, opportunities to actively engage, and coherence (Birman, et al., 2000). Shulman (1987) regarded content knowledge as the most important aspect of effective professional development. Activities of a longer duration have more opportunities for content focus, active learning, and coherence than shorter activities. Participation by teachers from the same department, school, or grade encourages active learning and coherence with other activities. In the study, teachers reported the focus on content knowledge was directly related to an increase in skills and knowledge. An example of this focus would be to target a specific subject area or a specific teaching method, such as creating science curriculum kits with specific materials and instructions. The researchers also found active learning encouraged teachers to be more engaged in discussion, planning, and practice during the professional development activity. Examples of active learning included: simulated lessons, presenting a demonstration, observing teaching by a peer, and keeping a journal (Birman, et al., 2000).

Critics of professional development often believe activities are disconnected from each other and are not likely to be effective unless it is a "coherent part of a wider set of
opportunities for teacher learning and development (Birman, et al., 2000, p. 31). Activities are coherent when they are "consistent with teacher goals, build on earlier activities, and involve teachers in discussing their experiences with other teachers and administrators in the school" (Birman, et al., 2000, p. 31) and also are aligned with local, state, and national standards and assessments.

Traditional professional development approaches can be fragmented, inefficient, unproductive, unrelated to classroom practice, and lacking in intensity and follow-up. Effective professional development does much to address these issues (Bull et al., 1994; Corcoran, 1995; "Professional Development", 1994). Effective professional development is ongoing; it includes training, practice, and feedback; opportunities for individual reflection and group inquiry into practice; and coaching or other follow-up procedures; is school-based and embedded in teacher work; is collaborative, provides opportunities for teachers to interact with peers; focuses on student learning, which should, in part, guide assessment of its effectiveness; encourages and supports school-based and teacher initiatives; is rooted in the knowledge base for teaching; incorporates constructivist approaches to teaching and learning; recognizes teachers as professionals and adult learners; provides adequate time and follow-up support; and is accessible and inclusive. (Abdal-Haqq, 1996, p. 2)

Professional Development and Adult Learning

Since professional development is an expected experience in today's schools, understanding the characteristics of adult learners is extremely important (Hunzicker, 2010). Most adult learners can be said to be experienced, self-directed, ready to learn,
intrinsically motivated, and task-oriented (Knowles, 1983). They prefer to have a voice as to the direction and pace of their learning. Their life experiences are used to make meaning of any new information. Adult learners tend to be motivated by any opportunity to learn how to solve problems that are directly related to their lives (Hunzicker, 2010). As Knowles (1983) also indicated, adults are generally more interested in something that has immediate relevance to either their job or their personal life.

Hunzicker (2010) believed school leaders should create appropriate professional development opportunities by understanding the characteristics of adult learners. Teachers need professional development that is supportive, job-embedded, focused on instruction, collaborative in nature, and ongoing. Professional development encourages teacher motivation and commitment to life-long learning; this is accomplished by considering teachers' personal and professional needs, while accommodating any particular learning styles or preferences. Making professional development job-embedded makes it authentic as well as relevant. Activities such as mentoring, coaching, and study groups "engages teachers in learning through their daily activities and responsibilities, and requires that they take time to consider possibilities, try out new ideas, and analyze the effectiveness of their actions" (Hunzicker, 2010, p. 4). Appropriate follow-up activities and reflection that supports professional learning increases perceptions of how relevant or authentic activities are (Tate, 2009).

Effective professional development becomes instructionally focused when subject area content, pedagogy, and student learning outcomes are emphasized (Hunzicker, 2010, p. 5). Teachers need to know their instructional content well and be able to use a wide range of instructional strategies. "The integration of essential teacher knowledge and
skills promotes deep teacher learning and effective changes in practice" (Timperley, Wilson, Barrar, & Fung, 2008). Knowles (1983) believed teachers' behavior is more likely to change when instructionally focused learning is connected to teachers' experiences.

Active and interactive learning experiences encourage collaboration among teachers. Just like students, active engagement that requires any type of physical movement supports attention and memory (Tate, 2009). Teachers remember 90% of what they experience when involved in active engagement during professional development (Tate, 2009). Teachers value opportunities to share problems, ideas, and viewpoints with other adults (Guskey, 1995). In one study, teacher-to-teacher coaching and mentoring was found to result in higher-order learning by students than traditional professional development (Quick, Holtzman, & Chaney, 2009).

Ongoing professional development involving a combination of many contact hours, extended duration, and coherence with clear goals provides teachers many opportunities to interact and practice new skills (Hunzicker, 2010). One study showed even traditional forms of professional development that engaged teachers for many hours had a positive effect on teaching practice and student learning (Quick et al., 2009). Professional development that takes place over time allows teachers to transition from initial concerns about something new to concerns regarding planning and implementation (Loucks-Horsley & Stiegelbauer, 1991). Cambone (1995) believed teachers, as adult learners, needed time to learn, experience, and digest new information and ways of implementing new knowledge.
Gregson and Sturko (2007) conducted a case study to examine a professional development experience for career and technical education teachers to encourage the integration of academics and career and technical education. The professional development was designed around an andragogical framework to reflect principles of adult learning. A climate of respect was created for the teachers by making participation voluntary, not mandatory, and offering in-service or academic credit, and a monetary incentive to assist with registration fees (Gregson & Sturko, 2007). In addition, an environment of valuing and sharing teachers' experience and knowledge was created. To encourage participation, the integration course focused on experimentation and reflection. Teachers were expected to try the learned integration in their classrooms and report back. Teachers were not passive recipients of knowledge from an outside expert. Sharing experiences with peers was a significant part of the professional development. The presenter was successful in connecting teachers' prior experiences with the current learning. Since the course focused on integration strategies, teachers were asked to collaborate on exchanging ideas, to participate in discussions, and to work with another teacher to develop and deliver an integrated lesson (Gregson & Sturko, 2007).

One of the most important benefits reported by the participants in the study was the immediate applicability of the strategies they learned (Gregson & Sturko, 2007). Adults wish to apply new learning to current issues and problems faced in their work and in their lives (Knowles, Holton, & Swanson, 2005). The professional development was meaningful to their current practice.

Gregson and Sturko (2007) believed the most important principle for teachers as adult learners was the empowerment they noted through reflection and action. The
integrated course challenged teachers to examine their own practice and make appropriate changes. After using the strategies and reflecting on student achievement, they were able to share their reflections with their peers. This enabled the teachers to "gain confidence and enhance their pedagogical knowledge" (Gregson & Sturko, 2007, p. 14).

The six principles of adult learning were incorporated into a case study conducted by Gregson and Sturko (2007). This created a successful professional learning environment where intrinsic motivation was encouraged, and teachers were able to reflect on their teaching practices, construct knowledge with their peers, and develop collaborative relationships.

**The Integration of Instruction and Technology**

Today's economy absolutely requires a technologically skilled work force that is adaptable to change and is able to increase productivity (Geringer, 2003). Using technology as a way to enhance productivity is embraced by business, but less than 20% of teachers use technology in the classroom to support student learning (Geringer, 2003). Whether or not teachers should use technology in the classroom is no longer debated; instead, the emphasis is on ensuring technology is integrated into instruction to promote student achievement and future success. Dockstader (1999) stated technology integration is being able to use computers effectively and efficiently in subject areas, so students are able to learn how to use their computer skills in meaningful ways. Wetzel (2002) believed true integration occurs when pedagogy and curriculum changes include technology. Johnson and Johnson (1996) believed the use of technology influences a society, and those who do not become technologically literate will be left behind. Lever-
Duffy, McDonald, and Mizell (2005) determined “educational technology might include media, models, projected and non-projected visual, as well as audio, video and digital media” (p. 4).

Integration requires educators who are able to learn and apply their knowledge about technology consistently in the classroom. K-12 educators today are challenged to utilize the potential of technology in enriching the instruction in the classroom, rather than merely finding and using the latest and greatest technology. Using technology as a tool to engage students in deep thinking and learning is a necessity to support learning. Technology is being used in the classroom to motivate students, to increase knowledge retention, and to encourage creativity in all subject areas. Duhaney and Zemel (2000) found the integration of technology and instruction resulted in more collaborative strategies, thematic teaching, critical thinking and problem-solving activities, and guided inquiry practice.

“Technological advancement has changed the whole meaning of education" (Khim, 2003, p. 2). Students today need to learn and design projects, know how to work in groups, and construct knowledge through hands-on experiences. "The challenge for educators today is not about chasing the latest technologies, but about utilizing the potential of technology to enrich learning” (Khim, 2003, p. 2).

Pisapia (1994) reported research from three Metropolitan Educational Research Consortium's (MERC) studies. Teachers who integrated technology into their instruction became more student-centered rather than teacher-centered. The focus of teaching moved from lecture to working with individual students in an environment of exploration and inquiry. Students were encouraged to work collaboratively on group projects while
the teacher was more of a resource and a guide. In other words, students became participants in taking responsibility for their own learning due to the effects on pedagogy by the use of technology.

The educator must become a facilitator in the use of integrating technology into the curriculum to foster authentic learning. Shattuck (2007) asserted that even though technology is changing rapidly, education is not keeping up with technology and its applications. Today’s teachers benefit from training, support, and access to appropriate hardware and software, as they integrate technology into their classroom activities. “Integrating technology isn’t about using complex technology programs but rather simplifying technology choices and focusing on how technology connects to learning” (Antifaiff, n.d., p. 7). Technology can be used in the classroom to enhance learning; student motivation, information retention, and creativity are increased due to cooperative, project-based assignments and activities. “Few educational innovations hold the promise that technology-supported cooperative learning does. The combination of cooperation and technology has a potential that is changing the way courses are being delivered and instruction is taking place” (Johnson & Johnson, 1996, p. 806).

Despite legislation, technology plans, how-to workshops, and seminars, it is still difficult to make technology integration happen in K-12 schools (Plair, 2008). “The level of knowledge and familiarity with technology can be a factor in the incorporation of technology into the daily lesson planning” (Al-Bataineh, Anderson, Toledo, & Wellinski, 2008, p. 381).

Okojie, Olinzock, and Okojie-Boulder (2006) found there were common barriers to technology integration in education. These included lack of computers, lack of skill in
using computers, and computer intimidation. Teachers have identified various barriers (Semary, 2011). These are: “vision, access, time, assessment, and professional development” (Semary, 2011, p. 1). Other concerns included resistance to change, fear of losing status, instances of superficial adoption, and lack of training for students in use of technology. Mueller, Wood, Willoughby, Ross, and Specht (2008) found that environmental barriers might include having too few computers in the classroom, equipment issues, and a lack of technical support. Shattuck (2007) wrote that educators were hesitant to use technology due to their inherent reluctance, but also because of being responsible for student performance on standardized tests, as NCLB demanded. Continual advances in computer technology spur a constant change in availability of hardware and software, which challenges teachers to stay abreast of these changes. Even though teachers may seem to be more familiar with technology, they may not be wholly prepared or may be unable to fully integrate technology into their instruction (Mueller et al., 2008).

Ertmer (2005) argued teachers’ pedagogical belief systems that impact instruction stands as a barrier to integrating technology. Ertmer (2005) referred to a study by Newman in 2002 that indicated many teachers use technology for email and the Internet, but only a small proportion of teachers knew how to use high-tech tools such as spreadsheets, presentation software, or digital imaging to enhance their lessons. Teachers tend to use technology for other low-level reasons, such as word processing or searching the Internet.

A study by Williams (2007) found five areas in which teachers believed they could use more support: a) general support by administration; b) more professional
development to increase knowledge about computers and integration; c) access to all appropriate resources; d) an established school vision and culture for integration; e) some type of pressure or incentive for integrating technology and instruction.

The Knowing-Doing Gap

“Four frogs are sitting on a log, and one decides to jump off. How many frogs are left? The answer is four, not three, because deciding is not the same as doing” (Fullan, 2003, p. 2). Pfeffer and Sutton (2000) discussed why what we do doesn't always match what we know to do. Although their study was carried out in the corporate world, it is very applicable to education. Professional development that eventually leads to changes in practice and increases student results is a daunting task. The gap between knowing and doing is a challenge that is important to leaders and educators in the goal to increase teacher effectiveness and learning results for all students. "Change research informs us that merely knowing about new practices seldom results in those new methodologies being incorporated into ongoing classroom practices" (Kennedy, 2011, p. 7). Pfeffer and Sutton (2000) discussed a staff’s failure to implement practices that teachers know will help all students and review attempts to overcome these barriers. They believed that the gap between knowing and doing is more important than the gap between ignorance and knowing.

Pfeffer and Sutton (2000) questioned why knowledge of what needs to be done often does not result in the required action or behavior that is consistent with that knowledge. Does it stem from lack of awareness of the need to change, poor staff engagement, or misunderstanding of the rationale for change? Understanding the knowing-doing framework allows a district “the opportunity to leverage action to obtain
maximum benefit” (Washington State Association for Supervision and Curriculum Development, 2011, para. 3). In 2000, Pfeffer and Sutton described five barriers to action based on knowledge:

1. Just having the knowledge is not enough to translate into action; many times ‘talk’ makes it seem as if people are actually taking action. For example, a school may construct a mission statement and exhibit it at the entrance of the school, but no one actually accomplishes the additional work to make sure the mission becomes action.

2. Sometimes, people use their memory as a substitute for thinking, and consequently, do what has continually been done without reflection.

3. An atmosphere of fear and distrust can keep people from taking risks and learning from past mistakes.

4. A system that is very complex, subjective, or contains many separate measurements, may be problematic in the sense that important elements of performance that are difficult to quantify may be missed.

5. Interdependence, trust, and loyalty may be undermined if people feel they are competing with their fellow employees. This can lead to judgments of “winners” and “losers” as people avoid helping each other.

In 2000, Pfeffer and Sutton studied what organizations need to do to eliminate the knowing-doing gap and found by focusing on the following eight themes, organizations could be more effective at turning knowledge into action:

1. Why before how: philosophy is important.

2. Knowing comes from doing and teaching others how.
3. Action counts more than elegant plans and concepts.

4. There is no doing without mistakes.

5. Fear fosters knowing-doing gaps. So drive out fear.

6. Beware of false analogies: fight the competition, not each other.

7. Measure what matters and what can help turn knowledge into action.

8. What leaders do, how they spend their time and how they allocate resources, matters. (pp. 95-105)

Some educators accumulate necessary knowledge, but lack motivation to change (Shulman & Shulman, 2004). They can attend professional development activities, read journal articles, discuss new topics with their colleagues, but are still unable or unwilling to make needed changes. Angehern (2004) found that “being aware and interested in potential change, and knowing that it would be feasible doesn’t appear to be a sufficient condition to engage a person into action” (p. 3). Studies of the use of computers in K-12 education indicated that effectively integrating technology into the curriculum requires a type of change in teachers’ practice (Fuller, 2000). Even if an adult learner is interested in changing due to knowledge gained, it does not always follow that change will occur. Confidence, as well as motivation, should be considered.

Blanchard, Meyer, and Ruhe (2007) suggested three reasons for the knowing-doing gap:

1. Information overload – trying to learn too much at one time.

2. Negative filtering – self-doubt or negative thinking causes one to learn only a small amount of what we see and hear and also contributes to fear of implementing new ideas.
3. Insufficient practice – doing what has been learned cannot be left to chance; a follow-up plan is needed that provides support, structure, and accountability.

Addressing the knowing-doing gap can be key to transformation and is linked to acknowledging basic needs people may have (Angehern, 2004). The basic needs that should be considered are: confidence and competence; distributive justice/fairness; and procedural justice/fairness. Awareness, understanding and addressing these needs that may impede progress will enable school leaders to assist teachers in adopting new processes with increased confidence.

Kennedy (2011) called the knowing-doing gap a "mirror image of the implementation gap, which is the gap between the intended outcomes and actual actions associated with student achievement" (p 7). Kennedy (2011) discussed how change process research could assist teacher leaders in providing supports to move adult learners to action after acquiring new knowledge. Knowledge of a variety of differentiated supports that are aligned to teachers' needs and goals enable leaders to use dialogue and consistent communication, have high expectations, gather evidence so early successes can be acknowledged and celebrated, and keep the focus on goals and strategies. This means being consistent and following a well-planned cycle that includes "planning, implementing, analyzing results, reflecting, and evaluating the application" (Kennedy, 2011, p. 7). Of course, if the measurement practices are insufficient to measure growth, accuracy will suffer. An example would be if the wrong behaviors are measured, or the data tools are insufficient. Feedback is of utmost importance. Feedback that is received too late, or feedback that is vague or not useful impedes improvement. Frequent,
focused, and constructive feedback and staying focused on the right measures is critical to implementation (Kennedy, 2011).

**Summary**

Integrating technology and instruction is an ongoing struggle for K-12 faculty and may not be accomplished without adequate professional development (Abdal-Haqq, 1996). Barriers such as time, education, vision, and access must be overcome with the assistance and support of educational leaders. Much can be accomplished in this regard through taking the characteristics of adult learners into consideration when conducting professional development in the use of technology in the classroom.

Learning for adults must be relevant, practical, and in line with individual goals. Life experiences must be respectfully considered as adult learners take responsibility for their own learning (Knowles, 1980; Pereira & Aherne, 2009). As teachers accumulate knowledge and overcome barriers to using technology, special attention must be given to ensure knowledge has been transformed into practice in the classroom (Hunzicker, 2010).
CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

While much is known about the availability of technology and best practices for embedding technology in today’s curriculum, less is known about why teachers do or do not systematically and frequently use available technology in daily lessons and activities that impact student learning. Many school districts embrace well-articulated goals for enhancing their educational programs through the use of technology; however, many teachers do not take advantage of all technology has to offer. Such is the situation in District A. This researcher was asked to conduct a case study to determine factors based on teachers’ and administrators’ perceptions that contributed or hindered integration of technology and needed supports for teachers.

The methodology employed to tackle the research questions presented in this study is described within this section. The research questions are discussed first. Next is a description of the design for study, including a narrative of the population and sample. A detailed account of the collection method and data analysis procedures is then discussed. The role of the researcher, trustworthiness, limitations and assumptions are included. The chapter concludes in a summary of the methodology.

Research Purpose

Today’s teachers are challenged to prepare the students of today for a world not yet created, for future unknown jobs, and for using new technologies. Teachers are being asked to be more facilitator and coach, rather than disseminators of knowledge. In order for educators to be able to lead their students through the constant barrage of new
technologies and access to information, as adult learners, they must understand themselves how to best integrate technology into their curriculum and practice.

The purpose for this study was to provide a rural Midwestern school district with information regarding the perceptions of teachers and administrators concerning integrating technology and instruction. This study sought explanations for impediments to integration for some teachers and what factors contributed to integration for other teachers. Throughout the study, data was viewed through the lens of adult learning theory. The results of this study added to the body of research available on technology and instructional integration, especially in this rural Midwestern district.

Research Questions

One overarching question guided the researcher and addressed the purpose of the study: What are teachers’ and administrators' perceptions of effective integration of technology and instruction? This led to two additional research questions that were also used to access knowledge about teachers’ and administrators’ views on the integration of technology and instruction.

1. What factors impede or contribute to teachers effectively integrating technology and instruction in District A?

2. What are the needs of K-12 teachers in District A in effectively integrating technology and instruction?

Design for the Study

A research design is a blueprint for connecting empirical data to a study’s research questions and then to its conclusions (Yin, 2009). Creswell (2009) recommended selecting a research design based on the nature of the research problem,
the researcher’s experiences, and the audiences for the study. This researcher used a constructivist worldview, a qualitative strategy, and a descriptive case study. A constructivist assumes individuals seek meaning of the world; it is this meaning the researcher seeks to reveal. A constructivist researcher focuses on the contexts in which people live and work. The intent is to make sense of the meanings others have from their experiences in the world. Constructivists use open-ended questioning as they listen carefully to participants’ responses (Creswell, 2009). The participants in the study become co-constructors in generating knowledge in a collaborative relationship with the researcher and have an opportunity to review and give feedback on findings (Hatch, 2002).

As a constructivist, the researcher chose qualitative research, since the study was in a natural setting where the behavior and events occurred; the researcher was the primary instrument in data collection, descriptive data emerged, and the focus of the research was on participants’ experiences and perceptions (Creswell, 2009). Qualitative research “involves emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively building from particulars to general themes, and the researcher making interpretations of the meaning of the data” (Creswell, 2009, p. 4) in an inductive style. The researcher gathered data from observation, transcriptions of interviews, and unobtrusive data related to the focus of the study (Hatch, 2002).

Since only one district was used in this study, the researcher used a case study format. Data from observation, transcription of interviews, and unobtrusive data are appropriate for the case study method; it is a special kind of qualitative work that
investigates a contextualized contemporary (as opposed to historical) phenomenon in depth within specified boundaries (Yin, 2009).

Case studies become particularly useful where one needs to understand some particular problem or situation in great depth, and where one can identify cases rich in information, rich in the sense that a great deal can be learned from a few examples of the phenomenon in question. (Patton, 1990, p. 26)

Merriam (1988) indicated bounded phenomena could be a process or a social group. The phenomena investigated in this study were teachers either integrating or not integrating technology into their curriculum and teachers’ perceptions concerning district support for integration.

**Participants and Sampling Procedures**

Hatch (2002) recommended identifying gatekeepers who control the setting of interest to the researcher. In this study, the primary gatekeeper was the superintendent. The researcher met with District A’s superintendent to obtain permission to interview volunteers and obtain any necessary documentation to support the study. The superintendent of District A granted permission to conduct this study in a face-to-face visit and in a formal letter (Appendix A). Meetings were held with building administrators to gain their approval to conduct a focus group with administrators and to interview teachers. Since the researcher used interviewing as the primary data collection strategy in constructing the case study, a stratified purposeful sample of possible participants was used. Hatch (2002) described stratified purposeful samples as those that include "individuals selected to represent particular subgroups of interest (p. 98). Stratification ensured specific characteristics were included in the sample (Creswell,
The Technology Director examined the list of possible teacher participants and assigned each to one of the following four subgroups created by Hertz (2011) to assist with stratification.

Table 1

Levels of Technology Integration.

<table>
<thead>
<tr>
<th>Levels of Technology Integration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sparse</td>
<td>Technology is rarely used or available. Students rarely use technology to complete assignments or projects.</td>
</tr>
<tr>
<td>Basic</td>
<td>Technology is used or available occasionally, often in a lab rather than the classroom. Students are comfortable with one or two tools and sometimes use these tools to create projects that show understanding of content.</td>
</tr>
<tr>
<td>Comfortable</td>
<td>Technology is used in the classroom on a fairly regular basis. Students are comfortable with a variety of tools and often use these tools to create projects that show understanding of content.</td>
</tr>
<tr>
<td>Seamless</td>
<td>Students employ technology daily in the classroom using a variety of tools to complete assignments and create projects that show a deep understanding of content.</td>
</tr>
</tbody>
</table>


The superintendent of District A then sent an email (Appendix B) to each teacher and administrator explaining the study and encouraged everyone to participate. She made it very clear responses from teachers at all levels of comfort and expertise with technology would be invaluable to the study. Shortly after the superintendent's letter was sent, the researcher sent an Initial Contact Email (Appendix C) to all teachers in the four buildings in the district asking for their voluntary participation in the study. This email was sent to facilitate a quick, convenient response from all participants, to lessen time
involved by participants, and to decrease the researcher’s costs. Teachers from each building self-selected to be interviewed. The researcher included voluntary participants from all teaching levels and from all levels of technology integration due to stratification, thus ensuring all voices were heard. An Informed Letter of Consent (Appendix D) that addressed confidentiality and anonymity was attached to each email. The Informed Letter of Consent also explained the purpose of the survey, participants’ rights to decline to participate or ability to withdraw at any time, information on anonymity and confidentiality, and directions for contacting the researcher. Interviews were planned for all volunteers until responses became redundant, and it was determined more interviews were unnecessary. Each volunteer was then contacted by email to establish a time and place for a one-on-one interview. The interviews and focus group were conducted over a seven-week period.

**Data Collection**

The qualitative focus is on how participants understand their own lives and experiences, so qualitative researchers try to understand many different realities (Creswell, 2009). Hatch confirmed qualitative research is “a research paradigm which emphasizes inductive, interpretive methods applied to the everyday world which is seen as subjective and socially created” (Hatch, 2002, p. 6). “A qualitative researcher typically gathers multiple forms of data, such as interviews, observations, and documents, rather than rely on a single data source” (Creswell, 2009, p. 175). The researcher is the key instrument for gathering information. This section explains the multiple types of data collected during this study: interviews, focus group, observation, and document analysis.
Data collection in this case study was gathered from a purposefully selected site (Creswell, 2009) that included the district school buildings and central office. Data was collected during the months of February through April, 2014, after human subjects’ protection and ethical considerations were identified. Sources of data included open-ended interviews with teachers, the Technology Director, and the Curriculum Director. Interviews are useful if all participants cannot be directly observed, they can provide historical information, and the researcher has control over the questions (Creswell, 2009). Data was also gathered from one focus group session with administrators, observation at the high school technology training, and an analysis of unobtrusive data. Follow-up questions were sent via email as needed and agreed to by participants. The data collected during the case study was examined inductively within the framework of adult learning theory and the knowing-doing gap to determine the answers to the research questions.

**Data Collection Procedures**

Interview and focus group times and settings were established through email or phone contact. Interviews and the focus group were conducted at a mutually agreed upon time and place in a protected environment. The observation was conducted during a district in-service day when the topic was the use of technology in instruction. Observing social phenomena directly allows one to better understand the context in which phenomena occur (Hatch, 2002). There was also the chance the researcher may learn sensitive information that informants may be reluctant to discuss in an interview. The Technology and Curriculum Directors made documents pertinent to the study available to the researcher for analysis.
Interviews

The semi-structured interviews with teachers at the elementary, middle, and high school levels and the Technology Director and Curriculum Director in District A were conducted in quiet, private spaces on the building sites for approximately one hour each. Semi-structured indicated the use of guiding questions while still being open to the lead of the informant and being able to probe into areas that arise during the interview (Hatch, 2002). These are also known as focused interviews (Yin, 2009). This type of interview may be open-ended and conducted in a conversational manner (Hatch, 2002). Krueger and Casey (2009) discussed protocol for guiding a focus group; their suggestions were also used in conducting the interviews. The Informed Letter of Consent (D) was reviewed and signed, and a copy was made at each participant’s request. The interviewer reviewed the participants’ opportunity to critically read the transcribed interview to make changes. The interviewer stated the recording and the transcript would be kept in a secure location for seven years and gave contact information for any further inquiries or concerns. A list of prepared questions for teachers (Appendix E) was used as a guide; the researcher listened closely to each participant, asked pertinent questions when needed (Hatch, 2002), and recorded the interviews. Each interview was designed to prompt each participant to share their observations and perceptions regarding their experiences concerning professional development practices, opportunities to learn about, use, and collaborate using technology, and their feelings as an adult learner. During the interviews, appropriate probing and clarifying questions were used to explore statements made by the participants in response to questions. The end of the interview was signaled by asking for further information and thanking each participant for volunteering his or
her time in an important endeavor (Hatch, 2002). Each interview was audiotaped and then transcribed verbatim after the interview.

**Focus Group**

A focus group was conducted with administrators, one from each level, at the central office building. As mentioned in the preceding subsection, Kruger and Casey’s (2009) suggestions were followed to ensure the focus group ran smoothly. The Informed Letter of Consent (Appendix D) was signed, and a copy was made for each participant. A guide for questions (Appendix F) was used during the semi-structured, focused, face-to-face discussion. The researcher responded to participants' comments using head nodding, short verbal responses, and humor (Kruger & Casey, 2009). During the focus group, probing and clarifying questions were asked, as needed, to follow a particular line of response. The questions were clear and open-ended and contained familiar language for interviews (Fink, 2009). At the end of the group, the researcher briefly summarized the main points, asked if this summary reflected what was said in the group, and asked, “Have we missed anything?” A sincere thank you was given to each participant. The focus group was audiotaped and transcribed verbatim after the interview.

**Observation**

“The goal of observation is to understand the culture, setting, or social phenomenon being studied from the perspectives of the participants” (Hatch, 2002, p. 72). According to Yin (2009), observational evidence can add additional information to the topic being studied. In this case study, observation of approximately 40 high school teachers at a technology training during an in-service day was invaluable for understanding the context and phenomenon being studied. Hatch (2002) recommended
the constructivist researcher be moderately involved in observational work if participants are to be coconstructors of the findings of the study. The researcher sat at a table with two teachers and a student teacher near the back of the space, but participated minimally. Field notes of the setting, and what people said and did were carefully recorded on a laptop throughout the training.

**Document Collection**

A variety of relevant documents were collected and analyzed to triangulate data with the interviews and focus group. Creswell (2009) indicated unobtrusive documents are useful as written evidence, can be accessed when convenient, and represent thoughtful data compiled by participants. “The most important advantage presented by using multiple sources of evidence is the development of converging lines of inquiry, a process of triangulation and corroboration” (Yin, 2009, p. 115). Unobtrusive data was acquired with the assistance of the Technology Director and the Curriculum Director. Documents collected included: professional development dates and agendas, hardware and software records, the district vision for integrating technology and instruction, the district's strategic plan, an Apple Technology Profile Study, and an instructional rounds protocol. The documents were examined and coded for interrelated themes and used to confirm or further investigate information gleaned from participants in the study.

**Human Subjects Protection and Other Ethical Considerations**

No participants were put at risk, and agreement to the study was obtained from the superintendent of District A before beginning. The Campus Institutional Review Board (IRB) at the University of Missouri reviewed and approved the research plan. The IRB ensures all human subject research conducted at the University of Missouri-
Columbia complies with federal regulations that provide protection against human rights violations (Creswell, 2009).

An Informed Letter of Consent (Appendix D) for participants was created by the researcher and emailed as an attachment with the initial contact letter to possible participants. The form acknowledged participants’ rights would be protected during data collection. The form was explained a second time at the beginning of each interview and the focus group, and any questions were answered. This method gave “participants the opportunity to consider whether or not to consent and minimize the possibility of coercion or undue influence” (Hatch, 2002, p. 63). The researcher informed participants the recordings and the transcriptions would be kept in a secure location for seven years after the study and then destroyed. Participants were asked if further clarification was needed before they signed and dated the form. The researcher kept the original and a copy was made for each participant who desired one.

The researcher protected the privacy and confidentiality of each participant by using pseudonyms. It was important in this case study that teachers felt they were able to speak plainly and freely, especially if their comments were critical of the administration or technology program. Each participant was given the opportunity to later view transcriptions and data for errors and corrections.

**Data Analysis**

In order to make sense of the wealth of data, Creswell (2003) recommended “preparing the data for analysis, conducting different analyses, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data”. The researcher ensured consistency and dependability in the
data by triangulating interviews, the focus group, and the documents with the observation (Merriam, 2002).

The recordings of interviews and the focus group were sent to an outside source for transcription. After the transcriptions were received, the researcher read them while listening to the recordings to ensure accuracy. At this point, statements considered to be important to the research questions were identified, coded, and categorized to identify emerging patterns within the data. An email attaching the transcribed interview was sent to each participant in order to member check the accuracy of the interview. Open and axial coding was used (Creswell, 2009) to code and categorize data from the interviews, the focus group, and the collected documents. Emerging patterns were identified and aligned with the research questions and translated into themes. These were described and interpreted in the findings in Chapter 4.

**Role of the Researcher**

As a previous teacher in District A, the researcher was very aware of the path technology has taken since the first use of computers in the district. The researcher had long-term professional relationships with some administrators and teachers in the district and sincerely wanted the best education possible for attending students. Having been a pioneer and leader in technology use in the district, the researcher acknowledged a bias concerning the benefits for students when technology and instruction are integrated, but made a conscious effort not to let bias influence interpretation of data. The researcher was adamant about masking names of participants to ensure anonymity and erase fears of reprisal.
Trustworthiness

Lincoln and Guba (1985) wrote trustworthiness is important when evaluating the worth of a study. It establishes confidence that the researcher’s findings based on the design, the informants’ responses, and the context are indeed true. This was accomplished by attending to credibility, dependability, transferability, and confirmability.

Credibility

Techniques for establishing credibility or validity included triangulation of the data (interviews, focus group, observation, and unobtrusive data), member-checking, and rich, thick description (Creswell, 2009). Triangulation of sources consisted of examining the consistency of different data sources, such as comparing people’s viewpoints (Lincoln & Guba, 1985). Member checking provided an opportunity for participants to correct errors, challenge interpretations, provide additional information, and access the data (Lincoln & Guba, 1985). Creswell (2009) advised taking the polished product to the participants for review and also conducting follow-up interviews if needed. Rich descriptions of the process, the setting, and the participants were included in the writing process (Creswell, 2009).

Dependability

When checking for dependability, or reliability, the researcher used triangulation and also checked transcripts to be sure there were no obvious mistakes (Creswell, 2009). Member checking of the data was used to increase dependability. Coding was also examined for any shifts in the meaning of the codes during the process of coding. Thick,
rich descriptions of data gathering, analysis, and interpretation provided information as to how repeatable the study may be (Krefting, 1991).

The researcher conducted the study in an organized manner. Different research strategies were used and triangulated to increase dependability. The researcher’s advisor was also asked to recheck the research plan and implementation to ensure dependability (Krefting, 1991).

**Transferability**

Representativeness of the informants is important in a qualitative study for transferability. The researcher was able to determine content of the interviews, the behaviors, and observed events were typical of the lives of the informants by providing “background information about the informants and the research context” (Krefting, 1991, p. 220).

**Confirmability**

A number of strategies are useful in establishing confirmability. These included triangulation of data sources and documentation for interpretation from at least two sources to ensure the data supported the researcher’s analysis and interpretation of the findings (Guba, 1981).

**Limitations and Delimitations**

Limitations are unforeseen circumstances beyond the control of the researcher (Creswell, 2009). There were several limiting factors in this study. All data are self-reported and subjective in nature. Data may be inaccurate if participants are not honest or forthcoming during the interviews and focus group. The study was conducted in one district in one state. The time of year for the study was not ideal for asking teachers and
administrators to use precious time for the study, since these were the months leading up to state assessments in March. It was not the intent of this study to make generalizations about technology integration that are applicable to all school districts. However, the findings in this research may demonstrate the utility of using adult learning theory and the knowing-doing gap as tools for examining the success or non-success of integration.

Delimitations of the study concerned sampling. The geographic region and small population interviewed is a delimitation of the study. Since the researcher only interviewed personnel who volunteered to provide evidence, findings were limited to the perspectives of those professionals. Including perspectives from all teachers in the district would have enhanced the study. Furthermore, observation of all past professional development activities concerning technology and instructional integration would have yielded valuable knowledge of those proceedings and the interactions of trainers and teachers. Although this was not possible in the present study, given time and resources, future research could include a broader range of observations. If the researcher had included more than one district in the study, results might have been able to be generalized across multiple settings. It was not the aim of this study to report findings for all districts, but rather, to explore and create needed context supporting one case, District A, identified in the study.

Assumptions

Several assumptions should be kept in mind when interpreting the results of the study: all participants gave honest answers, cultural differences had no impact, and teachers and administrators shared similar life experiences and external events. The
researcher’s assumption that the research topic was important to all teachers and administrators could be limiting.

**Ethical Principles**

Throughout the study, tasks were carried out in an ethical, systematic fashion. The researcher obtained permission from the Institutional Review Board of the University of Missouri to conduct the study. Before the study commenced, permission was obtained from the Superintendent of Schools in District A, and participants were contacted to request consent for their participation. Participants were asked to sign a consent form (see Appendix D) that disclosed the purpose and nature of the study. It also included the parameters of confidentiality. During interviews, some demographic information was collected, such as number of years of experience in teaching and number of years in teaching in District A.

The interviews and focus group conversation were transcribed digitally by an outside source that assured confidentiality. There was no information included in the audiotapes to indicate specific participants. Confidentiality of participants was maintained throughout the data collection and analysis.

**Summary**

This research and design methods chapter outlined the case study in a rural, Midwestern school district concerning the integration of technology and instruction. The purpose was to discover and relate teachers’ and administrators’ perceptions of factors that contributed or impeded the integration of technology and instruction, as well as give insight to the needs of teachers in this area. Next, research questions were established and the rationale for a case study was explained. The population and sample were
described, along with tools and procedures to gather data. Data analysis was explained, and issues of trustworthiness, such as credibility, dependability, transferability, and confirmability were explored. The issue of confidentiality was explained, and limitations and assumptions of the study were given in detail.
CHAPTER FOUR

RESEARCH FINDINGS

Teachers possess tremendous autonomy in implementing changes and innovations in the classroom. When it comes to technology, how it is used and integrated into instruction is heavily dependent upon individual teachers. Technology use in education is prevalent in many, if not all schools, to some extent in the present day. The various ways technology has been used has been extensively researched in the past (National Center for Education Statistics, [NCES], 2000). In 2003, Geringer found less than 20% of teachers use technology to support students' learning. Wetzel (2002) believed true integration occurs when pedagogy and curriculum changes include technology. Johnson and Johnson (1996) believed the use of technology influences a society, and those who do not become technologically literate will be left behind. Technology can be used in the classroom to enhance learning; student motivation, information retention, and creativity are increased due to cooperative, project-based activities. “Few educational innovations hold the promise that technology-supported cooperative learning does. The combination of cooperation and technology has a potential that is changing the way courses are being delivered and instruction is taking place” (Johnson & Johnson, 1996, p. 806).

Even though much is known about the availability of technology and best practices for embedding technology in today’s curriculum, less is known about why teachers do or do not systematically and frequently use available technology in daily lessons and activities that impact student learning. Many school districts embrace well-articulated goals for enhancing their educational programs through the use of technology; however, many teachers do not take advantage of all technology has to offer. Such is the
situation in District A. This researcher was asked to conduct a case study to determine factors based on teachers’ and administrators’ perceptions that contribute or hinder integration of technology and to discover teachers' views of needed supports.

This chapter will provide results from analysis of data collected from interviews of fifteen teachers, a focus group of three administrators, an interview with the Technology and Curriculum Directors, a technology professional development observation, and a review of pertinent documents. The data from these sources were coded, organized, and analyzed to glean understanding and address the research questions. The following research questions were used to guide the study:

Overarching Question: What are teachers’ and administrators' perceptions of effective integration of technology and instruction?

1. What factors impede or contribute to teachers effectively integrating technology and instruction in District A?

2. What are the needs of K-12 teachers in District A in effectively integrating technology and instruction?

This chapter begins with a description of the setting as provided by the district profile and also introduces the participants who were involved in the study. The findings include patterns, commonalities, and discrepancies found in the study, as well as any patterns/themes that emerged during the coding process. The findings from the data analysis are presented in relation to the conceptual framework and the three research questions. Themes from data transcriptions of this case study will be identified and discussed, and data coding procedures used to discover the emerging themes will be presented. A generalization that summarizes the findings is provided.
Examples of data to support the findings are provided throughout the chapter. This includes excerpts from individual interviews, the focus group, observation, and formal documents.

**Garden Metaphor**

As the researcher learned, analyzed, and conceptualized, the process of integrating technology and instruction in this district was found to be much like the construction of a garden, which at some point, would be able to produce a variety of nutritious vegetables, herbs, and flowers. There are many comparisons that come to mind, and throughout the discussion of the findings, this metaphor will be referred to and further explained.

**Setting for the Case Study**

According to District A’s profile, it is a small Midwestern school district of approximately 1700 PK-12 students located in a rural, picturesque river town of approximately 11,000 residents. In 2010, the median family income was around $50,000 with 18% of families living in poverty. There are four school buildings and a central office located in the downtown area. The buildings consist of an elementary school (PK-5), a middle school (6-8), a high school (9-12), and an alternative school (PK-12). The elementary school has 77 teachers in the primary and intermediate sections; there are almost 900 students in the elementary setting. The middle school has 36 teachers that serve about 345 students, while the high school has 39 teachers and over 440 students. The alternative school has eight teachers with about 45 students. The district has a Superintendent, a Curriculum Director, a Technology Director, and a Special Education Director. Table 2 shows the number of teachers and administrators for each building.
Approximately 67% of the students in the district qualify for free and reduced lunch, and 26% of the student population has been identified as exceptional students. Fifth-three percent of the students are male, and 47% are female. As far as ethnicities, 13% of students are African American, 5% are Hispanic, and 75% are Caucasian, while 7% are labeled "other".

**Relationship of Researcher to Research**

As a former employee in District A, the researcher has a past history with the district and some of the employees. The researcher was employed at the middle school for 22 years as a special education teacher, and then for five years at the high school as a counselor. Since this time, the researcher has been employed at a local private college, which has had many ties to the local district. At the time of the study, the researcher had been gone from District A for nearly eight years but continued to maintain excellent relationships with administration and many of the teachers. Due to these cordial
relationships, it was assumed all parties involved in the study would be able to comfortably work together in determining the perceptions of teachers and administrators concerning technology integration.

Due to the researcher's background during her P-12 career, which included being one of the original technology leaders in the district's first technology cadre, the researcher held the assumption that integration of technology and instruction is extremely important to the success of students. To be sure of neutrality, the researcher continually reflected on the study's process and the researcher's own reactions in order to sustain a clear focus on the purpose of the study.

**Description of Participants**

The researcher's goal was to have input from employees in the district who were involved the most with the integration of technology and instruction, so teachers and administrators from each level were interviewed individually or were part of a focus group. In addition, the Technology and Curriculum Directors were interviewed together. Table 3 gives a picture of the number of employees interviewed, the years of teaching experience and employment in the district, and the level at which each teacher and administrator rated themselves as to knowledge of technology integration.

**Teachers**

All teachers in District A received a letter from the superintendent notifying them of the study, and then they received an email from the researcher requesting their voluntary participation along with a letter of confidentiality as an attachment. Of the twenty teachers who volunteered to participate in an individual interview, fifteen teachers were interviewed. By the time fifteen teachers had been interviewed, there were at least
four teachers from each level and representatives from all levels of technology use, and the researcher was finding redundancy in responses. The levels of technology use were: sparse – technology is rarely used or available to students; basic – technology is used or available occasionally; comfortable – technology is used on a regular basis and students are comfortable with a variety of tools; and seamless – students use technology daily using a variety of tools and exhibit deep understanding of content. Responses from each level of technology expertise and from each level (elementary, middle, high school) were desired in order to hear from a representative sample. Table 3 indicates all teachers interviewed had at least four years of experience in education and at least two years of experience in District A. Teachers will be referred to as Participant 1, Participant 2, etc. 

**Directors**

The Technology Director and the Curriculum Director have been employed in District A respectively, for seventeen and fourteen years. According to the Technology Director, she is responsible for all of the technology, networking, purchasing, and supervision of three employees. This includes anything that is integrated with technology, such as the bell systems, security cameras, printers, and copiers. She goes to trainings and gets involved in staff development. When the researcher attended the spring professional development session at the high school, the Technology Director was also in attendance, to observe and to assist. The Curriculum Director oversees the assessment program and curriculum and instruction, which include materials and resources. Since many of these are technology-dependent, both directors work in tandem on many projects, including professional development.
Administrators

The administrators in the focus group have been employed in District A for an average of nearly six years. Principals from each level will be referred to throughout the study as Principal A, Principal B, and Principal C.

Table 3

Description of Participants.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Number of Individuals Interviewed</th>
<th>Range of Years of Teaching Experience</th>
<th>Range of Years in District A</th>
<th>Range of Self-Rating of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary Level Teachers</td>
<td>5</td>
<td>4-40</td>
<td>3-40</td>
<td>Sparse to Seamless</td>
</tr>
<tr>
<td>Middle Level Teachers</td>
<td>4</td>
<td>8-24</td>
<td>2-15</td>
<td>Basic to Seamless</td>
</tr>
<tr>
<td>High School Level Teachers</td>
<td>6</td>
<td>4-35</td>
<td>2-30</td>
<td>Basic to Seamless</td>
</tr>
<tr>
<td>Administrators</td>
<td>3</td>
<td>NA</td>
<td>2-8.5</td>
<td>Comfortable to Seamless</td>
</tr>
<tr>
<td>Technology and Curriculum Directors</td>
<td>2</td>
<td>NA</td>
<td>14-17</td>
<td>Comfortable to Seamless</td>
</tr>
</tbody>
</table>

Interview Setting

Interviews with the teachers were primarily conducted during the school day and were held in individual teachers' classrooms or a vacant office during the teacher's plan time or after school. Teachers seemed to find this a comfortable setting, and this also allowed data collection to occur within the context of the setting. Two teachers requested the interviews to take place in their homes due to time constraints, and one teacher came to the researcher's office. The majority of the interviews took place during the teachers' planning time during a 50-minute block of time.
The two directors met the researcher in a meeting room at the central office; they chose to be interviewed together. Administrators met in the community meeting room with the researcher at the central office. The fifteen teachers' interviews ranged from twenty-five minutes to fifty-five minutes, while the directors' interview took fifty minutes. The focus group of administrators took sixty minutes to complete.

Upon entering each interview setting, the researcher allowed time for casual conversation. This helped to relax the participant before beginning the interview. Before each interview and the focus group began, the researcher reviewed the confidentiality assurance and reminded participants they could withdraw from the study at any given time. Audiotaping the interviews was also explained, as well as how the data would be used in the study. Due to the researcher's history in the district, trust was already in place. This encouraged participants to share openly.

**Interviews and Focus Group**

The researcher prepared a set of open-ended questions for teachers and the focus group based on the research questions and knowledge of the district (Appendices E, F, & G). The questions asked of each participant were to elicit responses and facilitate understanding of the supports, barriers, needs, and overall perception of technology and instructional integration.

As the interviews began and continued, the researcher began to include specific questions that were suggested from responses shared by participants. This enabled the researcher to ask more probing questions as interviews progressed (Merriam, 2002). An important piece of ensuring a study is credible and trustworthy is verifying interviews with the participants to be sure they accurately reflect what was said. A member-
checking process was carried out via email with each participant (Casey & Krueger, 2009). The researcher emailed the appropriate transcription to participants to review for accuracy and to be sure the transcript reflected their perceptions and thoughts. No participants notified the researcher of any needed changes, so accuracy and trustworthiness was verified. At this point, the researcher began the process of open and axial coding of the data (Creswell, 2009).

**Document Collection**

During the interview process, the researcher made note of types of documents that might be helpful in creating a complete picture of the district's technology program. After the interview of the Curriculum Director and the Technology Director, they agreed to provide the requested artifacts to the researcher. A list of artifacts can be found in Appendix P. The Curriculum Director spent approximately two weeks in gathering appropriate information. Some of the documentation was also gathered from the school's web site.

**Data Analysis**

After the interviews and focus group conversation were transcribed, the researcher read through the interview and focus group transcriptions and examined the unobtrusive documents and searched for categories and themes. During this process, attention was paid to the importance of viewing data in light of the insights gained during the literature review process. At this time, the researcher made corrections in grammar, A, and punctuation. The first few transcriptions were read multiple times, and recordings were listened to alone as well as when reading the transcriptions. Hearing and understanding participants' voice inflections and tone was essential at times to accurately
understand the language. Transcripts were read and reread in an attempt to determine importance, frequency, similarities, and differences. At this point, a system of coding and categorizing began to take place with each transcript. Items considered to be important to the research questions were identified, coded, and categorized using open and axial coding to identify emerging patterns within the data.

Creswell (2009) explained open coding as organizing material into smaller segments before determining meaning from the text. Common and relevant key phrases and statements were found in the interviews and focus group conversation that pertained to the three research questions. Participants' descriptive words and phrases from the first few interviews were copied and pasted into a pattern table in a Microsoft Word document along with inserted comments and notes. At this point, the researcher created categories under which these responses were grouped. This process was replicated for each interview and for the focus group conversation. Categories were added as the interviews continued. An identical process was followed for the document examination. The categories to emerge were the following:

1. Years of Experience
2. Self-Described Level of Technology Integration
3. Comfort Level in Using Technology
4. Type of Technology Used in the Classroom
5. Perception of Student and Teacher Use of Technology
6. Importance of and Ideal Classroom Use of Technology
7. Administrative Support to Integrate Technology
8. Perceptions of How Teachers are Respected as Adult Learners
9. Support Available and Desired Support

10. Accountability for Integrating Technology

11. Opportunities to Collaborate with Other Teachers

12. Reasons for Not Integrating Technology and Instruction

13. Consultation Regarding Professional Development

14. Past Professional Development and Desired Professional Development

15. Awareness of District Technology Strategic Plan

After all transcripts and document data had been categorized, axial coding was used to identify themes from the initial categories and descriptive statements across all transcripts and documents. Strauss and Corbin (1990) described axial coding as a process undertaken to examine subcategories and relate them to a single category. The statements in the table were then re-categorized under these themes. These themes also were created in light of the research questions and the information in the literature review. This process was repeated with each of the documents submitted by the Technology Director and the Curriculum Director.

The following themes were discovered: a) Integration of Technology and Instruction; (b) Professional Development; (c) Accountability; and (d) Barriers Contributing to the Knowing-Doing Gap. The researcher highlighted significant statements from each of the interviews and focus group conversation to identify specific instances of support for the themes. Evidence from the interviews, focus group, and documents to support these findings will be presented in the next section. Figure 4 shows the triangulation that provided this evidence.
Findings from the Data

After triangulation and coding, the study revealed four themes: (a) Integration of Technology and Instruction; (b) Professional Development; (c) Accountability; and (d) Barriers Contributing to the Knowing-Doing Gap, along with subthemes. These themes and subthemes were the result of this case study that incorporated individual interviews, a focus group of administrators, and the review of district documents. The analysis of this data created a picture of teachers' and administrators' perceptions of the integration of technology and instruction and barriers and supports in buildings across the district.

Theme 1: Integration of technology and instruction

The first theme that emerged from participant interviews, the focus group, observation, and documentation was how technology was integrated with instruction at different levels in the district. Further examination of the data revealed the following subthemes: a) resources; b) technology use; c) knowledge of teacher; d) opportunity for collaboration using technology; and e) support for integration of technology and
instruction. The ways in which technology has been integrated was dependent upon the technology available, the developmental levels of the students, the classroom setting, and the expertise of the teacher, just as the production of nutritious vegetables, beautiful flowers, and tantalizing herbs depends upon building up the garden soil by using appropriate tools and amendments to create a rich, loamy soil, choosing the correct types of plants for the garden zone, and the knowledge of the gardener.

The district had an abundance of resources available to teachers in the form of hardware, software, and Internet capability, but not all teachers have equal access to Promethean Boards or iPads (see Appendix J). All participants believed technology was important in teaching and in student use, but actual integration of technology and instruction varied greatly from teacher to teacher, as skill levels varied from basic to seamless, and preparation time for using technology ranged from none to sixteen hours per week. Teachers desired specific collaboration time for using technology. The district provided a lot of technology support for teachers, which was thoroughly appreciated, but some teachers believed more support was needed.

Sub-theme: Resources. A district technology inventory document indicated there are at least 832 computers available for teachers and students throughout the district. These take the form of teachers' laptops, computer labs, mobile carts, and iPads. The high school began a one-to-one iPad initiative two years ago, so there is one iPad for every student, teacher, and administrator. That is approximately 480 iPads. There are also 76 Boards scattered throughout the district (see Appendix J).

According to teacher participants, resource availability varies from building to building, and even from classroom to classroom. This, of course, affects the type of
learning activity that can be implemented. An example of this difference in availability of hardware is reflected in records from the central office (see Appendix J), which indicated 46 Promethean Boards available at the elementary school for 63 teachers, but only 11 in classrooms at the middle school level for 32 teachers. There were 17 at the high school for 36 teachers, and two at the alternative school for nine teachers. To look at this in a different way, 73% of teachers at the elementary building have access to Promethean Boards, a type of interactive whiteboard, compared to 34% at the middle school building, 47% of teachers at the high school building, and 22% of teachers at the alternative school building.

Some interview participants had mixed reviews on the availability of hardware. Participant 11 said she would like to have a Promethean Board in her classroom, but said, "right now I don't like to ask because of the budget cuts and all that." The lack of hardware was also reflected in Participant 5's interview, when she mentioned she used the same program as other teachers, and they had Promethean Boards for the program, but she did not have one in her classroom to use with her students. She commented, "if we [everyone] had a Promethean Board that would be nice. There has been some talk about whether or not that’s fair to the students that some are getting it and some aren't."

Participant 6 indicated the computer labs in her building were "worn and a little dated." She went on to say, "Sometimes we go on things and they don't have the updates we need. We have six computer carts, but a lot of times they're in classrooms. They're kind of hard to get our hands on." Other participants spoke positively about the availability of hardware. Participant 1 commented, "I think I've got it all at my fingertips, the iPad, the computer, and all of it," while Participant 13 spoke about the many resources teachers
had. Availability of technology was confirmed during the observation of a technology in-service session at the high school; every teacher present had a laptop or an iPad with which to participate in the training.

When asked about the availability of programs or applications, every teacher participant commented on the many and varied resources they used in the classroom. Titles mentioned included: Print Shop, Pages, Word, KidPix, StudyWhiz, Notability, Keynote, Starfall, Envision, Discovery Education, and various e-textbooks that have been loaded on iPads. In addition, teachers mentioned constant use of iPad apps and the consistent availability of the Internet.

**Sub-theme: Technology use.** All fifteen teacher participants interviewed believed technology was overwhelmingly important to use in the classroom. Some examples of comments were "I think it is important. I think kids are going to have to know how to use it. I also think kids are going to have to know how to use it in a manageable way for their job"; "with the way our society is headed, I think it is extremely important. I think there are jobs that exist now that were not there twenty years ago, and who knows what's going to be there by then; I think it's really important"; "I think it's important we teach them how to use it and how to use it to the best of their ability. Not just using it for games, or whatever they use it for at home, but how to utilize it to help them enhance their learning"; "In the future, the more access that they have to it now, we better prepare them, even though it will change a lot before they get to the business world, I think, or to the job market whatever. I think just being able to use it and know how to use it appropriately is important"; "I think it's really important. I think they need to know how to use it because that's what's used in the workforce and the
workplace”; "I think the world in which we live we use technology all the time, every
day. I think it’s very important for our kids to be immersed in technology"; and "Huge,
that’s our future." Participant 2 said, "I think it’s really important, because they view
anything without technology as old-fashioned and boring and- even things that I give
them are boring, and they’re using the technology." This was echoed by Participant 8, "I
think kids need the technology, I really do."

The principals in the focus group indicated technology is a large focus in the
district's strategic plan and so is extremely important. Principal C commented, "I think as
a district, we do have a lot of directive from board to main office, superintendent's office,
all the way down to use technology in whatever fashion will be necessary, and when it's
necessary in the classroom." Principal A added, "It has been communicated through the
strategic plan from superintendent to the administrative staff and administrative staff to
the teachers." Principal B believed there was not one teacher in the building who was not
using technology effectively on a regular basis. Principal C indicated there was one
teacher in Principal C's building who never uses technology at all, two who seldom use it,
and the "rest are using it pretty comfortably". Both the Curriculum Director and the
Technology Director commented that teachers used technology a lot. The Technology
Director commented, "I think they’re using it a lot only from my perspective, because
when it doesn’t work, it’s a big deal. It’s not like they just move on. They let me know
immediately. I would say that’s K-12…they’re using it. Whether they could use it at
higher levels…I’m sure that’s always a possibility. I absolutely think they’re using it."

When asked about frequency of use, nine (60%) of the fifteen teacher participants
interviewed indicated they used technology on a daily basis in their classrooms. Two
participants said they used technology two to three times a week, one said sporadically, one indicated regular use, one used it as often as possible, and one said she used technology very little due to the type of class she teaches and the size of her classroom.

Eight of the fifteen [53%] teacher participants indicated students used technology on a daily basis. Six teachers [40%] said their students used technology two to four times per week, and one teacher said students often used clickers for the Promethean Board, but that was typically the only technology they used. The teachers at the high school all indicated daily use due to the one-to-one iPad initiative.

Teachers had much to say regarding the level of student usage of technology, which included how often as well as the type of program they used. Eight teachers [53%] believed students use technology at just about the right level, while two indicated students did not use technology enough. Three teachers [20%] commented that students used technology (meaning the iPad) for reasons other than learning; iPads were used as a gaming device or toy or for social media, and that this type of use depended on the class. Participant 5 elaborated by saying, "I think it's a mix of things, because there are so many wonderful apps for the iPads, and we do have iPads available and so many wonderful things you can get…I think in cases like that, yes. Having a child that you just hand them an iPad and say, 'Go play in the corner,' then I think it's too much." Participant 3 indicated, "If the teacher is not strict about iPads being under the desk or flipped over or whatever, the kids are on there constantly. Not using it for school good but using it as their social media. It's a problem with every grade level, every subject." Participant 4 commented that technology was used a lot in some classes, but "not so much in others".
While discussing the topic of technology and instructional integration, teacher participants gave their versions of the ideal marriage of technology and instruction by describing the "ideal" classroom. Some teachers envisioned a class that included 1:1 iPads, while others wanted a Promethean Board included in the classroom, or both. Participant 7 commented, "where the students each have their own iPad that they were looking at and using, and it was somehow maybe linked with the Promethean board and the teacher, what they were doing there maybe it's even on the screen kind of thing like a mini little movie screen for them. As the teacher is working there, they can see it in front of them. I would say that they are using it to work with their skills and review during the day; they've got free time - they can pick up that iPad and they can work on any game or something like that. They have access." Participant 4 described the layout of the ideal technology-based classroom, "It would look a lot like a library, because you would have to have tables, and you have to have chairs to sit in to look and move around and spread out. If they're too close it's not good. And then just have a variety of different kinds of technology in ones or twos." Another version of the ideal use of technology in the classroom by Participant 3 was more concerned with on-task behavior, "Maybe on the web site actually working, putting together whatever they’re supposed to be doing, creating what they’re supposed to be creating, submitting what they’re supposed to be submitting, and when you look about the room you don’t see video games up on it or…everyone is engaged."

Most of the teacher participants mentioned that students should be engaged or active. Participant 11's ideas were, "It'd be a classroom with a Promethean or RS smart board and kids would be interacting with that. It wouldn't be just there for note taking. It
would be there for student interaction." Participant 12 commented, "...kids actively engaged. I think one of the things that I fear with the whole idea of that kind of a setting is the technology being used for things other than the best educational possibilities. I think them actively engaged, I think used when appropriate, technology being used when it's appropriate." Participant 15 echoed this sentiment, "I guess just for the kids to be on task with it and doing what they're supposed to do rather than going to the games and zoning out and stuff like that."

The Technology and Curriculum Directors echoed teachers' versions of the ideal technology-supported classroom. The Technology Director commented, "I guess in a dream classroom you wouldn’t notice the technology. It would be so integrated and fluid in the lesson you’re focused what should be the content and the technology just supporting everything that’s going on. There’d be engagement. I guess that’s my biggest thing, engagement. There wouldn’t be any frustration at something in the work because things would always be working." The Curriculum Director believed the ideal classroom would be "Probably personalized for kids. If they’ve got the device that they’re using to go along with what the teacher is talking about if it’s a project-based, personalized or you got a group of kids working on this, get rid of the desks, get rid of rows, get round tables in there, get kids working together on something...it’s [the technology] there, but you don’t even notice it just because it’s so routine and part of the day-to-day of it that it just goes." Both directors agreed technology in the classroom should be seamless.

**Sub-theme: Teacher knowledge.** The ability of the teacher to infuse technology into the curriculum is of vast importance in stimulating interest and motivating students to learn. In 1994, Khalili and Shashaani studied the effects of computer technology on
the academic performance and achievement by conducting a meta-analysis of 36 independent studies between 1988 and 1992. They found if teachers exhibited a positive attitude towards and experience in using computer technology, students showed improvement overall in attitude, interest, and performance.

Teacher participants were asked to rate their level of integration and technology based on four levels created by Hertz (2011), which included the categories of sparse, basic, comfortable, and seamless. They were also asked to rate themselves on a scale from 1-10 with a 10 indicating they were extremely comfortable and knowledgeable concerning the integration of technology and instruction. While four teacher participants did not rate themselves numerically, the others ranged from 5 to 10. Teacher participants were then asked how much time was spent per week in preparing instruction integrated with technology. Answers ranged from no time used to prepare to sixteen hours per week.

Even though the researcher shared the same specific definitions for the four levels of expertise with each participant, teachers interpreted these ratings in various ways. Some teachers correlated the levels with the frequency of use of technology by the teacher or the students, while others considered the ease with which they used technology. Some teachers labeled themselves as 'seamless' because they had no difficulty in using a few tools on a daily basis, such as Microsoft Word, email, or PowerPoint, while another participant rated herself as 'seamless' because her classes used the same Internet-based program on a daily basis and rated herself as a '10' in comfort. She also indicated she spent no time in preparation. One participant rated herself 'seamless' and a '10' due to the use of applications like Keynote, PowerPoint, and
students' use of the iPad and Googledocs two to three times per week, but spent only one to two hours per week in preparation. In contrast, another participant who rated herself a '10' and 'seamless' spent at least sixteen hours per week in preparation. She puts everything for students on a class web site. This includes "warm-ups, assignments, readings, directions, and a daily schedule." One participant rated herself as 'basic' due to her environment, even though she is well versed in using different types of applications for many purposes. Her classroom lacked a Promethean Board and had only her laptop for students to share. Another teacher indicated she was at a 'comfortable' level because she used technology for grades and to regularly email parents, and her students were able to use the Internet and a search engine.

Teachers who indicated they spent at least five to sixteen hours in preparation primarily rated themselves from '7' to '10' on the comfort scale. There were several exceptions to this; one participant stated she prepared for about 15 to 20 minutes per week, but rated herself as a '10' in comfort, but only in using the Promethean Board. This was due to her ability to incorporate use of the Promethean Board into nearly every aspect of her instruction.

All principals in the focus group agreed that while the majority of their teachers use technology pretty comfortably, there was only a handful in each school that were "knocking it out." Technology at some schools was embedded in the curriculum in a few subject areas, so 90-95% of teachers had to use it, but principals acknowledged there were a few teachers who never used technology.

The district shared the results of an Apple Technology Profile Survey in which 39 high school level teachers participated in January 2014 (Appendix K). This survey's
purpose was to provide the district with an overall profile of the levels at which teachers were using technology in the classroom. The survey used the Substitution-Augmentation-Modification-Redefinition (SAMR) model in evaluating teachers' performance (Puendetura, 2006). The SAMR model indicates a progression of levels that teachers may follow as they improve their technological skills in the classroom ("SAMR model", 2014). Table 4 explains more about the aspects of the SAMR model. The top two rows explain ways in which instruction is actually transformed, while the lower two rows of the table indicate Substitution and Augmentation enhance the instruction.

<table>
<thead>
<tr>
<th>Level</th>
<th>Definition</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redefinition</td>
<td>Technology allows for creation of new tasks, previously inconceivable</td>
<td>A classroom is asked to create a documentary video answering an essential question related to important concepts. Teams of students take on different subtopics and collaborate to create one final product. Teams are expected to contact outside sources for information.</td>
</tr>
<tr>
<td>Modification</td>
<td>This is the first step over the line between enhancing traditional goings-on of the classroom and transforming the classroom. Common classroom tasks are being accomplished through the use of technology.</td>
<td>Students are asked to write an essay around the theme &quot;And This I Believe...&quot;. An audio recording of the essay is made along with an original musical soundtrack. The recording will be played in front of an authentic audience such as parents, or college admission counselors.</td>
</tr>
<tr>
<td>Augmentation</td>
<td>Computer technology offers an effective tool to perform common tasks.</td>
<td>Students take a quiz using a Google Form instead of using pencil and paper.</td>
</tr>
<tr>
<td>Substitution</td>
<td>Computer technology is used to perform the same task as was done before the use of computers.</td>
<td>Students print out worksheet, pass it in.</td>
</tr>
</tbody>
</table>

Note. Adapted from "SAMR model: Technology is learning," 2014, Retrieved May 13, 2014 from https://sites.google.com/a/msad60.org/technology-is-learning/samr-model
The following percentages are approximations of the number of teachers at the high school at each level, according to the analysis of the SAMR survey: 60% - Substitution level; 13% - Substitution/Augmentation level; 10% - Augmentation level; 4% - Modification level; 0% - Redefinition level. The district will be able to use these results to assist teachers in reaching higher levels of use.

Sub-theme: Opportunity for collaboration using technology. Speck (1996) found participating in small-group activities enabled adults to move to higher, deeper levels of thinking and enabled them to share and reflect upon their learning. Participants reported there was really no specific time set aside for collaboration with other teachers in designing, developing, or implementing instruction that integrated technology. Teachers used some of their team time to discuss technology use, or they might talk with someone in the lounge. A few teachers expressed a desire to have some collaboration time set aside or have it formally implemented during Professional Learning Communities periods. Two special education teachers reported they felt fortunate they were able to do some collaborating with their regular education co-teachers. One example of the minimal collaboration climate existing throughout the district was, "There is some time, but usually when it happens with me, it’s like, you’re in the lounge, hey, can you show me this? Then somebody will show you, or I’ll show somebody, and then you just move on."

The Curriculum Director believed, "If the technology feeds into the units of their planning, the curriculum they’re talking about, the assessments they’re discussing, that kind of stuff, if it becomes a natural part of that discussion, then they have quite a bit." This statement referred to teachers' use of collaborative team time or time scheduled for
their Professional Learning Communities meetings. Principals believed a type of collaboration occurred when teachers had the opportunity to go once a quarter and observe other teachers in the classroom.

**Subtheme: Support for Integration of Technology and Instruction.** A study by Williams (2007) found five areas in which teachers believed they could use more support: a) general support by administration; b) more professional development to increase knowledge about computers and integration; c) access to all appropriate resources; d) an established school vision and culture for integration; e) some type of pressure or incentive for integrating technology and instruction.

Participant 15 saw the one-to-one iPad initiative at the high school as an indicator of support for technology integration. Teachers believed district personnel supported them by asking them to share their technology projects with the board. An example of district support occurred when the elementary school's subscription to an online curricular resource, BrainPOP, expired, and teachers immediately emailed the Curriculum Director, who worked quickly to fix the situation. Participant 9 indicated, "I think in our district, the TD does a great job of encouraging. She lets us know what's available." Participant 12 said, "Any kind of new idea that we have that we want to, we'd get a lot of support if we need the equipment or if there's a program that we find that we really like. A lot of the times, they'd be willing to give you a subscription to it to try and use it. There's a lot of just support from the administrations and encouragement, do it, do it and any of that help, time, money, whatever you need."

Participant 11 had a different opinion concerning support, due to the lack of hardware availability in her classroom, "I think if I would have something, they would be
pretty supportive. Somebody would be down there trying to train me and helping me to integrate."

A few teachers also commented on the use of the district's helpdesk system as a support. Participant 7 said, "Helpdesk is okay, but sometimes their [tech staff] responses are very vague and you don't really know what they want you to do or they can't understand what you need." Participant 6 believed the idea behind helpdesk is great, but at times there is a lag in response time, which results in missed opportunities to use technology.

The Technology Director indicated it has been difficult to get to staff requests in a timely manner due to being short-staffed, and they have had to prioritize requests by importance. She commented, "I'm constantly reprioritizing. I always prioritize it, too, by how many people it affects." District documents showed a total of 3,635 requests had been made to the helpdesk over the last three years. During 2011-2012 and 2012-2013, there were 3.5 employees available to assist teachers with technology issues; in 2013-2014, that number decreased to 3.0, which made it more difficult to immediately meet everyone's requests (See Appendix I).

As for encouragement, the Technology Director commented, "To me, it's another little reward when they get asked to present these little trainings because they're like, 'Oh, I must be doing something good I get to share.' That's a huge incentive." One principal said encouragement occurs by always giving them new ideas and feedback, asking them to present their findings, and sending teachers to trainings. "They have the opportunity to see other teachers using technology. I think more of our teachers are beginning to be more comfortable and they understand, 'Oh, I can use it this way.' Maybe it's just one
little segment, one little lesson that they begin to use it. I think it's just a matter of saying you can't break it. You can't mess it up." In addition, a principal said support might come from peers. "Professional learning communities have a specific grade level that have seven or eight teachers. They feel comfortable enough within their own learning group, where they'll say, 'I need help with this.' Someone from that group will help."

**Theme 2: Professional Development**

The second theme that emerged from the data is that of professional development. Being an educator means one is involved in a lifelong process of teaching and learning. Learning is necessary due to new and ongoing research as well as to new technological advances (Loveland, 2012). Professional development is a “continuous process of lifelong learning and growth that begins early in life, continues through the undergraduate, preservice experience, and extends through the in-service years” (International Technology Education Association, 2005, p. 2). Subthemes to emerge were: a) professional development opportunities; b) in-house professional development; c) support for professional development; d) relevancy of professional development; and e) respect for adult learners.

Continuing the metaphor, gardening is a lifelong process; there are always new and exciting vegetables and flowers to procure and plant and different gardening tools to try out. Continuing to improve the fertility and friability of the soil is a constant challenge. To be a master gardener, one has to read, discuss, attend training sessions, and sometimes collaborate with others in working towards an end goal. This is much like the ongoing process of attending professional development to improve teachers' instruction and technology integration. While all teachers believed the district and administration
were supportive of professional development and there were opportunities to attend external and internal professional development, in-house opportunities varied greatly by building, with more opportunities available to staff at the high school, due to the one-to-one iPad initiative. Peer presentations were well received. Teachers approved of having choices in professional development activities, but some believed some activities were not relevant to their teaching environment. While most teachers believed they were treated respectfully at trainings, a few teachers mentioned incidents where they were not. While most participants felt teachers had decision-making opportunities in choosing professional development, some decidedly felt they did not.

**Sub-theme: Professional development opportunities.** District documents indicated over the past three years, a total of 130 teachers attended some type of PD that included a variety of technology topics. Some of these were: training on the Promethean Board, iPads, Discovery Education, the A+ program, a graphic design workshop, and attending Podstock (Essdack, 2014) (See Appendix L). Over that same time period, administrators attended various professional development trainings in technology 41 times (See Appendix L). When teacher participants were asked about time spent in professional development for specifically technology within the last year, the answers varied from "I can't remember" to "50-100 hours". Teachers who attended a three-day training like Podstock accumulated many more hours than those who did not. Data indicated those teachers who had hours of five or less only attended professional development in technology provided by the district, while those who had hours over five had attended out-of-district professional development, such as Podstock. Participant 12
indicated that technology training had tended to "drop off" due to the longevity of the staff in the building.

The Technology Director indicated any type of technology professional development was available to teachers by saying, "The doors are pretty much open, if you see something that fits with what you’re trying to do, get a core group there to go. That’s okay to do. That’s primarily kind of how we’ve done it." Participant 9 agreed, saying, "They've always been very responsive to us attending in-services or PD days where we could go and learn more things about the technology," while Participant 8 commented, "They've never turned us down."

In an explanation as to why the district did not hold more training in technology, the Curriculum Director commented, "We’ve got three PD days during the school year. By the time you do technology, common core, new assessments, new teacher evaluation, when you look at the plate and everything that’s on it, technology gets some of it but it’s not much." Various opportunities have been presented to teachers, such as Tech Tuesdays or training on Saturdays. The Technology Director said, "People don’t like to come to the afterschool stuff," and "Unless they got paid, they never came on Saturdays." Both directors commented that teachers indicated they really like the calendar professional development days the district does provide. "Whenever we have done those, we'd get great reviews."

**Sub-theme: In-house professional development.** Participants at all levels indicated teachers are very appreciative and satisfied with the in-house professional development presented by the Technology Director or their peers. In the Technology Director's opinion, "Really the most successful ones [professional development] have
been when their peers are the teachers." As an example of this, the Curriculum Director responded with, "The high school loves their little in-house when they do. Oh geez, they love that thing! It’s a focus because they got the iPads, so they’ve got a need to make it a big focus. The principals there will identify who are the people who are just going gangbusters on it. They set up the sessions. People get to choose the session they want to go to, so it’s not an entire group sitting in one session for the entire time, because people might be interested in separate things and different things. I think that autonomy and that flexibility there probably is what they like."

The Curriculum Director's statements were corroborated during the researcher's observation of the high school technology in-service. The researcher had the opportunity to observe a high school training in technology during this study. A classroom teacher who was well respected and considered to be one of the most proficient users of technology during classroom instruction presented the training.

The in-service was held in the library, which is a comfortable, spacious room, carpeted with acoustic ceiling tiles. There were about a dozen round or rectangular tables with four chairs at each. As teachers wandered in, they formed small, talkative groups at the tables. The projection screen was set up in one corner, and the assistant principal and a teacher set up the projector and computer. Nearly everyone had either a laptop or an iPad open at their table.

The assistant principal introduced the peer presenter, and he began a presentation about using an online quiz format named Kahoot, a game-based classroom response system ("Kahoot," 2013). The use of Kahoot was taught to the group by asking them to actually take the quiz, which consisted of humorous questions about individuals at the
school. There was a lot of laughter and conversation during the Kahoot, with lots of ribbing taking place. Many questions were asked, and either the presenter or another teacher answered them, so there was an interplay of questions and ideas. Then, the small groups of teachers were given time to create their own Kahoot; when most were complete, an individual from several groups demonstrated their own creation. At that point, the presenter went on to show and explain a classroom Internet tool named Showbie. It is "a website and mobile application that allows teacher to assign, distribute, and collect students' assignments electronically" ("Showbie," 2014). During the entire in-service, teachers were engaged and participatory. Their peers, the assistant principal, and the Technology Director treated them respectfully. The subject of the presentation was directly connected to their students and their curriculum. All questions were answered, and the teachers were given ample time to practice the Kahoot application. This in-service was an excellent example of effective peer sharing and participation in a planned technology in-service.

Participant 10 indicated that on "PD days we can learn new things and work with peers who have used those apps." Participant 12 commented, "The nice thing about it is there are a lot of people in the district that have skills in technology, so we can do some kind of training like that within district and actively bring others in, we can just share the skills we have and a lot of people learn from those or pick out new tricks or a little things."

**Sub-theme: Support for professional development.** Many participants gave kudos to the district for their support for professional development in the use of technology. Participant 14 commented, "They're 100% supportive." Participant 11
indicated, "I could probably go to the board office and request somebody come up and do some individual training for me and usually they're pretty prompt about doing that if you need that training." The general consensus of all participants was all administrators were very supportive, while one principal in particular was commended for being extremely knowledgeable about integrating technology and instruction. Participant 10 indicated the administration allows teachers to try new things and be innovative, "If we find something that we need or want, so far they've always spent the money for that, they've always been very responsive to us attending in-services or PD days where we could go and learn more things about the technology."

Sub-theme: Relevancy of professional development. Responses from teacher participants on relevancy of professional development in technology were mixed. At the high school level, two teachers indicated the training they have had is very relevant. An example was, "Totally and completely. They need it. They need it a lot more than the kids."

The majority of the elementary teacher participants indicated training was not always relevant to what individual teachers needed. Participant 4 said, "Sometimes it is and sometimes it isn't," while Participant 5 believed having all teachers attend a technology training for the math program was interesting, but it was not a great deal of help for those who didn't teach math. Participant 7 told about a particular training that was relevant to her, but not to her colleague, whose lack of technical expertise left her feeling lost during the training. Another elementary participant disclosed that she went to training, but was unable to "do that stuff. I think I've gone to those and walked away with…well, I'm not going to really do that."
Middle school teacher participants also had mixed reviews on relevancy of technology training. Participant 6 recalled having iPad training, but the students did not yet have iPads. "They tried to say, well, eventually you will have iPads. We didn't even have an iPad in front of us to look at that. We're using our computer, we go to the apps, and I think even the presenter was offended because it got to the point where everybody got bored in two hours. I was doing something completely different. I just gave up, and I didn't want to be rude. I tried to be respectful, but I, at the beginning of the year, I felt like I did not have time to give him when I could have been lesson planning." McGrath (2009) stated adults who attend training that has little relevance to their jobs would have little motivation. Participant 9, on the other hand, thought training was relevant no matter what it was, because teachers need to keep up with it all. One participant indicated that none of the training was relevant, since she had very little technology in her classroom to use. High school teacher participants, who have had professional development geared towards using the iPads in the classroom, believed their training had been relevant to an extent.

When asked about relevancy to individual teachers, one principal replied, "One of us figures out how, we're writing a book!" They discussed different methods used for making training relevant, such as asking the leadership teams or team leaders to bring requests to the administration. One principal commented, "We don't judge. We try to figure out how we can effectively meet their needs. It's no different than differentiating in the classroom."

**Subtheme: Respect as an adult learner during professional development.**

Making the training relevant to individual teachers according to their level of need,
expertise, and subject area is a way to be respectful of teachers. Speck (1996) found adults need to see that professional development is related to their work and is relevant. When asked about their feelings of being respected due to this being considered, teachers had much to say.

Several middle level participants indicated they felt they were treated as adults most of the time due to the choices of activities during training. Participant 12 indicated, "As you're planning a district wide or even a building wide professional development and it's hard to get everyone's needs covered, but I think a majority of them are, I think we look at what are some needs, what are we seeing?" and Participant 9 felt teachers' needs were met at an adult level. However, one participant had this to say, "If we're given an idea to use in the classroom, I don't really like to be treated as the student and go through that. I don't want to … I don't want to participate in an activity. I want you to tell me how it works, show me kids doing it."

High school participants reflected similar sentiments. Participant 3 commented, "There are several different categories. We’re allowed to pick and choose where our level is." Participant 10 concurred, saying, "Instructors are helpful, take time to make sure we understand, will go over it as much as needed. We are asked what kind of apps and things we want to investigate." Participant 10 indicated, "We're given a lot of opportunities. This district does an awesome job when it comes to the training aspects. And the tech people are awesome. You need to know that." Another high school participant reported, "There are several different categories [of technology sessions]. We’re allowed to pick and choose where our level is. We’re not assigned, you are doing this or whatever, and then they have teachers who feel like they can lead or that they’re
good at this. I think they try very hard in making it relevant...because you can pick and choose and what you use, you go to, and if you want to just sit there a couple of times and just keep working on, you could." Participant 10 indicated, "Instructors are helpful; [they] take time to make sure we understand; [and] will go over it as much as needed."

Though the majority of high school participants felt their needs as adults were respected, one participant reported an episode of technology training that was "...horrible. The StudyWhiz was so overwhelming, because there’s so much it can do, well, he was going kind of fast. I was trying to pay attention, he was going a little fast for me, but I was going to get there. But some other teachers, like, 'I’m done. I’m done. I’m not coming back tomorrow, I’m done'."

Three out of the five elementary level participants felt their needs as adult learners had been respected when attending professional development for technology. When asked, Participant 4 reported, "Yes. I know one year we did a tech day at the high school and we went to different places and did different things." Participant 7 said, "Yeah, I do. I will say we were introduced to Google Docs, and then it was kind of like, “Now, you have to do Google Docs.” I still felt like, oh, my gosh. We have a help desk, so I put in help desk and said, 'Help. I still don’t know what I’m doing.' They came over and sat down and had a meeting with me...we sat and went through all the little things I needed to work out to have it work for my classroom," and Participant 13 indicated the presenters were always great about us asking additional questions or during a break, they asked if all questions had been answered. Two of the elementary participants felt quite the opposite. Participant 5 said, "Yes and No. They (the presenters) never quite realized that they're talking to reasonable adults who teach...some people think, 'You teach
elementary, therefore you have an elementary brain, so I need to talk to you that way.' It has nothing to with the technology. It's just that’s the way they approach, talking to the elementary.” The other participant felt the topics did not fit her situation and she walked away from the presentation knowing she would never implement what she had learned.

Another example of being respected as an adult learner is being a part of the decision-making regarding the needs of the adult. One of the key points in adult learning, according to Pereira and Aherne (2009), is adults prefer to be involved in decision-making concerning their own learning. They like to be a part of deciding who, what, where, when, why, and how they learn. When asked if teachers had input into the type of professional development or technology available, teachers reported contrasting opinions. Four out of five high school teachers believed they had input, while one said definitely not. In this teacher's opinion, the Technology Director routinely decided professional development and technology acquisitions, even though it was well known some teachers were decidedly against certain purchases. At the elementary level, three out of five teachers were unsure or didn't know, several believed decisions about professional development were made by administrators at the last minute, and two believed surveys were sometimes used to poll teachers. One middle school teacher reported that professional development was discussed at staff meetings, while two did not know how those decisions were made.

**Theme 3: Accountability**

When one gardens for oneself, typically there is no one looking over the gardener's shoulder to be sure everything is done correctly or in a timely fashion. On the other hand, if one is gardening for someone else, the gardener is much more likely to be
aware of things like expenditures for seeds, plants, bushes, or trees, keeping tools in proper condition, and following a correct time schedule for planting, watering, and cultivating in order to produce a successful harvest or effective integration of technology for teachers and students. If a gardener is not interested, does not learn about appropriate current practices, or does not take the time to garden properly, the garden will not flourish. Teaching is much like this; there is a lot of autonomy present in the profession, but teachers are accountable to their students, their students' families, and to their school and district to do the best they can. This means continually working to attain increased knowledge and skills not only in curriculum, but also in integrating technology.

Teacher participants repeatedly indicated there was little actual accountability for ensuring they were progressing in their ability to integrate technology and instruction by attending in-services or conferences. At the same time, teachers believed there was an understood responsibility on their part to use the provided technology to implement learning from in-services and conferences and use it to integrate technology in their instruction. The data brought the following sub-themes to light: a) actual accountability; and b) understood accountability.

**Sub-theme: Actual accountability.** Ten out of the fifteen teacher participants mentioned the walk-throughs, or quick evaluations, performed by principals as a way to check on their use of technology. Participant 15 said administrators "have this little list of things they check, and one of them is technology…The only issue I see is they see technology and think it's good or think that they're [students] learning, but it's not always the case. Technology is not always learning." Participant 1 commented, "I don’t think we have anything required totally, but our observations do tell us if we have used
something or if we haven’t used something that they want to see." Participant 2 told the researcher, "It’s on the walk-through sheet, and there’s the people doing the walk-throughs or instructional rounds (see Appendix O). It’s like, 'Is the teacher using technology? Are the students using technology?’ You [administrators] check if it’s observable or it’s not. While they say you’ve got to do it, I feel like there’s no real follow-through by the people that are in charge, ultimately." Another teacher related, "I know that the district does a walk-through program and one of the things that’s listed that they check is to see whether or not you're using technology. The administrators do these walk-throughs; whether they're specifically looking for the use of the technology to make sure that it's not wasting the money, I don’t know. I would assume that that’s part of what they get from the walk-through." An elementary teacher shared, "When the principals walk around to do walk-throughs in our classrooms, that's part of their protocol that they fill out, whether technology is being used by the teacher, by the teacher and the students, by the students, or not at all."

At the middle level, none of the teacher participants believed there was any specific requirement to use technology in instruction. One teacher mentioned the walk-through indicates the number of students using computers, and the principal might discuss that with a teacher during their personal evaluation, but that it's not required to use technology. Another teacher believed there was no accountability, and it was also not part of the teacher evaluation.

One teacher wondered if administrators would even know what to look for if they did check for integration, while another teacher indicated there was a walk-through on a day when her laptop was being used by another teacher, so she appeared in a negative
light, since there was no technology present in the classroom. A high school teacher commented, "While they say you’ve got to do it, I feel like there’s no real follow-through by the people that are in charge, ultimately," while another said, "I’ve never been required to do a certain thing in my classroom, never." Another teacher's sentiments were, "No. I would say no. They might say something else, but I've never been forced to use what I've learned in a training. I think part of that comes down to money. If we're going to meet after school and talk about our training, some people might say, 'We got to get paid for this.' I get that. You have so much of your time taken away on your own that's free already. You get a little mad about that."

All teachers believed there was no formal way they were held accountable for using technology or integrating it into their instruction, other than the walk-throughs, which, for the most part, only ascertained if students or teachers were using some type of technology, not whether it was effective or truly integrated with instruction. This was somewhat supported by an administrator's comment, "The integration of technology is a piece of what we're checking for every time we go into a classroom. You could determine through the protocol not necessarily the use of technology was effective, but students were using it. Teachers were using it. If you go through the rest of the protocol, you're going to be able to determine whether or not that was effective. Now, is there a button that says effective use of technology? No. Is there a way to determine throughout the protocol? Yes." Another principal said, "I'd say that's an area of weakness for us… I'd like to see every teacher using it, every teacher and make sure they're forced to use it."

The directors believed accountability was mostly through "word of mouth", and even the professional development points earned for attending conferences or in-services
only reflected seat-time. The Technology Director related, "Who cares if you use what you knew or not because there’s no checks and balances feature. There are no rewards if you do. There’s no discipline if you don’t. Those are strong words, but teachers need to know if I go the extra and do this extra thing, I’ll get to show it off. I’ll get a pat on the back. I’ll get whatever because now it’s just like…there’s no reason to try it because you’ve got nobody to check and support them. The principals, they don’t have the time to do that right now. There’s no accountability. No. None." In relation to the walk-throughs, the Curriculum Director commented, "Is it the appropriate use? Is it a good use? Is it a higher level? No, but they get marked yes because they’re using it. You don’t know if it’s appropriate or not. There’s not much accountability."

**Sub-Theme: Understood accountability.** To some extent, interviews with participants showed teachers believed integrating technology and instruction is something they "should" do, and for which they feel responsible. Participant 15 commented, "Then also it's encouraged because they did give all of our students a piece of technology, and they want to see if being used. They always tell the board about what we're doing and ask us to show what we're doing." Participant 3 remembered being told to "integrate, integrate, integrate, all the time. I mean there’s just a very big push to use technology. If you’re doing something on technology or you’re using an app or whatever, let administration know so they can come in and see how you’re integrating it, promoting it and it’s very promoted." Participant 8 said, "We're encouraged to use it all the time. We use it in our in-services; we're talking about it. Teachers are sharing how they use it…It's really encouraged." Another teacher commented, "You feel like what you do in your classroom with technology is important, and other people who are in that same boat
would validate it." Participant 11 felt, "It’s almost, it’s assumed, and it is, that the teachers do go back and use…I think because the principal would come in and observe us then there's a little thing that they mark how much technology is used. That holds you accountable that you need to make sure that is part of your curriculum," while Participant 9 said, "…for the most part, I would say when we’re trained to do something, it gets used. It’s not that it’s required to be used, it’s just we go back and do it."

Accountability does not always come from administration. As participant 13 commented, "In our team, I can't speak for other teams, we all hold each other accountable."

Another view of accountability presented itself in several of the interviews. Participant 5 commented, "It's not like they come by and say, what project have you finished with this, which in a way is good because we have so many things that we're expected to do, that having a project that you had to do with this new technology would almost be like having a homework assignment from the class, and it's not always a good time." Participant 12 said, "I think if you forced it on them, that's just the whole other barrier creating, because you don't want people to feel like they have to do it."

**Theme 4: Barriers Contributing to the Knowing-Doing Gap**

Just as events like drought, pests, lack of knowledge, foraging animals, or lack of time and knowledge can prevent one's garden from growing and flourishing, there are also various barriers to teachers' integration of technology and instruction. Pfeffer and Sutton (2000) believed one barrier to implementation is the tendency to think something is being accomplished just because a decision has been made to do it. In other words, talk is a substitute for action. Interview and focus group questions assisted in discovering
these barriers and finding out why teachers who have the opportunity to attend training and learn how to integrate ultimately use very little of what they know, i.e., the knowing-doing gap.

The Curriculum Director believed, "The barriers are time and support." This was echoed in many teachers' responses, like that of Participant 6, "I would say it's probably three things; a time issue, a confidence issue, and then what if something goes wrong, what do I do?" Interview data confirmed the barriers for teachers are: a) time; b) comfort level; c) ongoing support; d) opportunities; e) students as barriers; and f) other barriers.

**Sub-theme: Time.** A majority of teacher participants cited time as a barrier to implementing technology. For instance, Participant 5 commented, "I think it's a matter of time because if you're not comfortable with the technology used to do whatever, I know the first few times that I made something on the computer it took me hours. Sometimes you got to get this much done in the curriculum and you feel like doing something on the computer unless you know that it's going to really make a difference to the students if you're like you're maybe wasting some of the time that you had to." Participant 2 lamented the amount of time missed while at a training and then the time needed to really learn how to integrate what was learned. "What you’ve gained from the workshop is lost, because you’re playing catch-up all the time. It really comes down to time. If you go to a workshop for a day, you need time to start playing. We’re never given the time to actually play and figure things out." Participant 13 shared, "I think the other thing is that they don't necessarily want to put in the extra time. They might have personal things that they're doing, or they might be focusing on something else school related." Participant 2 echoed this by saying, "Extremely time-consuming, so teachers just stop," and also
mentioned "too many things to juggle that we have to do. I also think that I just don't have loads of time to go find apps and different things, and I don't know how you would fix that, because there are three billion apps, and you don't know what the good ones are." Participant 15 commented, "I noticed my planning time went so much faster when I didn't have to think about all the technology and all the implementation."

**Sub-theme: Comfort level.** Pfeffer and Sutton (2000) wrote, "Fear creates knowing-doing gaps because acting on one's knowledge requires that a person believes he or she will not be punished for doing so – that taking risks based on new information and insight will be rewarded, not punished. When people fear for their jobs, their futures, or even for their self-esteem, it is unlikely that they will feel secure enough to do anything but what they have done in the past. Fear will cause them to repeat past mistakes and avoid trying out better ways of doing the work (p. 4)." Several participants mentioned fear of failure in teachers' attempts to integrate technology and instruction. Participant 1 said, "They would like to stick to what they know and they are comfortable with." An elementary teacher commented, "They're afraid. They're afraid that they're going to break something. They're afraid that they're going to wipe out some program. They're afraid of even things like classroom management; how do I manage the class by utilizing this kind of technology now, where the kids are real hyped up and they are energized? I think they're afraid of that." A middle school teacher said, "I've got to be convinced that this is going to be better for the kid than what I have already had success with. Sometimes they have got to convince them that, yes, this is effective and, yes, this can work as well and better than what you're doing." Participant 7 commented, "I would say the comfort level probably, the idea that if they don't really feel comfortable knowing
it or doing it, they are not going to start trying to get 20 kids to do it. Then, just maybe their brain can't think that way like, 'Oh, I could use this for this lesson.' Their brain just thinks in a different way because they haven't been exposed to technology as much as themselves or something like that. I would just say probably the number one reason would be their comfort level. They are not comfortable with it so they are not about to try to teach with it.” Participant 13 said, "I think part of it is maybe how comfortable they are with it, because some teachers aren't as comfortable with it." Participant 3 related, "I think some of them are nervous or they’re not comfortable with it. They’re comfortable with the way they’ve always done there, whether it’s their guided notes or their PowerPoints. That’s the way they’re used to teaching, so that's the way they’re going to teach.” Another teacher commented, "Maybe they don't understand how it would work or maybe they're scared of using it…it's easier to stay the way that you've done things. Once you get in a routine it's hard to get out of it, too.” This was echoed by another teacher, "Some of them are scared. Some of them are just nervous about integrating it and how it will go and if it will flop and most of this are the kids are very good with technology and we don’t want to look like a fool in front of them with using it.” Participant 8 added, "Being uncomfortable with technology. I think younger teachers do a much better job of integrating. Although, that's not always true, but I think it's harder if you're older and didn't grow up with it.” Participant 11 believed, "Sometimes I'm just afraid to do it. I think they might be, too. What do I do? Even with some of the training I'm thinking what if I mess up the computer? It takes time sometimes outside of the school or during the study time where we can get that and get it perfected. Then a lot of that is you're going to have to learn to do it on your own and then integrate it."
addition, Participant 11 said, "You become accustomed to this is how it's always been, so I'm not going to do it. Maybe you're afraid to go into the changes. That's what I can see, especially some of the seasoned teachers."

**Sub-theme: Ongoing support.** Encouraging teachers to use technology they have learned about in professional development and then giving them the support needed to correct problematic issues was an ongoing theme in interview and focus group conversations. Participant 3 indicated a desire for after-training support, "Having somebody to support you like if you have regular meetings with them or you have a regular time to get together, somebody that could walk you through stuff." Participant 15 added, "That's one thing that I don't see. We go to these trainings, and then we don't have a discussion about it. We don't keep up with who went to the training. We go and then it's forgotten." Participant 10 commented, "No real set supports; we must seek out additional help from the presenters on our own as needed." Participant 6 felt, "The bad thing about that is if there is a technology concern, we don't really have a pro in the district to address that concern."

When asked about after-training support, Participant 4 believed it was non-existent, "I don't see there is any. They don't care and then they…oh, I don't know, so keep going. Find somebody else." Participant 5 said, "There isn't a great deal of follow-up for people."

In relation to ongoing support, the Curriculum Director said, "We just feel like that would be some glue that we need, because we have brilliant teachers. I think our teachers, like I say, they’re doing great with what they have. They need time but they need support." The Curriculum Director added, "We get questions a lot on specific
software, specific apps especially or whatever. We just take the time to learn them ourselves." The Technology Director commented in relation to teachers using the Promethean Boards, "I don’t know, I guess a good thing would be to do follow up stuff. When we implemented it, we did a lot of PD. Now they’d have them for several years. We don’t repeat that PD." Principals believed the teams helped "support that kind of stuff." As far as ongoing support, one principal commented, "Once I've had a conversation with them [individual teacher], I tie that in with conversations that I have with the department leaders and the more computer literate teachers and just say, 'Hey, can you help so and so get involved?'" Principal A added, "We have people with so many different levels of comfort and ability to integrate this technology," when discussing who could give teachers support.

One teacher believed their peers, the administration, and the technology team typically carried out follow-up support. Participant 13 commented, "We have the support of our team members within our team. The administration's always very helpful. The technology team for the entire district, they're always helpful." Participant 14 agreed, "There are techy people in the building…the librarian."

**Sub-theme: Opportunities.** The Curriculum Director discussed several reasons for limited opportunities for professional development, "We’re limited by…you can only get so many teachers to do it, because you have substitute teachers. We can only get six teachers at a time to do that stuff, so you’re limited with that." He also mentioned lack of time for local technology training, "We’ve got three PD days during the school year. By the time you do technology, common core, new assessments, new teacher evaluation,
when you look at the plate and everything that’s on it, technology gets some of it, but it’s not much."

Teachers mentioned other types of missed opportunities. Participant 14 wasn't sure about asking to go to professional development in technology due to budget concerns. Participant 15 corroborated this by saying, "Think training…we're lacking money. It's kind of one of those situations where they want us to use it, but we don't have the money to train." Participant 5 said there were not many opportunities to use technology in the classroom due to the nature of the content taught. Participant 2 remembered teachers missed the opportunity to use a specific piece of technology due to a poor presenter, and then the program did not work for nine weeks, so teachers stopped using it.

**Sub-theme: Students as Barriers.** Participant 6 commented, "Just like teacher ability levels, the level of the kids is varying. Maybe the students also have different backgrounds with technology. You have some kids who can't even type in the web address properly. I've had to go back and re-teach kids." Participant 3 believed students were not using the technology properly, "Not using it for school good but using it as their social." This teacher believed this was a problem with every grade level and every subject. Participant 14 believed the number of students in a classroom and the behaviors are a barrier, and that perhaps all students were not getting the opportunity to use technology for learning. Participant 1 believed off-task students were a barrier to using technology in the classroom. Participant 2 said teachers' negative attitudes towards technology were due to students using cell phones inappropriately in class, "They see everything bad that the kid does, instead of recognizing that there’s bad and good. Some
teachers are just like, 'No, it’s all bad.' Getting them past that, I don’t know how you do that. Many kids are screwing around on the iPads, and they’re playing games when they have better things to do…if you don’t have the technology, you can better manage your classroom with fewer problems. It is a problem. 'Put your phone away.' How many times do you have to say that, and, 'Get off the game.' How many times do you have to say that? The kids can outlast any teacher, I swear!"

One participant also believed some students created barriers to integrating technology into instruction, "I think a lot depends on the students that have the technology in their hand. I see games, music, emails, that kind of stuff getting in the way. I see kids too often checking those things. It interrupts the learning." An elementary participant said, "Because so much of what you're doing is teaching how to do this or that. I think the little kids have a harder time focusing and getting from class to focus and figure things out. You lose time."

**Sub-theme: Other barriers.** Participant 15 commented, "We go to these trainings, and then we don't have a discussion about it. We don't keep up with who went to the training. We go and then it's forgotten. I've gotten in the habit of going and forgetting. It's like what's the point if we're not going to discuss it and try to implement it, and go on from there." Participant 3 said after training, implementation and integration did not take place because it was "not practical for me. It’s not practical for this semester at all," while Participant 4 believed some teachers just didn't want to. "They just don't want to. Because then you can say you don't know how or just plead the fifth." Participant 5 said, "Some people will use it because they have to once, but they don’t force themselves to use it over and over again. Sometimes I think it's a personality
thing, and some people really don’t like technology that much." Participant 11 indicated she would integrate technology more if she had a Promethean Board in her classroom, and she would need training as well, while Participant 2 believed some teachers just have a negative attitude. One participant said sometimes technology just does not fit in the curriculum. Principal B commented about how teachers may have to be convinced that this is going to be better for the kid than to what they already have access. "Then you almost have to paint the picture of where we're going with technology. Sometimes you have to paint the bad picture. This is what's going to happen as your kids go forward if you don't, because they're going into classrooms where this is going to be an expectation, and they're going to be doing this. Sometimes they have got to convince them that, yes, this is effective and, yes, this can work as well and better than what you're doing."

Another teacher told about using e-books in instruction. "It didn't work out well; pages change size and kids lose their place. I felt as if I were not in control. Maybe it's a control issue for me." Yet another teacher participant related an experience with failure of the technology. "I've had the experience a couple different times during the year when I got the labs and have something set up, the kids get on to different work, right? About halfway through that, if you've done it in Firefox, it would have worked, but it didn't work in Safari. Some things like that … once that happens once and it's kind of a fail, then it leaves a bitter taste and you don't really want to go back to it."

Participant 2 believed there was another barrier at stake, "To me, kind of a big barrier is - bigger than anything or anybody really - it’s kind of a societal thing. Kids don’t really value education, and they don’t really value learning. They feel like it’s something that we do to them, instead of that they’re in charge of their education and
learning. They don’t see that. I think that many teachers, especially if you work with all those kids all day, get just really tired of fighting the battle."

**Follow-Up Questions**

Towards the end of the study, the researcher developed several follow-up questions, based on participants’ responses during interviews. These were emailed to the teacher participants. Fourteen out of fifteen participants responded by email.

The first follow-up question was, "How knowledgeable are you regarding the district's long-range technology plan?" Out of the fourteen responses, eight teachers were not at all knowledgeable about the long-term technology plan for the district, and six teachers were somewhat knowledgeable or at least aware of such a plan. Participant 4 indicated she was aware just because she asked the technology staff, not because of any communication from the district; however, Participant 6 reported the Technology Director showed the faculty a spreadsheet identifying three different plans for obtaining iPad’s at the middle school level. In addition, Participant 9 indicated, "Yes, our technology director visits faculty meetings to keep us informed. They are currently working to add Wi-Fi to our newly renovated Roosevelt building. Long range they are looking into adding one-to-one at the middle school. They are looking three years out. Teachers would get their equipment and training one year prior to the students."

The Technology Director, who indicated there was a twenty-page technology plan, added, "I will talk to individuals. Sometimes the elementary, they ask me when we’ll get a lab upgrade. I just pulled up my computer; I said, 'this is what we talked about at the last board meeting. Here’s the three-year tech plan. This is where your lab's at.' Even that was at the board meeting. They weren’t aware of it." The Curriculum
Director added the following concerning how knowledgeable teachers were about the long-range plan, "We communicate it through our leadership team, which then needs to go out and take it to their schools. That’s kind of the progression that we go through as we talk about it as a district leadership team, principals, everybody here. Then they go down, and it probably loses some of its talking points as it goes down the chain. I’m sure it does, but that’s how we go through it and talk about it… I’d probably say not very. It would be my guess."

Principal A believed, "Teachers know the strategic plan for the district…I think for the most part, I believe that the Board Office and the Board of Education has deemed this as a necessary tool…It has been communicated through the strategic plan from the superintendent to the administrative staff and administrative staff to the teachers."

Principal B added, "I think the teachers, they understand where we are in terms of technology; they understand where we want to be two years from now, four years from now, six from now going out. They're beginning as they look at units and going forward. They're beginning to look at ways to integrate technology and integrate flexible technology that can be adapted as what we have to work with improves." Principal C commented, "Yeah, the vision is there at the board office, and the board members have that vision, but if we don't carry it out as principals then nothing really actually gets done in the building. I think that's a big point to hit home because all of us know the vision, where the board wants us to go. Almost every day or every fact of the meeting, one of us or all of us are talking about that vision constantly."

The second follow-up question was, "Are you aware of any performance indicators in the use of technology for students at each grade level?" Eleven teachers out
of fourteen were either unaware or not familiar with any student indicators for technology, while two teachers were aware of standards but were not familiar with them, and one teacher was aware of and used standards in teaching. During the focus group, principals believed there were proficiency levels attached to a particular class, such as keyboarding or a computer class, but there were no formal benchmarks in place for all students.

The third follow-up question was, "Are you aware or knowledgeable about performance indicators for teachers in increasing their knowledge about technology and how to integrate it into instruction?" Eleven of the fourteen respondents were either unaware of any existing technology performance indicators for teachers or did not have a good understanding of them. Participant 1 believed this might be a part of the goal-setting evaluation discussion with the administrator, and one teacher was knowledgeable about ISTE (International Society for Standards in Technology) standards, but believed the administration was either unaware or did not care to be aware of them.

The Curriculum Director indicated, "No. We’ve heard of them, we’ve read of them, we’ve seen them, they’re there. We just haven’t had the time to do them. Yeah, no, we don’t have anything like that in place, though." Principal C said, "We are using the SAMR (Substitution-Augmentation-Modification-Redefinition) model to move teachers from the lowest level of substitution to redefinition. Each level has specific expectations that move teachers from one level to the next. We had the staff take a survey that showed us where the majority of teachers fell, and we are designing PD around this for the year." Principal A mentioned, "I don't know about that specifically, but in our KEEP (Kansas Educator Evaluation Protocol), technology is part of two of the
four constructs: Content Knowledge and Instructional Practices. Both of those address or point toward using technology to enhance students' knowledge base and make the instruction more engaging." These comments indicated the district is moving in the future towards using a formal system to evaluate teachers' skill levels in technology integration.

The last follow-up question was, "Are you knowledgeable about how much student learning correlates with the use of technology?" Two out of the fourteen teachers believed there was positive correlation between the use of technology and student learning due to their reading of journal articles. For instance, Participant 4 said, "Yes, I have read many articles and reports that show how technology correlates with the use of technology and I have seen what the students can do when they are challenged. I just don't think many other teachers are aware of it or even care to be aware," while Participant 9 indicated, "Yes! This I have read a great deal about. There are many factors that are important here. Teacher training on use of technology is key. It is NOT the amount of time we use technology in the classroom, it is how we effectively use it. Technology use should be varied at each level, (elementary, middle, high school), as the students have differing needs. There have been positive impacts on student learning when technology is used properly. There are also economic factors that impact our students. These factors support the one-to-one push."

Five teachers attributed their positive beliefs about this correlation to their own experiences. An example of this came from participant 10, "I know that today's generation of students are much more technology-savvy than even my generation. Students are not as interested in things if it is not moving around and making noises. I
think technology helps in grabbing students' attention, but I don't know of any direct benefit to the learning process it has (I'm sure there is some though)." Seven teachers were not aware of any type of correlation.

When asked about correlation data, the Curriculum Director indicated the district had none, but Principal B commented, "We're starting to have data that says that now I … when I want to see changes going forward, I do want to see the data on how this impacts, and going into a new testing system, going into all this new stuff we are integrating all this technology. Are we seeing a positive impact? Can we tie that back into the use of the technology? We've been missing that on a small scale, where a teacher made a point, or teacher made assessments, which is then driving discussions, okay how did that happen? I did this, this, this. I used this program here and never seen that before. Let's talk about it." Principal C said, "It is really hard. We have a survey we give kids at the beginning and end of the year on how much do they use technology, do you think … it's more of a kind of perception surveys. How do you feel about it, are you using it, is it helping you? We just started that at the beginning of this year. We're going to take another one at the end of next year. Then we're going to come and do it. To see some performance type stuff, that might give us some interesting data. Yeah." Principal B believed the correlation of using technology and student learning is embedded within the instruction, so it becomes very difficult to measure effectiveness.

**Research Findings**

Teacher participants, focus group principals, and the two Directors were asked for their ideas for improving integration of technology and instruction throughout the district. The Curriculum Director said, "What we're moving forward with on our new technology
part in our strategic plan will be each building will have that technology cadre now. They can go through and say, 'Okay, here are the needs for what we’ve got.' The Curriculum Director explained that the building technology plans would begin to reflect the overall district technology plan by identifying similar goal areas and individual technology elements. If a technology element were missing, it would be incorporated into the building's goals for the following year.

The Curriculum Director explained, "If they had somebody who could really sit down, dedicate some time to them and find out where they are, what level they’re at, talk with them about what are some of their concerns; If somebody can really dedicate the time just to work with me, I’m trying one little thing." He added that ongoing support would be a key piece. The Technology Director added, "Wouldn’t it be awesome if you could just see an integration coach walking in and out of classrooms? That would be my dream - having an integration coach. I think that would just fill a huge gap. I’d love to have that. I think that would just benefit untold amounts." The Curriculum Director agreed, "If they’ve got that group, and they’ve got that focus on what they’re trying to do, if you had somebody who was like a technology integration specialist that would go with that group and then could say, 'Okay, so what are your goals? Okay, you two teachers really want to work on this type of app. You guys want to work on this,' or if you had somebody who could dedicate themselves to doing that, then they could do all kinds of coaching opportunities, because that person could help them put together their projects, their units, their lesson plans and facilitate that follow-up with that."

Teachers related a variety of strategies that would help them integrate technology and instruction to a higher degree. Some of these echoed the Curriculum and Technology
Directors' comments. These ranged from professional development on basic skills to a tiered system of interventions for struggling teachers to having a technology specialist on call in every building. Categories and responses from various participants follow.

**Time**

"Time would be nice." "Time to play with it because you try and take enough notes and try and remember how to do it, but then when you’re back here and you’re trying to do it, it’s like, it didn't work out right.” The need for more time to practice alone and with others was echoed throughout the study.

**Professional Development**

"Just some basic skills so I don't have to rely on other teachers when they don't really have the time to." "Take you where you are at and then just slowly build." "It would be nice to have something like MACE come here…even make it be more intense. Rather than just a day long, maybe a couple of days, and one day you’re getting training, the next day, you’re actually creating and having the people still there to help you. If you were actually creating and the trainers were still walking in the room, that would be fantastic because I know there have been words like, oh, I clicked this and it didn’t work. That might be a benefit, but that’s also very expensive." "Have different sessions that may be on different levels. Even levels is important, too, because not everybody is at the same level." "…maybe have levels: beginning level, intermediate level, advanced. So that you could move along the way you felt you needed. But have it closer together, once a semester or something. Have the first two fairly close together." Some teachers mentioned having professional development on building their own website and learning how to integrate technology with all levels of students, especially lower functioning ones.
Hardware

"If each student had their own laptop or iPad cart that stayed in the room." "If we [meaning "everyone"] had a Promethean board that would be nice." "Give the paras iPads so they can do a better job of assisting students."

Personal Instruction

"Maybe being paired up with somebody that is tech-savvy, that can tell me, hey, this is how you do this." "That would be nice to have somebody here, a pro, that can step in and say, hey, you're doing this right or wrong." "It’s going to be great to be able to call somebody and they’d be right there to help you, but that would also be wonderful if we had that in the budget. That type of support would be great." "Have a tech coach available to teachers." "I think I would like a goal to increase my own technology skill level." "Observing somebody using it and actually using it in a lesson because sometimes I think we see it at a workshop, then coming back and putting it in our lesson is a little bit more challenging." "I think they need at least one person in every building that would help, and that could come to your room if you were working on something and help you through it." "Maybe just having either a person that I work with or maybe from our technology team because they're techno-gurus, they know it all, maybe just having that person be able to sit down with me individually. This is what my goal is, this what I want my in product to be, what can I do to make sure that happens? I think maybe just time to sit down with those people would be great." "Having somebody to support you like if you have regular meetings with them or you have a regular time to get together, somebody that could walk you through stuff."
Relevancy

"Again, to me, professional development, to be worthwhile, has to be something I can use the next day. I can go change my lesson plans to fit it in, to put in practice immediately." "That right piece of technology that they're going to feel comfortable with, that they're going to feel like they can use and tied in to what they're doing." "It's got be quick and easy. It has to fit in."

Support

"Maybe just a little more follow-up afterwards to make sure they really understood what was going on and understood the training." "I think they need a little more direction as far as how to use things, and more follow-through. A lot of times we get, here it is, and then they never mention it again. Let them use the tools. Let them use it a lot instead of just for fifteen minutes and say well, that's what we're doing." "Have a little support group, if I had somebody on me like, 'did you get it done? Did you get it done?' Then I would feel more pressure to complete that."

Answering the Research Questions

This section will begin with two research questions and then discuss the overarching research question.

What factors impede or contribute to teachers effectively integrating technology and instruction in District A?

The district had an abundance of resources available to teachers in the form of hardware, software, and Internet capability, but not all teachers have equal access. Not all teachers have Promethean boards in their classrooms, and a few are not sure how to go about asking for them. All participants believed technology was important in teaching
and in student use, but actual integration of technology and instruction varied greatly from teacher to teacher due to skill levels, preparation time, amount of support for problems, and little specific collaboration time with other teachers. Although all participants believed the district and administration were supportive of external and internal professional development, there were observed differences in the amount of opportunities for each building. Peer presentations and choices available during professional development days were well received by teachers, and this was corroborated by observation at the high school professional development activity. Some teachers questioned relevancy of the topics during some professional development opportunities to their particular situation. Some teachers felt their needs as an adult learner were not always respected in professional development, especially in the area of decision-making. All participants agreed accountability processes for integrating technology and instruction were lacking throughout the district, but teachers believed there was an understood responsibility on their part to use the provided technology to implement learning from in-services and conferences and use it to integrate technology in their instruction.

Interview data confirmed barriers for teachers in integrating technology and instruction were time and ongoing support, as well as comfort level, limited opportunities for professional development, the students themselves, and various other barriers.

**What are the needs of K-12 teachers in District A in effectively integrating technology and instruction?**

All participants were able to describe an ideal classroom where technology was integrated successfully into the instruction; these descriptions included engaged students
and teachers using technology that was seamless, so technology was a tool and was not the focus of the lesson. Teachers discussed many and varied needs that would allow them to get to this point in developing their abilities in using technology. The desires of the teachers reflected the barriers previously discussed:

1. Communication concerning the vision of the district in technology
2. Professional development to learn strategies to integrate the technology into instruction, not just in learning how to use the technology
3. Knowledge of student and teacher standards or indicators of progress in using technology
4. An accountability system to reflect increase in acquisition of skills
5. A device available for each student during class time
6. More time in the school day to practice using technology alone and with others
7. Specific mandatory time set aside to collaborate
8. More opportunities to observe other teachers who are using technology successfully
9. A tiered system of interventions for teachers
10. An expert technology coach in each building to support individual teachers in creating technology-infused lessons and problem-solve
11. Setting specific personal technology goals
12. Use of technology mentors for "the digitally challenged"
13. Small groups who meet regularly to support each other in using technology
14. More follow-up support after training, such as specific meetings with small groups to collaborate and 'check' on each other

15. Training specifically geared to the needs of individual teachers

16. More teacher input in the decision-making process regarding professional development, acquisition of hardware, and choice in applications

17. Equitable treatment for each building in terms of hardware, training, and tech support

18. Flex time or pay during summer for teachers to convert curriculum materials or enhance skills

**Overarching Question: What are teachers’ perceptions of effective integration of technology and instruction?**

All participants had a vision of effective integration of technology and instruction in the classroom. The terms most often used were "seamless" and "engaged". Students would have the appropriate technology and access in the classroom for the lesson, and it should all work flawlessly. Students would work either individually or in small groups on engaging topics that reflected the use of some kind of technology in content, process, or product. The technology available would include classroom clickers, iPads, laptops, Promethean Boards, a variety of applications, and use of the Internet. Time would not be taken up in class teaching students how to use the technology; rather, time would be spent on facilitating student learning of the subject. Of course, none of this would take place unless the aforementioned barriers explained by all participants were nonexistent and the desired supports were in place.
Summary

This chapter provided data and an analysis of the data collected from interviews of teachers, the Technology Director, and the Curriculum Director and a focus group of administrators, a technology professional development observation, and a review of pertinent documents. The setting of the research study was described. The process of coding and resulting themes were listed and described in relation to the conceptual framework and the following research questions:

Overarching Question: What are teachers’ and administrators' perceptions of effective integration of technology and instruction?

3. What factors impede or contribute to teachers effectively integrating technology and instruction in District A?

4. What are the needs of K-12 teachers in District A in effectively integrating technology and instruction?

Excerpts from individual interviews, the focus group, observation, and formal documents that support the findings were provided throughout the chapter.

A master gardener inspects and gathers information about each plant in order to carefully meet each one's needs, so the result is a healthy, vigorous garden. Gathering data from teachers, directors, observation, and documents was done in this study to analyze the needs of teachers in the district when integrating technology and instruction. This will enable district leaders to learn what is needed to ensure that teachers learn about and use technology in a healthy, deliberate fashion to meet the needs of the district's students. Chapter 5 discusses the implications of these findings in greater detail.
CHAPTER FIVE
DISCUSSION AND IMPLICATIONS

At the time of this study, School District A was considered by other schools to be somewhat of a forerunner in the use of technology (personal communication, Technology Director, February 19, 2014). This can be attributed to careful planning by district leaders in many areas and to the hard work and initiative of the outstanding teachers throughout the district in learning and embedding technology in their instruction. The district has an abundance of hardware that is available in classrooms and computer labs for teachers and students. These included Promethean Boards in many classrooms and laptop carts that can be checked out from the media centers. Access to the Internet for research, surveys, and many other applications is available throughout the district. In 2012, a one-to-one iPad project was initiated at the high school level, and ongoing professional development is available for all teachers, inside and outside the district.

All participants in the study believed in the appropriateness and importance of integrating technology and instruction and the necessity that students learn how to use and benefit from technology. This was readily apparent in the district's 2012-2014 District Strategic Plan (Appendix M); one of the main focuses of the district's vision was to "enhance student achievement through the use of technology" (p. 2). It also provided for professional development for faculty and developing a training model at each school to increase technology integration.

As a former teacher in the district and a forerunner in the field of technology, and now a professor in an Education Department that prepares pre-service teachers, this researcher had great interest in the state of technology in public education. In a
conversation between the researcher and the Technology Director, the director expressed an interest in learning what barriers existed for teachers who did not always integrate technology and instruction, even though the district provided professional development and access to appropriate hardware, software, and the Internet. The findings were of interest not only to the district's Technology Director, but also to the Curriculum Director, administrators, the superintendent, and the Board of Education, as they sought information for improving their teachers' expertise in integrating technology and instruction.

This qualitative case study was conducted to examine teachers' and administrator's perceptions of the integration of technology and instruction in a small Midwestern school district. The study was framed by three research questions. The overarching research question was: "What are teachers’ and administrators' perceptions of effective integration of technology and instruction?" The remaining two questions were, "What factors impede or contribute to teachers effectively integrating technology and instruction in District A?" and "What are the needs of K-12 teachers in District A in effectively integrating technology and instruction?"

Two qualitative data sources were used. First, a representative sample of teachers and the Technology and Curriculum Director were interviewed, then a focus group of administrators (one from each level) was held. The three research questions were explored by asking teachers and administrators questions concerning their perceptions of frequency, category of use, and ideal use of technology in the classroom, what barriers and supports existed for integrating technology and instruction, and what was needed in the future to promote teachers' expertise and knowledge of integration.
Interview questions for teachers and the Curriculum and Technology Directors and the focus group are listed, respectively, in Appendixes E, F, and G. The focus group and interviews were recorded and data was transcribed. Data was triangulated using the interviews, a focus group, observation of a high school technology in-service, and appraisal of unobtrusive data. Open and axial coding was used to discover emergent themes and subthemes. The previous chapter ended with a summary of the findings as related to the research questions. This chapter includes a discussion of the findings as they relate to the literature through the lens of adult learning theory, implications for practice and research, and conclusion.

**Discussion of Findings**

The findings were filtered through the lens of Adult Learning Theory and the constructs of Technology Integration, Professional Development, and the Knowing-Doing Gap. Four themes and accompanying subthemes were discovered through open and axial coding: a) Integration of Technology and Instruction; (b) Professional Development; (c) Accountability; and (d) Barriers Contributing to the Knowing-Doing Gap. Table 9 shows the four themes and sub-themes derived from the coding process.

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<tr>
<th>Theme 1: Integration of Technology and Instruction</th>
<th>Theme 2: Professional Development</th>
<th>Theme 3: Accountability</th>
<th>Theme 4: Barriers Contributing to the Knowing-Doing Gap</th>
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<td>PD Opportunities</td>
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<td>Opportunity for Collaboration</td>
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<td>Support for Technology Integration</td>
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<td>Students as Barriers</td>
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Table 5

**Themes and Subthemes.**
Adult Learning Theory

Knowles' (1984) following six core principles of andragogy were based on his study of adult learners.

1. It is important adults understand why they need to learn something before attempting to learn it.
2. Adult learners view themselves as being responsible for their own decisions.
3. Experiences of adults play a large role in determining final outcomes.
4. Adult are ready to learn things that can be applied to their real life situations.
5. Adults exhibit more motivation and orientation to learning when the learning is applicable to their own problems or life tasks.
6. Motivation to learn is a response to external situations. (p. 57-63)

These principles can be applied to the responses of teachers throughout this study.

Although a few participants in the study related an incidence of not feeling respected during training by an out-of-district presenter, for the most part, participants felt as if they were respected during their actual participation during in-service activities. What was an issue was the sense of relevancy of professional development to each participant's unique situation and the applicability to one's own classroom situation. The following discussion was based on participants' responses.

One facet of participants' responses is the opportunity to contribute to decisions made by administration as to the type of professional development in each building. For the most part, teachers had little understanding of how decisions on professional development in technology were made. There seemed to be no consistent communication that took place in any building that would influence decision-making
concerning professional development. At times, decisions appeared to be made just prior to the event itself with no sense of visible thought and preparation. Sometimes there was an email sent to teachers, or a specific group of teachers would be consulted, but more often than not, the professional development topic would just be announced some time before the event.

Adult learners prefer to be self-directed; it is natural that participants felt they would benefit from professional development that was geared toward their specific, individual need. Learning must be practical and useful for adults, and they must be made aware of how the knowledge will be used in their “daily practice” (Pereira & Aherne, 2009, p. 126). Participants felt they benefited greatly from the "cafeteria" style professional development, where they were able to choose the training that was most applicable to their level of expertise and their students.

The teachers varied greatly in their knowledge and application of technology. Even though the district has generously supported teachers in their requests for external professional development, there are some teachers who felt unsupported in internal professional development. This was due to their need for more instruction and practice at individual levels of integration, or, as some participants mentioned, they left an in-service frustrated by the irrelevancy of it to their own needs. Vella (2002) found instruction for adult learners should be sequential and reinforced. For instance, offering professional development on how to teach with an app on the iPad would be out of sequence to a learner who was not familiar with actual manipulation of the various tools on an iPad. Cross (1981) recommended adults be offered choices as to availability and organization.
of learning programs. He also recommended adaptation in instruction based on the capabilities of each participant.

Participants felt they would benefit from having frequent allotments of time devoted to specific technology tasks, for follow-up support, collaboration, or training, rather than going for a few hours to a training two or three times per year. Suggestions were to formally allocate part of the PLC time for this or create a specified "Tech Time" at another time in the school day. Teachers were only interested in time outside of the school day if it was comp time or paid time.

Adult learners prefer hands-on experiences, in preparation for carrying out similar activities in their field. Teachers would like to have ample time for practice immediately after learning something new. Participants also want to observe other teachers being successful in using and applying technology in their instruction other than for a few minutes while accompanying an administrator during a walk-through.

Participants stressed their need to meet with other teachers, mentors, or a partner to collaborate and learn together or talk about their ideas and observations. They felt feeling accountable to someone else would be a motivator for their own learning and doing. A few participants stated the benefits of learning in small groups or in a one-to-one endeavor. Vella (2002)) found the need to feel safe while learning is an absolute necessity for adults. A smaller venue may encourage this feeling of safety, therefore encouraging adults to take risks in learning and doing something challenging.

Adults are motivated by a need to achieve and to increase their self-esteem. Instituting a model like Substitution-Augmentation-Modification-Redefinition (SAMR) would assist teachers in understanding their own levels of integration of technology and
would enable them to set realistic goals as they advance through the levels (Puendetura, 2006). As teachers saw their students benefiting from their increase in their own knowledge and expertise, their self-esteem would naturally improve.

Adult learners respond well to an organized, well-defined learning program with clearly explained goals. A model like SAMR, explained in the next section, which can be aligned with professional development, would enable teachers to know what their starting level is and how they can progress through each level.

**Professional Development**

Professional development is a vital component of any policy that affects teaching and learning. The factor that is most important for student learning is teacher quality (Darling-Hammond & Berry, 1998). Geringer (2003) also believed having a good teacher was crucial to student learning and stated a quality teacher was more important than standards, class size, or amount of funding. Teachers have to increase their content knowledge and become skilled at using new teaching strategies. One way to improve teacher quality is through professional development (Colbert, Brown, Choi, & Thomas, 2008). During the interview process, it became clear that professional development was not as effective and as worthwhile for all teachers as district leaders believed it was.

Professional development must cater to meeting the needs of teachers as adult learners if it is going to be successful. Being pragmatic, most teachers tend to desire specific and concrete ideas that relate directly to the daily operation of their classrooms (Fullan & Miles, 1992). While this researcher understands the heavy burden of nearly unlimited responsibilities placed on teachers to stay up to date on other issues, such as the Common Core, bullying programs, new teacher evaluation programs, intervention, etc.,
learning to integrate technology and classroom instruction well is indeed a worthy priority that can, undoubtedly, transform the classroom through empowering and motivating one's students to achieve. Teachers benefit from taking in new knowledge and developing skills that allow them to re-invigorate their teaching; sitting through a professional development merely to earn points for participation should be left in the past. One model of preparing teachers for technology integration is the SAMR model.

The SAMR model created by Ruben Puendetura was designed to assist educators in integrating technology into their teaching and learning (Puendetura, 2006). Use of the model enables teachers to design, develop, and integrate technology in ways that lead to student success.

The SAMR model enables teachers to gauge how technology is utilized in their own classroom. The ratings are influenced by the teacher’s comfort with the technology. The focus is on what can be done with the technology. The model is premised on using technology as a tool for learning, not as a substitute for the teacher. Technology integration can be considered on a continuum - moving from substitution to the redefinition of classroom activity.

**Substitution** is when technology is used as a direct substitute for existing classroom practices. It is doing the same task with the introduction of technology but without any modification of the task. For example, using a note taking application on the iPad to draft a document rather than handwriting with paper and a pencil.

**Augmentation** involves some functional improvement, but is still a direct tool substitute. The task has not changed, but been enhanced slightly. For example,
using some of the iPad’s built in tools such as the thesaurus, dictionary or speak mode to augment the classroom task. If technology integration remains in the substitution and/or augmentation level, classroom workflows will only be slightly enhanced. Students may be engaged while using technology in the classroom, but the use of the device remains defined and limited.

**Modification** involves giving students a different kind of task. An example is using multimedia and adding sound and video.

**Redefinition** is doing something that was inconceivable without technology and gives students a stage. An example is creating a digital storybook to share with students across the classroom, school or world. When technology is used in this way, it leads to the transformation of classroom and student workflows, and the technology is used in its most effective form. (Department of Education, 2014, para. 9)

The model moves from enhancing the classroom atmosphere to actually being transformative, so students and teachers are using technology in a seamless, effective fashion to achieve student learning at a deep level. The technology ceases to be the main character in the classroom; it takes a supporting role as a tool, which is where it belongs.

The high school in the district recently gave a survey to teachers to determine the level of each teacher according to the SAMR model. This is a great beginning to aligning professional development with the specific levels of technology integration of teachers.

**The Knowing-Doing Gap**

Pfeffer and Sutton (2000) questioned why knowledge of what needs to be done often does not result in the required action or behavior that is consistent with that
knowledge. Understanding the knowing-doing framework allows a district “the opportunity to leverage action to obtain maximum benefit” (Washington State Association for Supervision and Curriculum Development, 2011, para. 3).

Pfeffer and Sutton (2000) recommended the pursuit of several avenues for organizations who want to eliminate the knowing-doing gap. Appropriate ideas for this district are included in this section.

Why before how: philosophy is important. This relates to adult learning theory. Adults want to know why any type of change will be useful in their present endeavors. Teachers and administrators were aware that several teachers in the district want nothing to do with using anything other than the basic technology for emails and online grading in their classrooms. An important step for these teachers would be attending professional development that teaches why embedding technology is effective and necessary, along with encouraging them to take small steps toward increasing their skills and knowledge. Again, pairing them with mentors may be a comfortable arrangement for them.

Knowing comes from doing and teaching others how. There are quite a few teachers in the district who are extremely knowledgeable about integrating technology into instruction. The district has used these teachers in several in-house professional development opportunities. These have been successful, and participants speak well of them. Recruit these teachers for the tech cadre addressed in the 2014-2016 Strategic Plan (Appendix N), and based on the results from the SAMR survey, incorporate their knowledge and experience when planning future in-service opportunities. As teachers progress, tech cadre members can step down, and new members will be able to also learn more by teaching others.
Fear fosters knowing-doing gaps. So drive out fear. Establishing a climate of collaboration and acceptance will assist those teachers who are less than eager to try something new in the classroom for fear of failure before one's students due to lack of knowledge about a specific tool or application. Assigning mentors to inexperienced teachers, meeting frequently in small groups, giving time for observation of teachers in the 'seamless' category, and allowing time to design and practice are all ways to banish fear of failure. Another suggestion would be to have a mentor in the classroom during a novice teacher's first time using technology in a lesson. The mentor can give valuable feedback and also be available for trouble-shooting during the lesson.

Be reminded this is a process. Change does not occur rapidly, but with fits and starts, and there will be disappointments along the way, but there will also be celebrations of accomplishments!

Limitations of the Study

The overall design of this case study contributed to several limitations. One limitation was that all data is self-reported, and teachers may have reported their level of integrating technology and instruction at a more desirable level than which they are actually functioning, due to their desire to appear more skilled than they actually were.

The data was gathered from teachers and administrators in one small school district in the Midwest. The findings were based on the experiences and beliefs of a small sample of participants, and this specific sample may impede generalization of the findings. Participants volunteered to be included in the study, so beliefs and experiences of all teachers and administrators in the district were not included in the study. A larger population of participants may add new information to the study.
Implications for Practice

Following an exhaustive search of the literature and the understanding of the realizations learned from this study, the following recommendations are humbly offered to assist district leadership and other practitioners in their efforts to improve and increase the level of technology integration in their classrooms.

1. Communicate, communicate, communicate! This one endeavor can alleviate barriers and increase support throughout the district. The vision and Strategic Plan of the district should be shared among all stakeholders, including teachers in all buildings. Teachers need to be involved and knowledgeable about the direction the district will follow in technology integration. This alone could be motivating to teachers as they plan their personal development of technology skills. The vision in each building should align with the district's vision, which the Curriculum Director discussed during the interview.

2. Successful endeavors have one thing in common: strong leadership. Administrators should be fully engaged in the process of assisting teachers in integrating technology. Leadership teams, or cadres are recommended at each building to fulfill roles as leaders, planners, mentors, and coaches. The Strategic Plan for 2014-2016 (Appendix N) emphasizes cadres in each building.

3. Continue the supportive environment established throughout the district in encouraging teachers to take risks. Most of the teachers saw their administrators as extremely supportive and gave kudos to the Technology Director and technology staff for their continued work.

4. Incorporate use of the SAMR model into the principals' walk-through evaluations
so the level of rigor and student engagement in the technology-laden classroom can be evaluated, rather than just the instance of technology use.

5. Research the possibility of purchasing a student monitoring tool, such as DyKnow Vision or LanSchool to allow teachers to monitor and share student screens in one-to-one schools by monitoring thumbnail versions of each student's screen. Teachers are also able to blank screens, limit applications, poll students, and students are able to silently request help. This would support teachers' concerns about inappropriate use of iPads during classroom time.

6. Professional development at this point should focus not on how to use an application or use an iPad, but should focus on how to successfully integrate what teachers already know about using technology in a constructivist manner into their instruction. They need to be taught how to use technology to enhance the curriculum. When this approach to professional development for technology integration is undertaken, learning with technology will occur, and students will take a more active and engaging role in their learning process (Keeler, 1996). Be mindful that the process is slow, and success should be celebrated along the way. Site visits to schools that are successful in technology integration should be encouraged.

7. Training designed to meet specific needs of teachers at their individual levels should be conducted. Basics should not be overlooked for those who need beginning training in using the Promethean Board or using applications.

8. Training on how to manage a classroom filled with students using technology should be included in professional development. Address how to create
conditions for learning for students that include being responsible for control of their iPads and other types of technology in the classroom.

9. Consistent, on-time communication among all participants as to the type of professional development needed and time allowed for professional development should occur systematically at all levels.

10. Create a seamless, simple format for teachers to indicate their needs as to hardware and software applications. If some teachers are not using or do not need Promethean Boards, consider transferring them to those who want and need them.

11. Create a district goal to have a technology integration specialist in each building. This could be a new hire or a part-time responsibility for an existing position. "Many teachers do not know how to design and support a technology-rich learning environment…Coaching, combined with communities of learning, is a highly effective job-embedded professional development model" (ISTE, 2011, p. 2).

12. Add additional technology staff to meet the needs of buildings in a meaningful, timely fashion. The district has been short-staffed in this area; this will make the teachers feel more secure about using technology, as assistance will be available in a much more timely fashion.

13. Consider establishing requirements for student proficiency at each grade level so students are able to quickly and efficiently use the various forms of technology in each subject area and grade level.

14. Accountability – there was much discussion with participants concerning accountability for integrating technology and instruction. Some participants were
appreciative that the district had not put 'pressure' on them to be at a certain point in their development, while others believed some form of "actual" accountability might be a successful strategy to encourage all teachers to build their integration skills. Of course, including the SAMR model in the principals' walk-through would be one form of actual accountability. Administrators setting integration goals with teachers would be another form of actual accountability to consider. "Understood" accountability would take place when teachers are paired with mentors or are working in collaborative groups to improve integration.

**Implications for Future Research**

The following implications emerged for future research studies in an effort to contribute to the existing amount of research in regards to technology integration. First, data produced from findings gained from a similar study conducted in a larger setting could be compared to the findings from this study. Another avenue of future research would be to conduct a longitudinal study of this same district monitoring improvement, as they begin to use the SAMR model, and teachers continue to improve their skills in integrating technology.

Another implication for future research would be to conduct a study to discover how a high level of integration of technology and instruction in a school building or district impacts student achievement. In addition, a study to determine whether teachers' existing pedagogical beliefs influence their desire to integrate technology and instruction in ways recommended by current literature would add to the literature. Another avenue of research would be to study students' perceptions of their own engagement and
achievement when appropriate integration of technology and instruction exists in the classroom setting.

**Conclusion**

Creating a lush, well-tended, nutritious garden that includes colorful flowers and greenery means the gardener has overcome many barriers and has various supports in place. The soil has had amendments mixed in; these may include organic compost, blood meal, bone meal, lime, or peat moss to improve fertility, consistency, and pH. Perhaps the vegetables and flowers in each section are companion plants that together ward off pests. An interesting, sturdy fence surrounds the garden in order to keep out plant predators, such as deer or rabbits. A digitally controlled irrigation system on a timer runs to every plant for on-demand watering. Individual plants that need special attention, like staking or tying to a fence, have been provided the necessary supports. This makes for an eye-catching and welcoming display that provides sustenance and enjoyment for all who enter.

Just as a seamless system of attending to a garden's needs may lead to a successful harvest, attending to the needs of teachers and consequently, students, by decreasing barriers and increasing desired supports may lead to successful integration of technology and instruction. Understanding the characteristics of adult learners will assist in this process (Galbraith & Fouch, 2007; Knowles, 1984). Teachers, principals, and the two directors agreed the district has a long way to go in reaching the point where technology in instruction is a seamless process. Hence, this study, which sought to discover the perceptions, barriers, and supports needed to improve the integration of technology and instruction for all teachers and students in all buildings.
It is obvious students are connected to technology in a way previous generations were not. Bringing their interests and skills into the classroom by integrating technology and instruction seems to be a natural bridge to engage students in their own learning. District A is definitely a student-centered environment, with tremendously caring and talented individuals who desire improvement in technology integration for the success of their students. It is the focus of the district to build capacity in its teachers and leaders to support and use technology use in a meaningful and engaging way that will prepare students for living and working successfully in the 21st century. Hopefully, the information included in this study will enable District A to create a collaborative culture in each school that will enable teachers to implement technology in ways that will positively impact student achievement.
References


Williams, K. (2007). *Beliefs about technology integration support factors held by school leadership and school faculty: A mixed methods study.* (Doctoral dissertation). Retrieved from Georgia State University, Digital Archive @GSU.

February 18, 2014

Jane Bennett, Assistant Professor

Dear Janie:

You have permission to conduct your study, "A Case Study of the Integration of Technology and Instruction in a Rural Midwestern School District" in USD____, _____ Public Schools, with our certified staff.

Sincerely,

(Signature)

Superintendent of Schools
Appendix B

Superintendent's Letter to Staff

To Administrators and USD ___ Certified Staff:

Some of you may remember Janie Bennett, who taught in our district for nearly 30 years as a middle school special education teacher and as a high school counselor. Now an assistant professor in the Education Department at Benedictine College, she is completing her dissertation at the University of Missouri and will be conducting a study in our district. Her dissertation is entitled, "A Case Study of the Integration of Technology and Instruction in a Rural Midwestern School District". The study focuses on teachers’ and administrators’ perceptions of how technology and instruction are integrated, and also on what supports or barriers they believe exist. This study will help our district in providing recommendations for professional development and support for technology integration in the future.

I believe it is important for every teacher who wants to participate in the study to voice their opinions and beliefs on this subject. Voices from teachers at every level of technology expertise should be and are invited to be heard. The study is confidential; no identifying information, such as grade level or subject taught, will be disclosed; the study has been approved by the Institutional Review Board of the University of Missouri.

Soon Mrs. Bennett will contact you by email to ask you to be a part of the study, which will take about one hour of your time. I encourage you to volunteer to be one of the participants.

Sincerely,

(signature)
Appendix C

Initial Contact Email

Good day,

I am a doctoral student at the University of Missouri working on my doctoral degree in Educational Leadership and Policy Analysis and am working with your district to gather information about your technology program. This information will be used to improve technology support services and plan future technology professional development. Your input is extremely valuable in this project.

Your participation as either an interviewee or a focus group member (administrator) is entirely voluntary; there will be no compensation for participating. I’d like to assure you that all participants will be protected by anonymity and confidentiality from any negative repercussions from participation. The interviews and focus group will be held in a quiet and secure setting at a time convenient for you, and you will have the opportunity to review a transcript of the interview or focus group for corrections. I would like to begin accumulating data within three weeks, so please respond soon if you are interested.

There are no known risks or discomforts associated with this research study. If you have concerns you may contact my research advisor, Dr. Carole Edmonds, at cake@nwmissouri.edu or 660.562.1258. If you would have any further questions, please feel free to contact me, the researcher, at janieben@rainbowtel.net

Please read over the attached Informed Consent Statement to become familiar with your rights. If you consent to be interviewed in a one-on-one situation, please contact me at the following email or phone numbers (Numbers were deleted to be faithful to anonymity of the district):

janieben@rainbowtel.net

I look forward to hearing from you soon.

Janie Bennett
Assistant Professor

janieben@rainbowtel.net
Appendix D

Informed Letter of Consent

The Department of Educational Leadership and Policy Analysis at the University of Missouri supports the practice of protection for human subjects participating in research. The following information is provided for you to decide whether you wish to participate in the present study. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time. If you do withdraw from this study, it will not affect your relationship with this unit, the services it may provide to you, or the University of Missouri.

Purpose of the Study
The purpose of this study is to develop an understanding of the perceptions of teachers and administrators in your district on integrating technology and instruction. The study seeks explanations for factors that are barriers or contributors to this integration. In addition, the study will identify teachers’ ideas for district support that is beneficial to integration of technology and instruction.

Procedures
By giving your written consent to participate in the study, you are consenting to (a) be interviewed or be a member of a focus group for a maximum of one hour, and/or (b) provide relevant documents, and/or (c) be available for follow up questions for a maximum of one hour. With your permission at the time of your interview(s) or focus group, the conversation will be audio recorded, and the recording will be kept in a secure location for seven years after it is transcribed. If you do not give permission for such recording, it will not be done. All materials related to the study will be stored in a locked file cabinet within a locked office when not in use. You may choose to receive a copy of the finished study.

Risks
There are no risks to you associated with participating in this study.

Benefits
The benefits of participating in this study include gaining a better understanding of barriers, contributors, and supports for technology and instructional integration. The benefit to you as a participant include better understanding the nature and effect of technology and instructional integration and a better understanding of the perceptions of others regarding this topic. The benefit to the academic community includes broadening the understanding of why or why not technology is integrated with instruction by teachers in your district.

Participant Confidentiality
Although names of individuals and agencies will be collected, they will not be used in any written reports of the findings of the study. Through use of a data coding system and
pseudonyms, diligent effort will be made to preserve the anonymity of participants and agencies.
Permission granted on this date to use and disclose your information remains in effect indefinitely. By signing this form you give permission for the use and disclosure of your information for purposes of this study at any time in the future.

Refusal to Sign Consent and Authorization
You are not required to sign this Consent and Authorization form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Missouri or to participate in any programs or events of the University of Missouri. However, if you refuse to sign, you cannot participate in this study.

Cancelling This Consent and Authorization
You may withdraw your consent to participate in this study at any time. You also have the right to cancel your permission to use and disclose further information collected about you, in writing, at any time, by sending your written request to: Janie Bennett, 504 Eminence Rd., Bendena, KS 66008.

If you cancel permission to use your information, the researchers will stop collecting additional information about you. However, the research team may use and disclose information that was gathered before they received your cancellation, as described above.

Questions About Participation
Questions about procedures should be directed to the researcher(s) listed at the end of this consent form.

Participant Certification:
I have read this Consent and Authorization form. I have had the opportunity to ask, and I have received answers to, any questions I had regarding the study. I understand that if I have any additional questions about my rights as a research participant, I may contact the University of Missouri’s Campus Institutional Review Board at umcresearchcirb@missouri.edu, call 573.882.9585, or write the Campus Institutional Review Board, Office of Research, University of Missouri, 483 McReynolds Hall, Columbia, MO 65211.

I agree to take part in this study as a research participant. By my signature I affirm that I am at least 18 years old and that I have received a copy of this Consent and Authorization form.

__________________________________________         _____________________
Type/Print Participant's Name                          Date

__________________________________________
Type/Print Researcher’s Name                          Date
Researcher Contact Information:

Janie Bennett  Carole Edmonds, Ed.D.
Principal Investigator  Faculty Advisor
504 Eminence Rd.  Educational Leadership and Policy Studies
Bendena, KS  66002  Northwest Missouri State University
785.988.4287  Maryville, MO
janieben@rainbowtel.net  660.562.1258
cake@nwmissouri.edu

Campus IRB Approved 2/19/2014
IRB #1210738
Appendix E

Teacher Interview Questions

Pseudonym: __________________________________________________

Personal:

1. What grade and subject do you teach?

2. How many years of teaching experience do you have? What areas?

3. How long have you worked in District A?

4. How would you describe your level of skill in using computers for work?

5. How many hours per week do you typically spend in planning for instruction or preparing materials that will help students use computer technology for learning?

6. In the past four weeks, how often have students (in your classroom) used computers for instructional purposes?

7. Do you believe students use computers too much or too little?

8. How do you use computers in instruction?

9. How often do you use computers in instruction?

10. What do you think of the quality of the software available to teachers and students?

11. How comfortable are you in designing and delivering lessons that integrate technology and instruction on a scale of 1-10?

12. How do you use instructional technology to assess student progress? to assess progress on meeting Common Core Standards?

13. What would you expect to see in a classroom where technology is ideally integrated in instruction?
14. Estimate the number of hours of professional development in technology you have participated in during the last 12 months.

15. How easy is it to put into practice what you learn about integrating technology and instruction in a training or workshop? Is it time consuming?

**General:**

16. In what ways are teachers encouraged to integrate technology and instruction?

17. How important is computer technology to student learning?

18. What conditions or resources make it easier or would make it easier for teachers to integrate technology and instruction?

**Professional Development:**

19. How knowledgeable and supportive of instructional technology and training is your administrator?

20. How relevant is the content of technology training to teachers in this district?

21. In what ways do you feel respected during training?

22. After training, what requirements or supports are in place for teachers using new technology?

23. What opportunities exist for working with other teachers to integrate technology and instruction?

24. How are teachers held accountable for integrating technology and instruction?

25. Why do you think some teachers do not integrate technology and instruction even after professional development and being furnished with appropriate technology?

26. How often are teachers consulted when planning for technology and instructional integration?
27. What are the barriers to integrating technology and instruction for teachers in this district that we have not discussed?

28. What kind of professional development do teachers need to enhance their technological skills?

29. What other types of support for technology integration would teachers like to have?

30. Is there anything you would like to say on this topic that I have not asked you about?
Appendix F

Administrators’ Focus Group Questions

1. What is your level of experience in using technology?

2. What is your vision for integrating of technology and instruction for students?

3. How do you communicate this to your teachers?

4. What percentage of your staff integrate technology and instruction to your satisfaction?

5. What are the barriers for your teachers in integrating technology and instruction?

6. What do you do or can you do about overcoming these barriers?

7. What professional development opportunities are available for your teachers?

8. How is professional development decided? Who has input?

9. What follow-up or support is present for teachers after professional development?

10. Is there anything you would like to say on this topic that I have not asked you about?
Appendix G

Directors' Interview Questions

These questions were asked of the Curriculum Director and the Technology Director.

1. How do teachers learn about instructional technology in your district?

2. What professional development opportunities are available to teachers?

3. Do professional development opportunities include modeling? coaching? visits to other schools in the district? What else?

4. Describe your role as a district technology director.

5. What is the district vision for technology integration? How is this vision communicated to teachers and administrators?

6. What are the barriers to integrating technology and instruction?

7. What strategies have you used to help teachers overcome these barriers?

8. What professional development opportunities are available for your teachers?

9. How is professional development decided? Who has input?

10. What follow-up or support is present for teachers after professional development?

11. What would you like to change about the use of technology in this district?

12. Is there anything you would like to say on this topic that I have not asked you about?
Appendix H

Follow-Up Questions

1. Are you knowledgeable about the district's long-range technology plan?
2. Are you aware of any performance indicators in the use of technology for students at each grade level?
3. Are you aware or knowledgeable about performance indicators for teachers in increasing their knowledge about technology and how to integrate it into instruction?
4. Are you knowledgeable about how much student learning correlates with the use of technology?
Appendix I

Technology Department Information

# of Technology Workers in the District

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Helpdesk Requests

8/18/2011 to 3/18/2014 3,635 total requests
Appendix J

Promethean Board District Inventory

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<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87&quot; Short -Throw Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87&quot; Short -Throw Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87&quot; Short -Throw Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
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</tr>
<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87&quot; Short -Throw Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
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</tr>
<tr>
<td>Date</td>
<td>Type</td>
<td>Notes</td>
</tr>
<tr>
<td>------------</td>
<td>--------</td>
<td>---------------------------------</td>
</tr>
<tr>
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<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
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</tr>
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</tr>
<tr>
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</tr>
<tr>
<td>12/13/2012</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>2/20/2014</td>
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<td>87&quot; Short - Throw Projector</td>
</tr>
</tbody>
</table>

**Total = 46 (77 teachers) 60%**

### MIDDLE

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/10</td>
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<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/9/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/9/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/9/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
</tbody>
</table>

**TOTAL = 11 (36 teachers) 31%**

### HIGH SCHOOL

<table>
<thead>
<tr>
<th>Date</th>
<th>Type</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>7/1/10</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>1/1/10</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>6/1/08</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>6/1/08</td>
<td>Fixed</td>
<td>78&quot; Ceiling Mounted Projector</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>Fixed</td>
<td>87&quot; Short - Throw Projector</td>
</tr>
<tr>
<td>Date</td>
<td>Status</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>--------</td>
<td>------------------------------------</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>Fixed</td>
<td>87” Short -Throw Projector</td>
</tr>
<tr>
<td>Fall 2010</td>
<td>Fixed</td>
<td>87” Short -Throw Projector</td>
</tr>
<tr>
<td>9/20/2011</td>
<td>Fixed</td>
<td>87” Short -Throw Projector</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>17 (39 teachers) 44%</strong></td>
</tr>
</tbody>
</table>

**ALTERNATIVE SCHOOL**

<table>
<thead>
<tr>
<th>Date</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/1/10</td>
<td>Fixed</td>
<td>78” Ceiling Mounted Projector</td>
</tr>
<tr>
<td>6/1/10</td>
<td>Fixed</td>
<td>78” Ceiling Mounted Projector</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>2 (8 teachers) 25%</strong></td>
</tr>
</tbody>
</table>
Appendix K

Apple Technology Profile Survey
[sic]

Education Technology Profile Report

Name of Institution: Atchison High School
City: Atchison
State: KS
Date Survey Closed: 01/31/2014
Number of Responses: 39

The survey that your faculty have just completed was designed to provide you with some general demographics of technology use and three key pieces of information:

- An overall profile of the levels at which faculty are using technology in their classrooms;
- The types of professional development that might best assist your faculty in enhancing their technology-based practice, broken down by topic groupings;
- The types of teaching-oriented professional activities that your faculty engage in outside the classroom, broken down by category.

The information associated with this survey is only intended for informational purposes and for your internal use. Please do not distribute beyond the intended personnel within your institution.

General Technology Demographics

[Diagrams showing grade level and subject area demographics]
SAMR Analysis

The conclusions for the second section of the report are drawn from Dr. Ruben Puentedura’s SAMR model, which outlines four tiers for the use of technology in the classroom:

- **Substitution**: The new technology is used as a direct substitute for an older tool, with no change in the tasks undertaken by students or how these tasks are accomplished using the new toolset. At this level, no noticeable improvements in student outcomes are recorded.

- **Augmentation**: The new technology substitutes for an older tool, with no change in the tasks undertaken by students. However, features of the new technology are used to improve how these tasks are carried out by students, such as by making the tasks easier or faster to accomplish or by providing additional features not previously available. At this level, small improvements in student outcomes are recorded.

- **Modification**: The tasks to be undertaken by students are significantly redesigned in order to achieve new educational goals. The redesign is made possible by features of the new technology, not available before. At this level, noticeable improvements in student outcomes are recorded.

- **Redefinition**: Older tasks are replaced in part or in whole by newer tasks in order to achieve previously unattainable educational goals. The new tasks are made possible by features of the new technology, not available before. At this level, strong improvements in student outcomes are recorded.

While a full determination of the habitual SAMR level of a teacher’s practice requires classroom observation and conversations with both faculty and students, the current questionnaire has been found to be a good proxy. The scoring methodology was developed and refined in test survey sessions with Apple Distinguished Educators (ADEs) and validated by comparing scores to narrative answers given by the ADEs describing their classroom practice. The level of an individual teacher’s practice might potentially be slightly higher or lower than predicted by the questionnaire; however, noticeable discrepancies between questionnaire results and described practice were only observed in fewer than 1% of the responses.

The overall percentages of SAMR practices by faculty in your school are as follows:

![Teacher SAMR Practices](image-url)
Levels of Professional Development

It is important to realize that all four levels of SAMR practice can make valuable contributions to the work of an institution; however, large improvements in student outcomes are not observed until the upper levels are reached. Hence, it is desirable for faculty to progressively develop their practice to reach these upper levels. It is also worthwhile to identify the categories and levels of professional development that will prove most useful to educators, in order to assist them in reaching these levels. The current questionnaire identifies three levels of professional development best suited to faculty:

- **Level 1**: Corresponds to the APD Foundations workshops. Focused on technology skills, these foundational workshops help faculty become confident and comfortable integrating Apple products into their teaching strategies.

- **Level 2**: Corresponds to the APD Curriculum workshops. These workshops focus on curricula, content design, and instruction with all Apple products.

- **Level 3**: Corresponds to the APD Support and Leadership workshops. These offerings support faculty and administrators in technology visioning, planning, and building capacity.

The percentages of faculty at each of these three levels, in key toolset categories, are as follows:

**PD Levels Best Suited for Teachers**

![Pie chart showing percentages for Level 1, Level 2, and Level 3 of professional development](chart.png)
<table>
<thead>
<tr>
<th>Toolset Categories</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td>79.5%</td>
<td>20.5%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Mobile</td>
<td>82.1%</td>
<td>10.3%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Data Analysis</td>
<td>71.8%</td>
<td>25.6%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Visualization</td>
<td>82.1%</td>
<td>12.8%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Media</td>
<td>66.7%</td>
<td>25.6%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Digital Storytelling</td>
<td>59.0%</td>
<td>38.5%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Educational Gaming</td>
<td>69.2%</td>
<td>25.6%</td>
<td>5.1%</td>
</tr>
</tbody>
</table>
Professional Engagement

Finally, the results of this survey can help you address sustainability of ongoing professional development in your school. While Apple's Professional Development products can both support and assist you in this process, sustainable professional development requires that faculty be integrated into a range of scenarios and projects that extend beyond the reach of their individual classrooms. The greater their involvement, the more likely it is that projects will succeed, and that the use of professional development resources will be more efficient. The following results from the survey provide a profile of these activities in your school:

<table>
<thead>
<tr>
<th>Activity</th>
<th>No Role</th>
<th>Minor Role</th>
<th>Significant Role</th>
<th>Crucial Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serve on Committees</td>
<td>38.5%</td>
<td>43.6%</td>
<td>15.4%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Work on Teams</td>
<td>10.3%</td>
<td>46.2%</td>
<td>30.8%</td>
<td>12.8%</td>
</tr>
<tr>
<td>Participate in Online Networks</td>
<td>28.2%</td>
<td>33.3%</td>
<td>30.8%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Access Online Resources</td>
<td>7.7%</td>
<td>20.5%</td>
<td>43.6%</td>
<td>28.2%</td>
</tr>
<tr>
<td>Contribute to Online Resources</td>
<td>35.9%</td>
<td>25.6%</td>
<td>33.3%</td>
<td>5.1%</td>
</tr>
<tr>
<td>Develop Flipped Classroom Materials</td>
<td>43.6%</td>
<td>30.8%</td>
<td>17.9%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Communicate with Parents</td>
<td>7.7%</td>
<td>35.9%</td>
<td>30.8%</td>
<td>25.6%</td>
</tr>
</tbody>
</table>

Next Steps

Apple Professional Development workshops can help you integrate Apple products into your curriculum and overall student environment for a richer learning—and teaching—experience. They provide for the ongoing learning of educators and the sustainability of professional development in your institution.

Learn more about Apple Professional Development (APD) offerings and download a copy of the current APD catalog. Visit www.apple.com/education/professional-development.

We are happy to assist you in planning your next steps using Apple technologies and solutions for teaching and learning. Please call 1-800-800-2775 to speak with your Apple Education representative.
Appendix L

Three-Year History of Professional Development

<table>
<thead>
<tr>
<th>Conference/Activity</th>
<th>Admin</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS X Lion Update/Apple Learning with the iPads</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Using Data Systematically in ASSIST</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>PowerSchool and Pearson Inform</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A+nywhere Learning System Regional Training</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Online Learning Symposium for KS School Leaders</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Tech CADRE - Discovery Education</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>E-rate Workshop</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Tech CADRE - Discovery Education (Day 2)</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Mobile Learning Mini-Conference</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>iPad Server Demonstration</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Promethean Training</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Podstock</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>MACE Conference - Spring 2012</td>
<td>1</td>
<td>7</td>
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<tr>
<td>Graphic Design Workshop</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>Tech CADRE - Google Apps/Web2.0</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Tech CADRE - Web 2.0</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Apple Per Seat Professional Development</td>
<td>4</td>
<td></td>
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<tr>
<td>Technology in HPER Workshop</td>
<td></td>
<td>3</td>
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<tr>
<td>ILit Training</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>A+Users Group</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>E-rate Training - 2012</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Best Practical Uses of iPads and technology</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Professional Learning Mini-Conf: Mobile Learning</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>ILit Training</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>MACE Conference - Presenter 2013</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Podstock</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Apple Tech Round Table</td>
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</tr>
<tr>
<td>iPads in the Art Room</td>
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<td></td>
</tr>
<tr>
<td>Data Entry PowerSchool Training</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>SchoolMessenger Webinar</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Making the Best Use of iPads with Special Needs Students</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Apple Tech Update</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Best iPad Apps to Enhance Content Instruction</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Discovery Webinar</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>E-Rate Training - 2013</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>A+ User Awareness Meeting</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>iPad Initiatives and Implementations</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>SchoolMessenger New Release</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>MACE Conference - Spring 2014</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>Technology Leadership</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Deploying and Managing iPS and OS X in Education</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>iPads for Learning</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>41</strong></td>
<td><strong>130</strong></td>
</tr>
</tbody>
</table>
2012-2014 District Strategic Plan

Public School District shall be to identify and remove all barriers to promote equal opportunities for success by all students.

<table>
<thead>
<tr>
<th>Vision</th>
<th>Goals</th>
<th>Action Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kansas State Assessments: All schools and all grade levels will meet requirements for Annual Measurable Objectives on the Kansas State Assessments. On each state assessment, special focus will continue to be placed on the performance of identifiable subgroups as well as the percent of student scoring at the Exemplary and Exceeds Standards levels. College and Career Assessments: Schools will show yearly increases in the percent of students who meet benchmarks on college and career readiness assessments (i.e., EXPLORE, PLAN, and ACT).</td>
<td>Professional Learning Communities: All schools will continue implementing the Professional Learning Community model, focusing on school improvement including the following strategies: Model of Instruction: All schools will implement the following strategies: - Establish and communicate student learning goals. - Teach new information (content) in small steps (or chunks) followed immediately by guided practice - the opportunity for students to process new knowledge or practice it - alone or in pairs. - Check for understanding during and after guided practice activities to see how many students had mastered each small slice of the lesson. Common Core State Standards: Align a written curriculum to the Kansas CCSS to provide each student a guaranteed and viable curriculum. Walkthroughs: The district will develop and implement a walkthrough protocol to monitor implementation of curriculum and instruction initiatives. College and Career Readiness: All secondary students (8-12th grades) will develop a 4-year plan of study with special focus placed on instruction, interventions, and curriculum that is tailored appropriately for each student. College and Career Readiness: _____ High and _____ Alternative School will show yearly increases in the percentage of students graduating high school.</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Character Development | Each school will provide a safe, positive learning environment by continuing to evaluate character education as measured by:  
- a 5% decrease in the number of students who are bullied (GTC) and  
- a 5% decrease in office discipline referrals (SWIS). | Character Development: The district will provide ongoing opportunities in character education, including bullying prevention for staff, students, and parents. |
| Health and Wellness | The district and each school will continue to implement the health and wellness plan. | Health and Wellness: Nutrition: Provide healthy, balanced meals, snacks, and guidance to parents in providing healthy treats. |
| School Readiness | The district will build awareness of resources and community partnerships to help prepare students to enter school successfully. | School Readiness: The district will promote community partnerships to leverage resources to help prepare students to enter school successfully. |
| Technology Integration | The district will support technology integration through focused professional development activities. | Technology Integration: Each school, with support of the district, will develop a training model to address needed supports for technology integration.  
- Promethean Boards  
- iPads  
- Google Apps for Education  
- Discovery Education |
<p>| Digital Citizenship | All students will have access to embedded technological tools, will demonstrate knowledge of the appropriate use of such tools (digital citizenship), and will be able to apply their use in a variety of contexts. | Digital Citizenship: Each school will prepare students to assume the responsibilities of digital citizenship which includes ethical practices, understanding and application of digital technologies, and active use of digital technologies to support and expand learning opportunities. |
| Communications Plan | The district and schools will develop a comprehensive communications plan to support internal communication and two-way communication with the community. | Communications Plan: Each school will survey stakeholders to determine what communication methods are preferred/most effective. |
| Stakeholder Interaction | All communication with stakeholders is friendly, professional, and timely. | Communications Plan: The district and each school will develop and utilize specific communication tools as primary methods to communicate with the community. |
|                      |                                                                          | Stakeholder Interaction: The district and each school will identify and implement needed supports to ensure that all communication with stakeholders is friendly, professional, and timely. |</p>
<table>
<thead>
<tr>
<th>Human Resources and Value of Human Capital</th>
<th>Compensation: The district will strive to continuously improve and maintain a high level of personnel compensation that will rank competitively in Kansas.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Evaluation: The district will meet the requirements for the ESEA Flexibility Waiver for evaluation of teachers and principals.</td>
</tr>
<tr>
<td></td>
<td>Health/Wellness: The district health task force will identify and implement needed supports to improve the overall health and wellness of staff.</td>
</tr>
<tr>
<td></td>
<td>Professional Development: The district will provide continuous development of all personnel.</td>
</tr>
<tr>
<td></td>
<td>Compensation: Analyze/improve the total compensation including salary and benefits of all staff to be ranked in the top 30% in Kansas.</td>
</tr>
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<td>Evaluation: The district will research new evaluation models for teachers and principals.</td>
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<td>Health/Wellness: The district will analyze current data from screenings and develop wellness incentive program for all staff.</td>
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<td></td>
<td>Professional Development: The district and each school will identify and implement needed resources to support continuous growth for all staff.</td>
</tr>
<tr>
<td>FACILITY PLAN: Provide facilities that facilitate a learning environment for 21st Century Education</td>
<td>Long Range Facilities Plan: The district will continue to review, revise, and implement the caseload of the Long Range Facilities Plan.</td>
</tr>
<tr>
<td></td>
<td>Traffic Flow: The district will review/assess traffic issues at _______ Elementary, Middle, and High Schools.</td>
</tr>
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<td></td>
<td>ADA: The district will assess ADA accessibility at _______ Elementary and Middle Schools.</td>
</tr>
<tr>
<td></td>
<td>Long Range Facilities Plan: The district will conduct a bond vote in November 2012 to address the caseload of the Long Range Facilities Plan.</td>
</tr>
<tr>
<td></td>
<td>Long Range Facilities Plan: The district will continually caseload the Long Range Facilities Plan to determine future facility needs.</td>
</tr>
<tr>
<td></td>
<td>Traffic Flow: The district will convene stakeholder caseload to explore options to address traffic flow issues at _______ Elementary and Middle Schools and make caseload.</td>
</tr>
</tbody>
</table>
|                                          | ADA: The district will convene stakeholder committees to explore options to address ADA accessibility at _______ Elementary and Middle Schools and make caseload.
Appendix N

2014-2016 District Strategic Plan
[sic]

Vision
Building successful futures – every student, every day.

Mission
The mission of _____ Public Schools shall be to identify and remove all barriers to promote equal opportunities for success by all students.

Goals

<table>
<thead>
<tr>
<th>Academics</th>
<th>Community Collaboration</th>
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<tbody>
<tr>
<td>Educate the Whole Child</td>
<td>Human Resources</td>
</tr>
<tr>
<td>Technology</td>
<td>Facilities</td>
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Building successful futures - every student, every day.

The mission of _____ Public Schools shall be to identify and remove all barriers to promote equal opportunities for success by all students.
Goals

1. Academics
2. Educate the Whole Child
3. Technology
4. Community Collaboration
5. Human Resources
6. Facilities

Strategies and Initiatives

1. Academics

   Develop and enhance quality education/instructional programs to improve performance and enable students to meet their personal, academic, and career goals.

   *Key initiatives:*
   - Continually enhance a consistent Professional Learning Community teaming model.
   - Develop and implement a guaranteed and viable curriculum that prepares all students for success in college and/or careers.
   - Ensure the use of a balanced and coherent system of assessment to drive curricular and instructional decisions about student learning.
   - Develop and implement an RtI process for both academics and behavior that guarantees every student will receive the time and support needed to learn at high levels.
   - Develop and implement the Advanced Systems Accreditation for district-wide accreditation (timelines and processes).
2. Educate the Whole Child

Develop a well-balanced curriculum that ensures that all students are educated in mind, body, and spirit.

*Key initiatives:*
- Develop a systematic middle and high school guidance process that encompasses individual plans of study (student goals, performance, course enrollment, and post-secondary plans).
- Develop consistent standards and expectations for student involvement in extra-curricular activities through the District Activities Task Force.
- Implement the KS Social, Emotional, and Character Education Standards.
- Explore the possible implementation of a virtual school.
- Continuously enhance and implement the district’s and each school’s Health and Wellness Plans.

3. Technology

Enhance student achievement through the use of technology.

*Key initiatives:*
- Develop an implementation plan for a 1:1 technology program at _____ Middle School.
- Develop the Technology CADRE model at each school that will receive specific, focused, professional development that is unique to the needs of each school.
- Implement a digital citizenship curriculum district-wide.

4. Community Collaboration

Improve parent, community member, teacher, and student communication and involvement.

*Key initiatives:*
- Implement the Parent Teacher Association (PTA) National Standards for Family-School Partnerships.
- Develop and implement parent and student perception surveys where each school will set annual measurable goals.
5. Human Resources

Recruit, attract, develop, and retain the highest quality of personnel.

Key initiatives:

- Continue to implement and refine the new evaluation process (including the student performance requirements).
- Implement the Perform online evaluation system for classified employees.
- Develop and implement an incentive-based employee wellness plan.
- Analyze the teacher compensation packages of comparable Kansas school districts (based on location, size, and demographics) and improve annually.

6. Facilities

Provide facilities that are capable of providing a flexible learning environment for the 21st Century Learner.

Key initiatives:

- The Long Range Facilities Committee will review, revise, and implement the Long Range Facilities Plan to determine future facility needs and upgrades.
- Analyze and identify potential solutions for parking, pickup/drop off needs at _____ Middle School.
- Analyze and identify potential upgrades for video surveillance systems for each school.
- Research online bill payment and student enrollment systems.
Appendix O

Instructional Rounds Protocol

THE PURPOSE OF INSTRUCTIONAL ROUNDS

District Purpose
- The main purpose of instructional rounds is to improve student learning: we know that teachers who consistently teach well are the greatest assets to student learning.
- Instructional rounds create a common approach for the delivery of instruction, as well as common language for instruction. Common language is built upon Marzano’s work Classroom Instruction that Works (CITW).
- Instructional rounds provide data to guide professional development and implementation of the Common Core and instructional strategies.
- On-going instructional rounds provide a large set of data to inform district and schools of the need for further PD and to support instruction.

Teacher Purpose
- All teachers are a part of the Instructional Rounds Process to help guide the development of the instructional strategies taught instead of a one-shot PD.
- Instructional rounds provide an opportunity for teachers to learn from one another, coming away from classrooms with ideas to try.
- Group discussion provides an opportunity for teachers to see instruction from the perspective of the learners.
- Feedback is intended to promote self-reflection on the delivery of instruction.

THE FOCUS AND LOOK-FORS

An instructional rounds protocol will be provided with the following strategies to look for:
- Phases of Gradual Release of Responsibility
  - Learning Goals and Modeling
  - Guided Instruction
  - Productive Group Work
  - Independent Learning
- Literacy Activities

CONDUCTING INSTRUCTIONAL ROUNDS

- All teachers PK-12 will observe classrooms 4 times a year (quarterly). Each SLT will determine their own process and schedules to best fit their needs.
- Groups conducting rounds are best if kept small - from 3 to 4 teachers.
- Rounds are 10-15 minutes in length with a 5 minute debriefing after each observation.
- Paper versions of the protocol are in the school office. Every member participating in the round should have a copy of the protocol.
- During the Rounds:
  - Sit or stand quietly in an unobtrusive place, such as at the back of the room.
  - Refrain from redirecting student work or behavior (except in emergency situations).
  - Have a non-evaluative state of mind. Stay focused on gathering data about student learning that you see or elements of instruction that facilitate student learning.
  - Ask students about their learning if it is appropriate and can be done without interrupting instruction or learning.
- Debriefing Rounds:
  - After each instructional round, members of the observing team convene to reflect on their experiences.
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- Debriefing Rounds
  - After each instructional round, members of the observing team convene to reflect on their experiences.
**PHASES OF GRADUAL RELEASE THAT ARE EVIDENT IN THE LESSON**

Check all that were observed during the lesson.

- Stating or re-stating the content learning goals. "I do it." Teacher establishes purpose for learning today (what students are expected to learn, not what they are expected to do) and makes learning relevant.
- Modeling focus instruction. "I do it." Includes naming the task or strategy, explaining when it is used, and using analogies to link to new learning. Teachers demonstrate the task or strategy, alert students about errors to avoid, and show them how to check for accuracy.
- Guided instruction. "We do it." Teacher uses questions, prompts, and cues to guide students to greater understanding. Teacher focuses on releasing responsibility to students while providing instructional scaffolds to ensure that students are successful. Teacher moves around the room checking for understanding.
- Productive group work. "You do it together." Students work in collaborative groups to produce something related to the topic at hand. This phase of instruction should provide students with an opportunity to consolidate their understanding before applying it independently.
- Independent learning. "You do it alone." Students extend and apply what they have learned individually.

**LEARNING GOALS AND MODELING “I do it”**

Teacher has a learning goal posted so that all students can see it.

- Clearly observable
- Not observed

The learning goal is written in student-friendly "I can" statements that are a clear statement of knowledge or information (as opposed to an activity or assignment).

- Clearly observable
- Not observed

Teacher makes reference to the learning goal throughout the lesson.

- Clearly observable
- Not observed

Students can explain the learning goal in their own words (what they are learning, what they are expected to produce to demonstrate learning, the relevance of their learning beyond the classroom).

- Clearly observable
- Not observed

Teacher demonstrates new strategies or skills by modeling, scaffolding and/or coaching.

- Clearly observable
- Not observed

**GUIDED INSTRUCTION “We do it”**

Checks for understanding were evident.

- Clearly observable
- Not observed

Teacher responds to students’ misconceptions or partial understanding with questions, cues, and prompts to guide learners in alleviating misconceptions.

- Clearly observable
- Not observed
PRODUCTIVE GROUP WORK “You do it together”
Identify grouping format.
- Individual
- Paired
- Small group
- Whole class

Students work in collaborative groups to discuss and/or produce something related to the topic at hand.
- Clearly observable
- Not observed

INDEPENDENT LEARNING “You do it alone”
Students are completing tasks successfully on their own or with assistance as needed.
- Clearly observable
- Not observed

Determine complexity of student work (DOK)
- 4: Extended thinking requiring complex thinking, reasoning, and planning possibly relating concepts within or between content areas.
- 3: Strategic thinking requiring reasoning, developing a plan or a sequence of steps, some complexity, more than one possible answer.
- 2: Basic application of skills and concepts; using two or more steps for information or conceptual knowledge.
- 1: Recall or reproduction of a fact, information or procedure.

LITERACY ACTIVITIES OBSERVED
Check all that were observed during the lesson.
- Students are engaged in a purposeful reading of a text related to the content or topic. Could be a close reading that includes vocabulary instruction from the text and/or underlining and annotating the text.
- Students are engaged in purposeful discussion surrounding a text related to the content or topic (e.g., classroom or group discussions, classroom presentations).
- Students are engaged in purposeful writing about a text informed by close reading, discussion, or annotation of the text.
- No literacy activities observed today.

TECHNOLOGY
Technology supports the learning goal and is being used by:
- All students
- Some students
- Teacher
- No use observed by teacher or students

COMMENTS
Thoughts and ideas I came away with for changes in my own teaching ...

What I wondered about ...
Appendix P

Collection of Artifacts

1. Technology Department Information
2. Promethean Board District Inventory
3. Apple Technology Profile Survey
4. Three Year History of Professional Development
5. 2012-2014 District Strategic Plan
6. 2014-2016 District Strategic Plan
7. Instructional Rounds Protocol
VITA

As a kid, Janie Bennett was a straight A student during the school year, and had her summer days filled with hoeing long rows of potatoes in her family’s truck garden, or helping her mom can vegetables on a wood cook stove. She enjoyed playing catch or shooting hoops on the side of the barn with her brother until dark and reading a zillion books during a time when kids were seen and not heard and said “yes sir” and “no sir” to their fathers at all times.

Janie graduated from Wentzville High School, MO and attended Northeast Missouri State University in Kirksville, MO. She graduated magna cum laude in 1969, then went on a weekend trip to Eureka Springs, Arkansas to the Ozark Mountain Folk Fair, where she met and fell in love with David Bennett. They have been married for 39 years. Janie went on to teach special education at her hometown elementary school in Wentzville, MO, and then moved to Kansas to be with Dave. She taught 4th grade at Ft. Scott, then elementary special education at Columbus, KS.

During this time, Dave and Janie lived in a rural area and became advocates of organic gardening, home birth, and living the country life. Joshua was born at home in 1977 in Spring Hill, and Jason was born at home in in their current town in 1980.

In 1980, Janie began teaching at the district's junior high school in the special education department on the 4th floor. Janie taught English, math, history, science, driver’s education, reading, and resource in the special education department.

Janie was a chairperson of the Middle School Transition Committee, which guided the change from being a junior high to becoming a middle school in the early 90s. She was the 8th grade team leader for many years and also took her turn at being the
special education department chair. Janie was one of the first teachers to co-teach in the public school, when she teamed up with a history teacher for several years. That was one of her most enjoyable experiences.

Janie was introduced to technology in the early 90s and was part of the Road Ahead Team with a $30,000 grant financed by Bill Gates’ Microsoft. Due to this grant, her special education students were able to participate in diverse cutting edge activities, such as the Ted Turner Rain Forest Adventure, and many Amelia Earhart activities, which connected them with students and teachers around the globe via technology! Her special education students were top notch when it came to computer projects and won a state level award! Janie was also a member of the first Technology Cadre in the district.

In 1999, Janie received her master’s degree in Counseling Psychology from the University of Kansas, and in 2002, became counselor at the local high school.

In the 80s, Janie and her family built a new home after a fire damaged their old home, completing the work themselves. Janie and Dave were their sons’ Cub Scout Pack Leaders and Den Parents of Pack 255 for several years. They also were Rec Commission baseball coaches for many years in the summers.

In 1990, the Bennetts moved to a 240-acre farm in the country, where they are still in the process of remodeling after 24 years! Josh and Jason attended a small rural school, where Janie became the first ever female Booster Club president!

Presently, they have 42 head of cattle, 10 chickens, two White Shepherd siblings named Jethro and Ellie May, and a cat named Oscar the Grouch. They also plant a huge garden and landscape way too many beds each year.
In 2007, Janie retired from public education and took on the challenge of teaching in the education department in higher education. During the past few years, she has survived preparing for an NCATE accreditation visit while completing her doctorate at the University of Missouri. In sum, Janie has been active in education for 37 years.