SURVEY OF URBAN MIDWESTERN DISTRICT CERTIFIED STAFF KNOWLEDGE AND IMPLEMENTATION OF DIGITAL TOOLS AND INTEGRATION OF INSTRUCTIONAL BEST PRACTICES

By

ROBERTA DIAS

Submitted to

The Faculty of the Educational Specialist Program

Northwest Missouri State University Missouri

Department of Educational Leadership

College of Education and Human Services

Maryville, MO 64468

Submitted in Fulfillment for the Requirements for

61-724 Field Study

Spring 2012
ABSTRACT

This study focused on the knowledge of certified staff members about the implementation of digital tools and research based instructional best practices used for technology integration. A Likert style survey was sent to 790 certified teachers in the district. A return rate of 67% totaling 530 surveys was achieved. Data from this survey were used to determine whether a significant difference of implementation of digital tools and research based instructional best practices existed between elementary and secondary buildings. The null hypothesis was challenged at a 0.25 Alpha level. The first research question found no significant difference of implementation between elementary and secondary buildings while data from the other two questions did reveal a significant difference in implementation between the building types. Further research and follow up surveys to assess teacher growth and implementation after additional professional development could assist other districts in the planning process for a 1:1 laptop initiative.
# TABLE OF CONTENTS

ABSTRACT .................................................................................................................. 2

CHAPTER ONE: INTRODUCTION TO THE STUDY .................................................... 5

  Background
  
  Theoretical Framework
  
  Conceptual Underpinning
  
  Statement of the Problem
  
  Purpose of Study
  
  Research Questions
  
  Anticipated Benefits of the Study
  
  Definition of Terms
  
  Summary
  
  Limitations and Delimitations

CHAPTER TWO: REVIEW OF RELATED LITERATURE ............................................. 9

  Digital Age Learning/21st Century learning
  
  Constructivism and Instructional Best Practices

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY ............................. 17

  Problem and Purposes Overview
  
  Research Design
  
  Research Questions
  
  Data Collection and Instrumentation

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA ......................... 22

  Review of the Research Design
CHAPTER FIVE: OVERVIEW, FINDINGS AND RECOMMENDATIONS………..27

Overview
Restatement of the Purpose
Summary of Research Methods
Discussion of Findings, Conclusions and Recommendations
Summary

REFERENCES……………………………………………………………………..30

APPENDIX………………………………………………………………………..33

The LoTi Survey
NETS-S
NETS-T
SJSD Learner Profile
TPAK model
Survey Results
SURVEY OF URBAN MIDWESTERN DISTRICT CERTIFIED STAFF

KNOWLEDGE AND IMPLEMENTATION OF
DIGITAL TOOLS AND INTEGRATION OF INSTRUCTIONAL BEST PRACTICES

CHAPTER ONE

INTRODUCTION TO THE STUDY

Background

The recent trend of 1:1 laptop initiatives, digital-age teaching learning and ubiquitous access for students is growing rapidly. Educators’ knowledge and application of new technologies to enhance learning lag behind the opportunities readily available to students. Providing professional development to prepare teachers for a 1:1 technology initiative for an urban district requires understanding the knowledge of digital tools and resources of certified staff and the implementation of instructional best practices used for technology integration in the classroom.

This study will consist of a non-experimental, descriptive, one-shot survey of certified staff members in an urban school district in the Midwest. The survey will have three sections: implementation of digital age teaching and learning, integration of instructional practice and fluency of digital tools with student learning. This study focuses on the knowledge of certified staff members about digital tools and the implementation of instructional best practices used for technology integration. The study will include theoretical frameworks and conceptual underpinnings, statement of the problem, purpose of the study, research questions, benefits of the study, review of literature, research methods, finding and summary.
Theoretical Frameworks

As schools continue to try to meet the mandates of the No Child Left Behind Act of 2001, implement the new Common Core Curriculum and begin to assess students using the New Generation Assessments, there seems to be a lack of focus on digital integration. School districts are also trying to prepare students for jobs that will most likely use technology or technology skills. By providing teachers with focused professional development concerning integrating digital tools and resources with identified, research based, instructional best practices, raises the bar for meeting the federal mandates and producing digital citizens.

Conceptual Underpinnings for the Study

As schools are beginning to implement the new common core curriculum, it is important to understand research-based instructional best practices that support constructivist learning, student-centered approaches and the seamless integration of technology tools and resources as ways to promote student achievement and produce students that are college and career ready. Teachers need professional development in both research-based instructional best practices and integration of digital tools and resources.

Statement of the Problem

Technology in education is necessary. Educator’s knowledge and training of integration of digital tools cannot keep up with the new technologies that are released daily. Schools should be providing professional development for staff to make connections between transforming learning through technology integration and the implementation of best instructional practice. As
educators, we are preparing students for jobs that don’t even exist yet, with technology as the one common skill developer.

Purpose of the Study

The purpose of this study is to determine the knowledge of digital tools and the implementation of instructional best practices. Essentially, this study examined (a) the level of implementation of digital age teaching and learning in the classroom; (b) the level of support for implementation of learner-based instructional best practices and (c) teacher fluency level with digital tools and resources with student learning.

Research Questions

Research questions. The following research questions were constructed to investigate the problem.

RQ1: What is the degree of implementation of digital-age teaching and learning in a classroom?

RQ2: What is the level of support for or implementation of instructional practices consistent with a learner-based curriculum design and research-based best practice.

RQ3: What is the fluency level with digital tools and resources with student learning.

Anticipated Benefits of the Study

This study will give the degree of implementation of digital age teaching and learning in a classroom setting, the level of comfort of support or implementation of using research-based best practices and the teacher fluency level with digital tools and resources with student learning.
for each building. The levels will identify areas of professional development for schools to implement.

*Definition of Terms*

Digital-age teaching and learning—“balance between instruction, assessment and the effective use of digital tools and resources to promote 21st Century teaching and learning” (LoTi Connection, Inc. 2009).

Learner-based instruction (student centered) —“Content that emerges based on the needs of the learner according to his/her interests needs and/or aspirations and is supported by unlimited access to the most current digital application” (LoTi Connection, Inc. 2009).

Research-based best practices—“meaning solid, reputable, state-of-the-art work in a field” (Zemelman, Daniels & Hyde, 2005, p. vi).

Digital tools and resources—commonly include laptop computers, handheld devices, software applications, web-based applications, digital cameras, printers, probes, MIDI devices, interactive whiteboards, scanners, analog video cameras, digital video cameras, multipurpose calculators, and teleconferencing equipment available for instructional use in a classroom (LoTi Connection, Inc, 2009).

Constructivist learning—builds upon knowledge that a student already knows; student is actively involved in the learning process; teacher as coach, student as learner model of instruction.
Summary

This study identified the knowledge and use of digital tools and implementation of instructional best practices. The purpose of this study is to ensure that research-based best practices are used in the classroom to promote student achievement and life-long learners. This study will determine the professional development areas to focus for implementation of digital integration and researched-based instructional best practices.

Limitations and Delimitations

1. This study was limited by the number of survey participants that responded. Additionally, survey participants submitted their survey results based on perceptions of the meaning of the questions. This fact could have led to bias of the responses.
2. This study was limited to one year with no follow up survey to compare data.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

This chapter summarizes digital-age learning and instructional best practices. The review of literature and research studies shows current findings, thoughts, and opinions concerning digital learning and instructional best practices. The major topics that will be addressed include digital learning, constructivist learning and other research-based instructional best practices. Within the digital learning will include trends of digital tools and resources used in education.
Constructivist learning will contain information about constructivism and other best instructional practices as well as the national, state and local approaches to digital initiatives.

*Digital Age Learning.* The landscape of education is changing from the one-size fits all model of direct instruction to a technology-enabled individualized path for each student. Digital content, access to technology tools and resources and personalized learning are three trends that have hurled education into the digital age of learning.

Education has come a long way since the MARK 1 in 1944 at Harvard and the ENIAC, the first operational digital computer, in 1946 at the University of Pennsylvania. The ENIAC occupied about 1800 square feet and weighed almost 50 tons (Niederhauser, p. 28) In the 60’s, traditional education used computers for math, science and engineering courses and began programming with FORTRAN, BASIC and LOGO languages. By the late seventies, personal computers were abundant in schools and workplaces. In the 1980s, supercomputers appeared permitting global access to knowledge and information (Molnar, 1997, p. 2-3). Today, we are blanketed with modern, high-speed systems, personal portable devices and on-demand access to information. Digital learning is about information exploration, creation and management. As education continues to change, it isn’t about what people know, it is about how skilled people are in exploring information in the digital age.

Students are growing up with iPads, laptops and Smartphones in hand, accessing resources and information at the touch of a finger or the sound of voice. Students are connected to WIFI and ask Google anything. Students can respond to a classroom test or quiz via automated student response systems or Poll Anywhere using cellphones or laptops to receive instant results and feedback. “Today’s kids are always multiprocessing--they do several things
simultaneously-listen to music, talk on the cell phone and use the computer all at the same time” (Brown, 2006, p. 4). “Often called ‘Digital Natives’ those born between 1980 and 1994 are described as surrounded by and using computers, videogames, digital music players, video cams, cell phones and all the other toys and tools of the digital age” (Prensky, 2001a, p. 1). Students today have access to, can create, publish, communicate and collaborate globally in real time that has major implications for learning and education.

Nationally, in education, digital learning is being supported, guided and encouraged by International Society for Technology Education (ISTE) with the development of the National Educational Technology Standards (NETS). The NETS-S for students and for teachers are shown in Table 1 of the Appendix. The NETS-S are the standards for evaluating the skills and knowledge students need to learn effectively and live productively in an increasingly global and digital world (ISTE, web page). NETS-S describe the results educators would like students to be able to demonstrate after completing a learning activity. According to Serim, “when teachers master both NETS-S and NETS-T, the full range of digital learning becomes possible” (Serim, 2012, p. 2). Jacobs (2011, 81) states that all learning is social. It was technology—the development and adoption of a symbolic alphabet—that ended an era of “orality” and began an era we call “literacy.” It was technology—the development of moveable type and printing presses—that ended an era of scholastic authority by a selected priesthood and created a mass literacy in the vernacular of every culture. And it is dramatic new technology that once again is altering the landscape and redefining our notions of literacy. Using digital tools, students have the whole world in their hand.

At the state level, the Common Core State Standards Initiative is a state-led effort coordinated by the National Governors Association Center for Best Practices (New Generation
Assessment Center) and the Council of Chief State School Officers. The standards were developed in collaboration with teachers, school administrators and experts. The standards are aligned with college and work expectations, are clear, understandable and consistent, include rigorous content and application of knowledge through high-order skills, build upon strengths and lessons of current state standards are informed by other top performing countries so that all students are prepared to succeed in our global economy and society and are evidence-based (Governors Association, 2010).

At the local level, the Mid-western school district, in its mission to educate 21st Century learners for lifelong success, created a learner profile with a foundational knowledge through rigorous learning and thinking. The district’s school leaders created a learner profile framework distilled from Mishra and Kereluik’s work and crafted a local version. The profile contains three main areas of focus: a foundational knowledge, learning and thinking and lifelong success. Foundational knowledge included content, information literacy and cross-disciplinary knowledge; Learning and Thinking includes Collaboration & Communication, Creativity & Innovation, Problem Solving & Critical Thinking; and Lifelong Success includes Ethical & Emotional Awareness, Cultural Competence and Life & Job Skills. The district continues to promote and support digital learning through a laptop pilot program called Project Connect.

*Project Connect: Advancing Learning Through Technology* is the 1:1 initiative. Currently, this pilot program is available at two secondary schools and two elementary schools. In January of 2012, the two secondary schools provided a MacBook, power cube, and laptop case to each student. In February of 2012, an iPad, iPad case, and iPad bag was given to each student in grades 4-6 at the two elementary buildings (SJSD Website, 2012). The pilot will continue for a minimum of 18 months in order to complete professional development for teachers, collect
survey data from students, staff and parents and analyze student achievement in the areas of reading and writing and information literacy. The goals for the pilot are to increase proficiency in writing, improve reading levels, increase opportunities for collaboration and develop an exhibition demonstrating responsibility, digital citizenship and responsible use of information and technology. Combined with effective instructional strategies and student-centered classrooms, students will have a better chance at achieving the goals of the NETS standards.

Constructivist Learning & Instructional Best Practices. Teachers tend to teach the way in which taught, not necessarily using research-based instructional best practices. Traditionally, learning has been thought to be a ‘mimetic’ activity, a process that involves students repeating, or miming, newly presented information (Jackson, 1986) in reports or on quizzes and tests. Constructivist teaching practices, on the other hand, help learners to internalize and reshape or transform new information. Transformation occurs through the creation of new understandings (Jackson, 1986, Gardner 1991b) that result from the emergence of new cognitive structures (Brooks & Brooks, 1999, p. 15). Constructivist learning theory can be defined as constructing our own understandings using our previous knowledge or understanding. Piaget viewed constructivism as “a way of explaining how people come to know about their world” (Brooks & Brooks, 1999, p. 26). The following is a list of guiding principles for teachers of constructivism: posing problems of emerging relevance to students, structuring learning around primary concepts, seeking and valuing students’ points of view, adapting curriculum to address students’ suppositions, and assessing student learning in the context of teaching (Brooks and Brooks, 1999). The chart below compares a traditional classroom to a student-centered /constructivist classroom:
## Traditional Classroom vs. Constructivist/Student-centered classroom

<table>
<thead>
<tr>
<th>Traditional Classroom</th>
<th>Constructivist/Student-centered classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic skills</td>
<td>Big concepts</td>
</tr>
<tr>
<td>Fixed curriculum</td>
<td>Student questions</td>
</tr>
<tr>
<td>Textbooks and workbooks</td>
<td>Primary sources/manipulative materials</td>
</tr>
<tr>
<td>Students are passive</td>
<td>Students as thinkers</td>
</tr>
<tr>
<td>Teacher directed</td>
<td>Teachers as facilitators/coach</td>
</tr>
<tr>
<td>One correct answer</td>
<td>Students view points</td>
</tr>
<tr>
<td>Assessment is separate</td>
<td>Assessment is interwoven</td>
</tr>
<tr>
<td>Students work alone</td>
<td>Students work in groups</td>
</tr>
<tr>
<td>Classrooms are silent</td>
<td>Classrooms are experiential, hands-on, active, noisy and collaborative</td>
</tr>
<tr>
<td></td>
<td>(Brooks and Brooks, 1999)</td>
</tr>
</tbody>
</table>

Proponents of traditional teaching and learning would advocate for more focused, direct instruction. With a solid design of memorization of basic facts, a fixed curriculum and teacher directed lessons, traditional instruction allows teachers to be the sage on the stage and share content knowledge with compliant and passive students. In teacher centered classrooms, covering material takes precedence over teaching (Brown, 2003, p. 1). On the other hand, technology-enhanced student-centered learning environments require that individuals are active in the learning process (Hannafin & Land, 1997, p. 190). Learning that provides the opportunity for students to engage in the activity, explore the topic or task, tap into their schema and create new knowledge with or with technology is an alternative to direct instruction. Student-centered instruction may not always be the method of choice. There will be times when students need direct instruction of basic skills to scaffold learning and build upon background knowledge. Transforming learning from passive to active, direct to inquiry, teacher led to student-centered takes time. Even though teachers may belief they understand and implement constructivism, the proof is in the actual implementation. In a research study by Judson (2006), examining if there is a connection between how teachers integrate technology to their instructions beliefs, found no significant connection. What Judson did discover was that even though teachers said they
believed and followed constructivism, the observations did not conclude the same results.

Teachers believe in constructivist learning but the classroom behavior does not always reflect that belief.

In another research study, examining teacher concerns during implantation of a one-to-one Laptop Initiative at a middle school, the researcher discovered significant teacher concerns about pedagogy and technology. Teachers in this study were uncomfortable as they attempted to blend their traditional pedagogies with the requirements for teaching in the one-to-one environment. Some of the teachers’ biggest concerns were in relation to planning and meeting curricular goals. Donovan (2007) interpreted this as an indication that they were uncomfortable with the prospect of modifying their existing practices and making accommodations for teaching in a one-to-one environment. The observations conducted in the concurrent study confirmed this interpretation as teachers were observed primarily using laptops for word processing and other teacher-centered curriculum activities. Thus the need for focused professional development including pedagogy, content and technology. In Penuel’s (2006) research, he concluded that, “the amount of professional development that teachers have received has been found to be related to teachers’ feelings of preparedness to use technology with students” (NCES, 2000).

Another approach that is gaining momentum is the Technology, Pedagogy and Content Knowledge framework or TPACK. TPACK-based learning activities can help teachers successfully integrate technology into their practice. TPACK emphasizes the connections among technologies, curriculum content, and specific pedagogical approaches, demonstrating how teachers’ understandings of technology, pedagogy, and content can interact with one another to produce effective discipline-based teaching with educational technologies (Mishra & Koehler, 2006; Koehler & Mishra, 2008, p. 396). A chart of the TPACK framework can be
found in the Appendix. Providing professional development for teachers to understand each piece of the TPACK framework and how each essential piece is woven together can be helpful. The TPACK framework connects instructional best practice, content knowledge and technology into an effective design for teaching and learning.

Several schools have had success where they have implemented constructivist or student-centered approaches and integrated technology throughout curriculum. In Pinellas County, Florida, at the Clearview Avenue Elementary School, teachers who tended toward constructivism reported greater satisfaction with using the laptops and related digital devices. They exhibited a greater fluency and flexibility of integration approaches. Students in the constructivist-oriented classrooms used the laptops more than students in the traditional classrooms. At the end of the year when asked to reflect on their experiences, the students enthusiastically recounted the projects they had created on their laptops without referring to the computers themselves—the technology had become a transparent tool (Laptops for Learning Task Force, p. 6). School leaders and teachers at Clearview have created a successful infusion of constructivism, student centered classrooms and digital age learning.

Science Leadership Academy (SLA) is another successful school that has implemented constructivism, student centered learning and technology. SLA is a public high school in Philadelphia, Pennsylvania, which partners with the Franklin Institute, a science museum. SLA has forged an environment in which students create meaningful content, apply learning to real-world experiences and pursue individual interests. The project-based curriculum focuses on the core activities of inquiry, research, collaboration, presentation and reflections. Subjects are integrated across the curriculum and social medias and other digital tools including laptops are used in all classes (Hertz & Aungst, 2011, p. 2-3).
Another example is the Integrated Studies Program at Camden County Technical High School in Sicklerville, New Jersey. The Integrated Studies Program created a program built around project-based learning and constructivist theory, putting students in charge of their own learning. This program is a hybrid that includes direct instruction and teachers guiding students to pursue their own learning with school-provided laptops (Hertz & Aungst, 2011, p. 3). All three schools are different but the foundational instructional practice of constructivism is at the heart, infused with technology and student-centered classrooms. Student learning is the focus, not the technology. It isn’t about the laptops, it is about the opportunities to transform teaching and learning in our classrooms and schools. “In order to create effective learning environments, teachers need opportunities to learn what instruction and assessment practices, curricular resources, and classroom management skills work best in a 1:1 laptop environment” (Dunleavy, Dextert & Heinecket, 2007, 450). It is about providing the time, resources, training and support for teachers to become creators and curators of student-led learning experiences for students.

CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

Problem and Purposes Overview

The problem under investigation is the extent to which teachers have knowledge of digital-age learning and implementation of instructional best practices for a seamless integration of technology. Schools should be providing professional development for staff to make connections between transforming learning through technology integration and the implementation of instructional best practices.
The purpose of this study is to examine (a) the level of implementation of digital age teaching and learning in the classroom; (b) the level of support for implementation of learner-based instructional best practices and (c) teacher fluency level with digital tools and resources with student learning.

Field Study Methods

The following field study methods were used to explore the stated research questions. This section includes: research design, study group description, variables used in the study, research questions, null hypothesis, data collections, analysis, summary.

Research Design

This study will consist of a non-experimental, descriptive, one-shot survey. The research design utilized to investigate the research question was a non-experimental correlation study. This is a one shot deal with a survey used as the tool given to the all certified staff in April 2010 to be used for planning a 1:1 laptop pilot for 2011-12. The null hypotheses were tested by a chi-square analysis used to determine significance at 0.25 Alpha levels.

Study Group Description. The research sample group consisted of a school district with a total population of approximately 11,000 Kindergarten through twelfth grade students. The study group consisted of an urban school district in the Midwest. The district consists of three high schools, four middle schools, sixteen elementary schools, a technical center and two alternative school sites. The unit of analysis is individual buildings. The districts socio-economic status is approximately 63% free and reduced student population. The certified staff range in varying years of service and age. The district has identified best practices and provided
professional development for teachers for all school levels but only the two pilot secondary schools have implemented focused professional development with digital age learning.

Variables Used in the Study. Independent and dependent variables were used in the study. The independent variable is the individual elementary or secondary school. There were 16 elementary schools and 10 secondary schools, including two alternative buildings and one technical school. The dependent variables are based on the levels of implementation of digital age teaching and learning, fluency with digital tools and resources and implementation of research-based best practices. See Table two in the Appendix for units of analysis of the dependent variables. The following is a description of each dependent variable. The Levels of Teaching Innovation (LoTi) approximates the degree or support or implementation of digital age teaching and learning in a building. Personal Computer use (PCU) addresses fluency level with digital tools and resources for student learning as well as use in the workplace. Current Instructional Practices (CIP) – reveals support for or implementation of instructional practices consistent with a learner-based curriculum design and research-based best practices (LoTi 2009).

Research Questions

The following research questions were constructed to investigate the problem.

RQ1: What is the degree of implementation of digital-age teaching and learning in a classroom?

RQ2: What is the level of support for or implementation of instructional practices consistent with a learner-based curriculum design and research-based best practice.

RQ3: What is the fluency level with digital tools and resources with student learning.
Null Hypothesis. The following Null Hypotheses were constructed to investigate the problem.

$H_0\text{1:}$ The first null hypothesis states there is no significant difference between type of building and the level of implementation of digital age teaching and learning in the classroom.

$H_0\text{2:}$ The second null hypothesis states there is no significant difference between type of building and the level of support for implementation of learner-based instructional best practices.

$H_0\text{3:}$ The third null hypothesis states there is no significant difference between type of building and teacher fluency level with digital tools and resources with student learning.

Data Collection

Data were collected through the use of a one shot survey. The survey was anonymous. LoTi Digital-Age Survey for Teachers by LoTi Connection, Inc. (LoTi 2010) was used to survey all certified teaching staff. More than 790 surveys were distributed via computer and only 530 were returned for analysis, which is a 67% return rate. LoTi collected and compiled the survey information. Respondents were asked general information to identify subject taught, grade level, years of experience and greatest obstacle to further use technology in an instructional setting. Three categories were analyzed. The following are examples of actual survey questions from each of the three categories: “How often are you (the teacher) using digital tools and resources during the instructional day?” “I rely heavily on my students’ questions and previous experiences when designing learning activities that address the content that I teach.” “My students apply their classroom content learning to real-world problems with the local or global community using the digital tools and resources at our disposal” (LoTi, 1999).
Data Analysis. Since the independent and dependent variables were nominal in nature, Chi square analysis was used to challenge the null hypotheses and to answer the research questions. PC based SPSS statistical software was selected to perform the required data analysis steps. The survey was completed and results were entered into a spreadsheet for future data analysis. The Alpha level of significance was set in this study at 0.25 for all testing levels.

Summary

The problem under investigation is the extent to which teachers have knowledge of digital-age learning and implementation of instructional best practices for a seamless integration of technology. Schools should be providing professional development for staff to make connections between transforming learning through technology integration and the implementation of instructional best practices. This study is to examine the level of implementation of digital age teaching and learning in the classroom, the level of support for implementation of learner-based instructional best practices, and teacher fluency level with digital tools and resources with student learning. The research design utilized to investigate the research question was a non-experimental correlation study using. The null hypotheses were tested by a chi-square analysis used to determine significance at 0.25 Alpha levels. The study group consisted of an urban school district in the Midwest. The unit of analysis is individual buildings. Nearly 67% of the surveys were returned and analyzed for significance.
CHAPTER FOUR
PRESENTATION OF THE DATA ANALYSIS, FINDINGS AND INTERPRETATIONS

Overview of Problem and Background

The problem under investigation is the extent to which teachers have knowledge of digital-age learning and instructional best practices for a seamless integration of technology. Schools should be providing professional development for staff to make connections between transforming learning through technology integration and the implementation of instructional best practices.

Presentation of the Data Analysis, Findings & Interpretations

This section will restate the research questions and include an analysis of data, the findings of each question and interpretations for each of the three research questions presented on the survey.

Findings and Results for RQ 1. What is the degree of implementation of digital-age teaching and learning in a classroom?

SPSS Chi Square analysis methods will be used to provide information to answer this question. The table below shows 21 schools at a Level 2 – Exploration, which means that instructional focus emphasizes content understanding; students use digital tools and resources to generate multimedia products that showcase content understanding. There are 5 schools at a Level 1-Awareness, which means Instructional focus emphasizes information dissemination; teachers use digital tools and resources for classroom management tasks or instructional presentations. The highest or best possible level would be a Level 6 – Refinement, which means
Instructional focus is entirely learner-based; students experience seamless integration of digital tools and resources for their self-directed problem solving and issues resolution (LoTi, 2009).

Narrative

Table 1 shows the Chi Square analysis of level of implementation of Digital Age Teaching and Learning by building. Level 1 is the lowest level or beginning level of implementation. Type 1 are the elementary buildings and Type 2 are the secondary buildings. Ranking of the Levels of Teaching Innovation (LoTi) Profile approximates the degree to which each participant is either supporting or implementing the digital-age teaching and learning in a building (LoTi, 2009). LoTi levels 1 & 2 are described above and a complete chart of Level explanations can be found in the Appendix.

Table 1

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Chi Sq</th>
<th>Df</th>
<th>*p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>18.8%  (3)</td>
<td>20%  (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>81.3%  (13)</td>
<td>80%  (8)</td>
<td>0.0061</td>
<td>1</td>
<td>0.937287</td>
</tr>
<tr>
<td>Sign = or &lt; 0.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 1, there was no significant difference (Chi Square = 0.0061, p-value = 0.937287) between implementation of digital-age teaching and learning in elementary and secondary buildings. However, 81% (21) of the buildings were at Level 2 with only 19% (5) at level one. Yet, both types of buildings are at the beginning stages or low end of the implementation levels. Additional research or follow up surveys should be completed to
investigate the implementation of digital-age teaching and learning after additional professional development is provided.

**Findings and Results for RQ 2.** What is the level of support for or implementation of instructional practices consistent with a learner-based curriculum design and research-based best practices. Table 2 shows three schools at a Level 3 - instructional practices align somewhat with a subject matter based approach to teaching and learning with limited options given to students for their final products. There are 11 schools at a Level 2 – instructional practices still consistent with a subject-matter based approach to teaching and learning; emphasis on didactic instruction and teacher-generated questions. With 12 schools at a Level 1 – Instructional practices align exclusively with a subject matter based approach to teaching and learning; teaching strategies lean toward lectures and/or teacher-led presentations. The highest or best possible would be a Level 7 – which means instructional practices align exclusively with a learner-based approach to teaching and learning; students establish personal goals and monitor their own pace and progress with a purposeful learning space (LoTi, 2009).

*Table 2*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Chi Sq</th>
<th>Df</th>
<th>*p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>62.5% (10)</td>
<td>20% (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 2</td>
<td>37.5% (6)</td>
<td>50% (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>0</td>
<td>30% (3)</td>
<td>7.43561</td>
<td>2</td>
<td>0.0242873</td>
</tr>
<tr>
<td>Sign = or &lt; 0.25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As shown in Table 2, there was a significant difference (Chi Square = 7.43561, p-value = 0.0242873) of implementation of instructional practices consistent with a learner-based curriculum design and research-based best practices between elementary and secondary buildings. The secondary buildings only have two buildings at Level 1 of implementation compared to ten elementary buildings. However, all buildings are still in the beginning implementation stages of a learner-based curriculum. Additional research or follow up surveys should be completed to investigate the implementation of instructional practices consistent with a learner-based curriculum design and research-based best practices after additional professional development is provided.

**Findings and Results for RQ 3.** What is the fluency level with digital tools and resources for student learning as well as teacher use in the workplace?

Table 3 shows five schools at a Level 5 – High fluency level with using digital tools and resources for student learning; commonly able to expand range of emerging digital-age media and formats in support of curriculum. There are 16 schools at a Level 4 – Moderate to high fluency with using digital tools and resources for student learning; commonly uses a broader range of digital-age media and formats in support of curriculum. There are 4 schools at a Level 3 – Moderate fluency with using digital tools and resources for student learning; may begin to become “regular” user of selected digital-age media and formats. Only one school posted a Level 2 - Little to moderate fluency with using digital tools and resources for student learning; does not feel comfortable using digital tools/resources beyond classroom management. The highest or best level possible would be a Level 7 – Extremely high fluency level with using
digital tools and resources for student learning; sophisticated in the use of any existing and emerging digital-age media or format (LoTi, 2009).

Table 3

<table>
<thead>
<tr>
<th>Source</th>
<th>Type 1</th>
<th>Type 2</th>
<th>Chi Sq</th>
<th>Df</th>
<th>*p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2</td>
<td>6.3% (1)</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 3</td>
<td>0</td>
<td>40% (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 4</td>
<td>68.8% (11)</td>
<td>50% (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 5</td>
<td>25% (4)</td>
<td>10% (1)</td>
<td>8.09656</td>
<td>3</td>
<td>0.044056</td>
</tr>
</tbody>
</table>

As shown in Table 3, there was a significant difference (Chi Square = 8.09656, p-value = 0.044056) of fluency level with digital tools and resources for student learning as well as teacher use in the workplace between elementary and secondary buildings. The elementary buildings have 15 buildings that are at Level 4 and Level 5 compared to only 6 secondary buildings at those levels. Additional research or follow up surveys should be completed to investigate the fluency level with digital tools and resources for student learning as well as teacher use in the workplace and develop and provide professional development for teachers.

Summary

This section provided a presentation of the data with analysis and interpretation of the data in relation to the three research questions. The problem under investigation is the extent to
which teachers are implementing digital-age learning and instructional best practices for a seamless integration of technology.

CHAPTER FIVE
CONCLUSIONS AND IMPLICATIONS AND NEW LEARNING

Presented in this chapter is a restatement of the purpose of the study, summary of findings and major conclusions followed by a discussion. The chapter concludes with recommendations for educational leaders and future researchers.

Restatement of the Purpose

The purpose of this study was to examine the implementation of digital age teaching and learning and implementation of student-centered research-based best practices used in the classroom to promote student achievement and life-long learners in an urban district in the midwest. Three research questions and three null hypothesis describing type of building and the level of implementation were used to facilitate the study.

Summary of Research Methods

The independent variable for the three research questions was the type of building (elementary or secondary). The dependent variables were the levels of implementation digital age teaching and learning, student-centered researched based instructional strategies, and fluency of with digital tools and resources for student learning as well as use in the workplace. These
variables were examined by surveying certified teachers about the level of implementation and support.

Discussion of Findings, Conclusions and Policy Recommendations

According to the finding of this research study, the urban Midwest district is at the beginning levels of implementation of digital age teaching and learning, implementation of research-based best practices and fluency of digital tools with student learning. The null hypothesis one \((H_01)\) states there is no significant difference between type of building and the level of implementation of digital age teaching and learning in the classroom. Upon conclusion, the research accepts the null hypothesis. All buildings are at the lowest two levels of implementation with no significant difference.

Null hypothesis two \((H_02)\) stated there is no significant difference between type of building and the level of support for implementation of learner-based instructional best practices. Upon conclusion, the research rejects the null hypothesis. The analysis did show a significant difference between type of building and the implementation of instructional practices consistent with a learner-based curriculum design and research-based best practices student. With 80% of the secondary schools at implementation Levels 2 and 3 compared to 63% of the elementary buildings at Level 1. Again, all buildings are at the beginning implementation stages of instructional practices consistent with a learner-based curriculum design and research-based best practices student.

Null Hypothesis three \((H_03)\) stated that there is no significant difference between type of building and teacher fluency level with digital tools and resources with student learning. Upon conclusion, the research rejects the null hypothesis. The analysis showed a significant difference
of fluency level with digital tools and resources for student learning as well as teacher use in the workplace. The elementary buildings are moving quickly ahead with 94% at Level 4 & Level 5 while the secondary buildings lag behind with 90% at Level 3 & 4. Of the three research questions, RQ3 was the strength area for all buildings with a combined 16 buildings at Level 4 and 5 buildings at Level 5.

Based upon this research, the study recommends further research of digital age teaching and learning and student-centered teaching and learning. The district could benefit from focused professional development in implementation of digital age teaching and learning and student-centered instructional strategies. The importance of continuing to investigate all three areas of learning for this generation of learners is essential as federal and state mandates continue to raise the standards with common core curriculum and new generation assessments. Districts could certainly benefit from focused professional development in all three areas. Further research could be useful for many schools districts investigating digital age teaching and learning and implementation of 1:1 initiatives.
REFERENCES


APPENDIX

**TABLE 1 - NETS-S (STUDENTS)**

1. Creativity and Innovation—students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
2. Communication and Collaboration—students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. Research and Information Fluency—Students apply digital tools to gather, evaluate, and use information.
4. Critical Thinking, Problem Solving and Decision Making—students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
5. Digital Citizenship—students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
6. Technology Operations and Concepts—Students demonstrate a sound understanding of technology concepts, systems and operations. (ISTE, 2012)

**TABLE 2 - NETS-T – (TEACHERS)**

1. Facilitate and Inspire Student Learning and Creativity
2. Design and Develop Digital Age Learning Experiences and Assessments
3. Model Digital Age Work and Learning
4. Promote and Model Digital Citizenship and Responsibility
5. Engage in Professional Growth and Leadership (ISTE, 2012)

**TABLE 3 – MIDWESTERN SCHOOL DISTRICT LEARNER PROFILE**
Table 5 – Laptops for Learning Task Force (Florida)

Guiding Principles:

1. Bridge the digital divide
2. Teach 21st century skills
3. Reform teaching methods
4. Provide effective professional development
5. Prepare effective professional development
6. Prepare pre-service teachers for the 21st century classroom
7. Provide rich multimedia resources
8. Provide the appropriate tools to all students and teachers
9. Provide adequate tools to all students and teachers
10. Provide adequate technical support
11. Assess 21st century skills
Table 6 – Survey Results by Levels and Building Type

<table>
<thead>
<tr>
<th>Building Type</th>
<th>RQ 1</th>
<th>RQ 2</th>
<th>RQ 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>S 1</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 1</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>S 2</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 2</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>S 3</td>
<td>Level 1</td>
<td>Level 1</td>
<td>Level 3</td>
</tr>
<tr>
<td>E 3</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 4</td>
<td>Level 1</td>
<td>Level 1</td>
<td>Level 2</td>
</tr>
<tr>
<td>E 5</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 4</td>
</tr>
<tr>
<td>S 4</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 6</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>S 5</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 5</td>
</tr>
<tr>
<td>S 6</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 7</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 8</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 9</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 10</td>
<td>Level 1</td>
<td>Level 1</td>
<td>Level 5</td>
</tr>
<tr>
<td>S 7</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 3</td>
</tr>
<tr>
<td>S 8</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 3</td>
</tr>
<tr>
<td>E 11</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 5</td>
</tr>
<tr>
<td>E 12</td>
<td>Level 2</td>
<td>Level 1</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 13</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 4</td>
</tr>
<tr>
<td>E 14</td>
<td>Level 1</td>
<td>Level 2</td>
<td>Level 5</td>
</tr>
<tr>
<td>E 15</td>
<td>Level 2</td>
<td>Level 2</td>
<td>Level 4</td>
</tr>
<tr>
<td>S 9</td>
<td>Level 2</td>
<td>Level 3</td>
<td>Level 4</td>
</tr>
</tbody>
</table>
### TABLE 7  Chi Square RQ1

<table>
<thead>
<tr>
<th></th>
<th>Type(1)</th>
<th>Type(2)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level(1)</td>
<td>3</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Level(2)</td>
<td>13</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
</tbody>
</table>

Chi Square: 0.00619048, P-VALUE: 0.937207
Cramer’s V: 0.0154303, Gamma: -0.04
Lambda: 0, Inverse: 0
Somers’ d: -0.0190476, Inverse: -0.0125
Goodman-Kruskal Tau: 0.000238095, Inverse: 0.000238095
Kendall’s Tau: a = -0.00615365, b = -0.0154303, c = -0.0118343

Fisher’s Exact Test: P = 0.655917

### TABLE 8  Percentages for RQ 1

<table>
<thead>
<tr>
<th></th>
<th>Type(1)</th>
<th>Type(2)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level(1)</td>
<td>15.8</td>
<td>20</td>
<td>19.2</td>
</tr>
<tr>
<td>Level(2)</td>
<td>81.3</td>
<td>80</td>
<td>80.8</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
TABLE 9

Chi Square RQ2

<table>
<thead>
<tr>
<th></th>
<th>Type(1)</th>
<th>Type(2)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level(1)</td>
<td>10</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>Level(2)</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Level(3)</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
</tbody>
</table>

TABLE 10 PERCENTAGES FOR RQ2

<table>
<thead>
<tr>
<th></th>
<th>Type(1)</th>
<th>Type(2)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level(1)</td>
<td>62.5</td>
<td>20</td>
<td>46.2</td>
</tr>
<tr>
<td>Level(2)</td>
<td>37.5</td>
<td>50</td>
<td>42.3</td>
</tr>
<tr>
<td>Level(3)</td>
<td>0</td>
<td>30</td>
<td>11.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
### TABLE 11  CHI SQUARE RQ3

FILE: none, NO. OF VARIABLES: 4, NO. OF CASES: 27  (MISS. CASES: 1)
LABEL: none

<table>
<thead>
<tr>
<th>CHI SQUARE(3): 8.09656</th>
<th>P-VALUE: 0.0440576</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRAMER'S V: 0.558038</td>
<td>GAMMA: -0.584158</td>
</tr>
<tr>
<td>LAMBDA: 0</td>
<td>INVERSE: 0.4</td>
</tr>
<tr>
<td>SOMER'S d: -0.312169</td>
<td>INVERSE: -0.36875</td>
</tr>
<tr>
<td>GOODMAN/KRUSKAL TAU: 0.311406</td>
<td>INVERSE: 0.8937831</td>
</tr>
<tr>
<td>KENDALL'S TAU: a = -0.181538, b = -0.339282, c = -0.349112</td>
<td></td>
</tr>
</tbody>
</table>

**CROSSTAB VLevel BY Type**

<table>
<thead>
<tr>
<th>Type(1)</th>
<th>Type(2)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level(2)</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Level(3)</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Level(4)</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Level(5)</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>16</td>
<td>10</td>
</tr>
</tbody>
</table>

### TABLE 12 PERCENTAGES RQ3

FILE: none, NO. OF VARIABLES: 4, NO. OF CASES: 27  (MISS. CASES: 1)
LABEL: none

**CROSSTAB VLevel BY Type**

**PERCENT OF COLUMN TOTALS**

<table>
<thead>
<tr>
<th>Type(1)</th>
<th>Type(2)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level(2)</td>
<td>6.3</td>
<td>0</td>
</tr>
<tr>
<td>Level(3)</td>
<td>0</td>
<td>40</td>
</tr>
<tr>
<td>Level(4)</td>
<td>66.0</td>
<td>50</td>
</tr>
<tr>
<td>Level(5)</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>