BOSTON UNIVERSITY

COLLEGE OF FINE ARTS

Final research project

TECHNOLOGY TOOLS IN THE MIDDLE SCHOOL ART ROOM: THE IMPACT ON STUDENT MOTIVATION, UNDERSTANDING, AND ART PRODUCTION

by

Christine M. Trausch

Bachelor of Fine Arts, University of Illinois, 1983

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ABSTRACT

The growing use of educational technology tools in the classroom was the impetus behind this study. This classroom-based study was conducted to determine how technology-based lessons in middle school art classes might impact student motivation, understanding, and art production. An art unit, enhanced with technology lessons, was presented to three sixth grade art classes to determine the answer to this question. Observation notes and student surveys were used to gain multiple perspectives of this phenomenon. Additional data supporting the results of this study include teacher interviews, observations of technology-based lessons in various classrooms, and literature based on similar studies. It was determined that technology-based lessons can be used to increase student motivation and to help students to more clearly understand new material. It was also determined that with increased motivation and understanding, students were more engaged in the art process, worked more independently, and produced more meaningful art pieces. Also noted in this study is the importance of carefully planned technology-based lessons. These lessons should be varied and creatively planned in order to maintain a positive impact on student learning.

Keywords: educational technology tools, technology-based lessons, art and technology
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>viii</td>
</tr>
<tr>
<td>CHAPTER 1: INTRODUCTION TO THE STUDY</td>
<td>1</td>
</tr>
<tr>
<td>Background to the Study</td>
<td>1</td>
</tr>
<tr>
<td>Research Goals</td>
<td>2</td>
</tr>
<tr>
<td>Research Questions</td>
<td>2</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>3</td>
</tr>
<tr>
<td>Methodology of Study</td>
<td>3</td>
</tr>
<tr>
<td>Methods of Data Collection</td>
<td>4</td>
</tr>
<tr>
<td>Methods of Data Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Theoretical Framework</td>
<td>4</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>5</td>
</tr>
<tr>
<td>Limitations of the Study</td>
<td>5</td>
</tr>
<tr>
<td>Conclusion</td>
<td>6</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>6</td>
</tr>
<tr>
<td>CHAPTER TWO: LITERATURE REVIEW</td>
<td>7</td>
</tr>
<tr>
<td>Research Question</td>
<td>7</td>
</tr>
<tr>
<td>Conceptual Framework</td>
<td>7</td>
</tr>
<tr>
<td>Literature Review</td>
<td>9</td>
</tr>
<tr>
<td>Benefits of Technology Tools</td>
<td>9</td>
</tr>
<tr>
<td>Differentiated teaching/learning</td>
<td>9</td>
</tr>
<tr>
<td>Connects learning with technology culture</td>
<td>10</td>
</tr>
</tbody>
</table>
Analysis of the Data................................................................................................................. 27
The Study................................................................................................................................. 27
Difficulties in the Past.............................................................................................................. 29
   Engaged and Motivated ...................................................................................................... 29
   Understanding .................................................................................................................... 30
Results..................................................................................................................................... 31
   Significant Findings ........................................................................................................... 31
      Engaged and Motivated .................................................................................................. 31
      Understanding ............................................................................................................... 32
      Art Production ............................................................................................................... 34
Supportive Data ..................................................................................................................... 35
   Engaged and Motivated ...................................................................................................... 36
   Increased Learning ............................................................................................................ 37
   Improved Performance ...................................................................................................... 39
Additional Findings .............................................................................................................. 40
   Routine Use of Technology Tools .................................................................................... 40
   Loss of Hands-On Process ............................................................................................... 41
Conclusion.............................................................................................................................. 42

CHAPTER FIVE: DISCUSSION AND CONCLUSION ................................................................. 43
   Discussion........................................................................................................................... 43
      Personal Impact of the Study ......................................................................................... 43
      Impact on Practice......................................................................................................... 44
   Recommendations............................................................................................................ 45
Conclusion to the Research .......................................................... 45
Advice to the Field of Art Education ........................................... 46
Advice to Art Teachers ............................................................... 46
REFERENCES .............................................................................. 48

APPENDIX A

Figure A1  6th Grade Unit Plan ......................................................... 51
Figure A2  Student Reflection ....................................................... 58

APPENDIX B

Figure B1  Teacher Interview Questions ....................................... 59
Figure B2  General Classroom Observation Checklist .................... 60
Figure B3  Art Classroom Observation Checklist ............................ 61
Figure B4  6th Grade Unit Plan Observation Checklist ..................... 62
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>Conceptual Framework</td>
<td>8</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>Research Matrix</td>
<td>18</td>
</tr>
<tr>
<td>Figure 3.2</td>
<td>6th Grade Student Survey Questions</td>
<td>22</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Examples of PowerPoint Slides</td>
<td>28</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>IWB Lesson before and after students worked with images</td>
<td>29</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>6th Grade Survey: Favorite/Least Favorite Part of Heraldic Shield Unit</td>
<td>32</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>6th Grade Survey: What activities helped you to learn and understand?</td>
<td>33</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>Students work on various steps in making their Heraldic shields</td>
<td>34</td>
</tr>
<tr>
<td>Figure 4.6</td>
<td>Completed Shields</td>
<td>35</td>
</tr>
</tbody>
</table>
Chapter One: Introduction to the Study

Technology has gradually made its way into every aspect of our lives. Today’s adolescents do not know life without laptops, gaming systems, digital cameras, cell phones, and iPods. New technology has even moved into the classroom. Overhead projectors and DVD players have been replaced by document cameras and digital projectors. Chalk boards, along with the more modern dry erase boards, have taken a back seat to interactive whiteboards. Many schools have made room in their budgets to acquire these technology tools and encourage teachers to incorporate them into their teaching practices.

Background to the Study

Tillander (2011) points out that “digital technologies are changing the way young people learn, play, socialize, and participate in civic life” (p. 44). If young people are learning differently, teachers need to teach differently in order to help these young people learn most effectively. After all, “education is not about teaching – it’s about student learning” (Gregory, 2009, p. 47). Technology tools, such as interactive whiteboards and document cameras, are both visual and interactive, and engage students in learning. Dunn (1996) suggests that the reason students are more engaged in technology-based lessons “revolves around active versus passive participation in the learning process” (p. 7).

Finding ways to improve classroom practices and better engage students in learning in the art classroom is a goal of many art teachers. “Making meaning with tools and materials, both old and new, has long been central to our practice as artists and art educators” (Roland, 2010, p. 23). St. James is a Catholic PreK through eighth grade school in a suburb of Chicago. For the past few years, various technology tools have made their way into classrooms at St. James School to aid in teaching math, science, and language. Classroom teachers have discussed the
usefulness of these technology tools, as well as the impact they see on their students’ learning. If classroom teachers are experiencing such positive results, certainly similar results might be experienced using these technology tools in the art classroom. The administration at St. James School has pushed to incorporate technology in every classroom, and encouraged the researcher to discover how technology may be used to teach art and impact learning for middle school students.

**Research Goals**

The main goal of this research was to investigate how technology-based art lessons might improve teaching practices. By incorporating the use of such technology tools as a digital projector, an interactive whiteboard, and a document camera into art presentations, the researcher hoped to improve communication with middle school students so that they may better understand the art concepts and processes being taught. These technology-based art lessons might also make students more attentive and more deeply engaged in the classroom activity. With an increased level of understanding, as well as increased engagement, students may become more motivated and demonstrate greater creativity in their art production.

**Research Questions**

How might presenting art lessons using a digital projector, an interactive whiteboard, and a document camera impact motivation, understanding, and art production of middle school students? This classroom based study sought to answer this and other questions related to teaching art using educational technology tools. Could presentations using a digital projector, interactive whiteboard activities, and demonstrations using a document camera aid in communicating with middle school students in the art classroom? How might these technology-based lessons impact student understanding of art concepts and processes? With clearer
understanding of the lessons, might students be motivated to be more creative with their art production? Could the addition of these technology-based art lessons result in a more meaningful art experience for these middle school students? These questions were addressed through teacher interviews, classroom observations, and journaling of experiences with students as technology-based art lessons were introduced to the sixth grade art curriculum.

Conceptual Framework

In an attempt to improve teaching practices in the art room, a plan was laid out using “different methods [of gathering data] as a check on one another, seeing if methods with different strengths and limitations all support a single conclusion” (Maxwell, 2013, p. 102). These combined research methods helped to determine if the addition of lessons using a digital projector, an interactive whiteboard, and a document camera impacts the overall art experience of middle school students.

Methodology of study.

Existing literature was investigated to determine what has been studied regarding the impact of technology-based teaching. Interviews and observations of classroom teachers, as well as art teachers, who are actively using technology-based lessons to teach their students, were conducted. In addition, technology-based art lessons were added to units of study that had been used in the past (see Figure A1). As these lessons were presented to three sixth grade classes, students’ behaviors were observed. Levels of understanding were compared to the experiences of last years’ students which did not have the added technology-based lessons. Students were surveyed to determine their impressions of the technology-based lessons and the impact on student art experiences.
Methods of data collection.

Information from existing literature was noted for comparison to other data gathered. Detailed notes from teacher and student interviews, as well as classroom observations were used for comparison. Follow up interviews were conducted as needed. Student surveys were collected and compared to interview and observation notes. Observations of how students were impacted by these technology-based lessons were noted in detailed memos. This variety of data collection provided a number of different perspectives for comparison and analysis.

Methods of data analysis.

Notes and memos were collected and analyzed to look for “contiguity-based relations, [which] involves seeing actual connections between things” (Maxwell, 2013, p. 106). Information gathered from various teachers and students, various studies found in the literature, and the researcher’s own experiences and observations, were sorted into matrices for accurate comparison. In this way, the viewpoints of the different sources could be clearly evaluated to see any commonality among the participants in the study.

Theoretical Framework

Finding ways to motivate and engage students is an ongoing and ever changing process. As students change and evolve over time, so must teachers’ methods of teaching. “Teachers need to acculturate themselves to the lives and learning styles of these 21st-century students” (Unrath & Mudd, 2011, p. 7). Technology has become integral to the lives of adolescents. Using technology in the classroom may be one way to connect with these students. Studies show that “learning technologies, when used within a student-centered learning approach, can improve student learning, increase student and teacher motivation, and support an educational climate of higher order learning.” (Gregory, 2009, p. 48).
Motivation in the art room is instrumental to the success of student learning. Feldman (1996) explains that “motivation is necessarily the keystone of any art teaching strategy; without that keystone the other stones in our educational arch cannot be assembled to form a solid instructional unit” (p. 77). In her own art classroom, Gregory (2009) has found that when “using learning technologies… students have become more involved, empowered, engaged, and enthusiastic” (p. 53).

**Significance of the Study**

“Imagine that every student is fully engaged in whatever lesson the teacher is presenting” (Peterson, 2005, p. 16). This is the ultimate goal of every art teacher. Finding new teaching methods to make this happen is the challenge. Learning technologies may provide solutions to student motivation. Although it may be easier to continue to teach the same things using the same strategies, “we all know that if we always do what we’ve always done we’ll always get the same results” (Unrath & Mudd, 2011, p. 6). It is important to investigate how teaching practices may be improved through the use of technology-based art lessons. “If students are engaged, they take personal ownership of their learning, so engaging learners is a key ingredient of good teaching” (Delaney, 1998, p. 115).

**Limitations of the Study**

A portion of the study took place in the researcher’s classroom using her own technology-based lessons. The direct participation in the study could create a personal bias. In order to alleviate this potential bias all data was gathered and compared. The findings in the literature, as well as information collected through interviews with teachers and students, were noted for similarities, “testing the validity of [the] conclusions and the existence of potential threats to those conclusions” (Maxwell, 2013, p. 125).
Another limitation to this study was the time constraint incurred by both this thesis course as well as the term breaks set by St. James School. The study was primarily conducted within sixth grade art classes that met during the third trimester of the school year. Although meeting with these students every day greatly benefitted the study, the third trimester did not begin until March 4, 2013. There were also some interruptions during the first week of the trimester due to time needed to conduct annual standardized testing.

**Conclusion**

Discovering how learning technologies may be used to motivate students, increase understanding, and enhance the overall hands-on art experiences of middle school students was the goal of this study. Chapter Two will present a review of the literature on the subject of learning technologies in the classroom. The following chapters will then discuss the methods used in the study, as well as the findings.

**Definition of Terms**

**Digital projector**: High definition apparatus used to display enlarged images on a screen or wall. These projectors may be used in tandem with other electronic devices such as computers, interactive whiteboards, and document cameras.

**Document camera**: When connected to a digital projector, this electronic device, with a high-resolution lens, may be used to capture a real-time image to display to a large audience. The document camera is able to display from a desk top or table top, and therefore may be used to project live demonstrations, as in a classroom setting.

**Interactive whiteboard**: A large, touch-sensitive board connected to a computer and a digital projector, used for teaching in the classroom.
Chapter Two: Review of the Literature

This qualitative study examined the use of some of the latest teaching tools of the 21st-century. Besides computers, a number of other technology tools can be found in many schools and are used in many different classroom settings. This study sought to discover if technology-based art instruction might impact student learning.

Research Question

This chapter focuses on literature that supports the study of educational technologies and their impact on students in the art classroom. How might presenting art lessons using a digital projector, an interactive whiteboard, and a document camera impact motivation, understanding, and art production of middle school students? The literature studies presented here represent a variety of classroom settings: math, science, language, and art – as well as different school environments: large, small, urban, and rural. Despite these differences, a great deal of commonality is found among the various studies.

Conceptual Framework

This study sought to improve teaching practices in the art classroom. The Conceptual Framework chart below (see Figure 2.1) illustrates the plan to gather data from a variety of sources using a variety of methods to achieve specific goals. Personal experiences, combined with a number of research methods, helped to determine if the addition of lessons using a digital projector, an interactive whiteboard, and a document camera would improve understanding, increase motivation, and impact the overall art experience of middle school students.

Students often experience difficulties in understanding art concepts or methods and become frustrated with their work as a result. The art teacher may try different methods of presentation or demonstration in order to ease student difficulties and improve teaching
practices. Using technology-based art lessons may make it easier for students to understand new concepts. By increasing understanding students may be more motivated to learn about art and may be more creative with their art production. As Tillander (2011) points out in quoting Csikszentmihalyi (1996): “It is easier to enhance creativity by changing the conditions in the environment than by trying to make people think more creatively” (p. 42).

*Figure 2.1*

**CONCEPTUAL FRAMEWORK**
Literature Review

The investigated literature supports the study of the use of technology tools in the art classroom. Findings provide both teacher and student views of the positive impact of these technologies, as well as some challenges associated with the inclusion of these tools in pedagogies. The researcher has experienced many of the challenges described in the literature that often inhibit the use of educational technologies by overburdened teachers who lack the training needed to use these tools.

Benefits of technology tools.

Educational technology tools have been found to enhance learning beyond traditional teaching methods. Teachers and students alike have expressed the many benefits of incorporating technology-based lessons into many different subject areas. Today’s adolescents have grown up surrounded by technology. “The 21st-century student is not only technologically literate, but driven by the innovation, communication, and interfaces which they experience with technology” (Unrath & Mudd, 2011, p. 8). Perhaps the greatest benefit of incorporating educational technologies in the classroom is the way they enable teachers to better communicate with their technologically literate students.

Differentiated teaching and learning.

Different combinations of teaching methods provide a variety of ways for students to understand information. Differentiated teaching methods help to accommodate a group of students with varying learning styles. Interactive whiteboards, document cameras, and digital projectors may be used to provide differentiated teaching. Teachers who have incorporated technology into their teaching practices “believe that [it] has greatly improved student achievement, aided differentiation of instruction and enhanced their own instructional
techniques” (Peterson, 2005, p. 17). Visual learners in particular benefit greatly by these very visual technologies (Shenton & Pagett, 2007; Smith, Higgins, Wall, & Miller, 2005; Wall, Higgins, & Smith, 2005). Some of these technologies also provide hands-on interaction for students allowing them to be participants in the classroom rather than part of an audience.

“Often facilitated by technology, learning and knowledge are acquired by doing” (Unrath & Mudd, 2011, p. 9).

**Connects learning with technology culture.**

Adolescents today have lived their entire lives in the computer age. Many adults need to be taught how to use their newly acquired electronic gadgets, whereas young people use them instinctively. “The fact that technological means are so seamlessly integrated into students’ daily lives speaks to alternative literacies that require” teachers to consider different methods of teaching (Unrath & Mudd, 2011, p. 8). Educational technologies are a way to connect with adolescents both verbally and visually, and in the same way they connect with each other and their technology filled culture. Dunn (1996) points out that “children spend the first years of their lives learning through interacting with their environment” (p. 7). Integrating technology into the classroom allows students to interact with their learning environment, creating an engaging learning experience.

**Engaged and motivated.**

“Best practices suggest that using a variety of teaching strategies keeps teaching lively for teachers and learners alike” (Burton, 2001, p. 134). Studies have shown that educational technology has had an impact on student learning, but does not indicate how or why (Jenkinson, 2009, p. 274). However, “teachers report being able to reach all learners with more efficient instruction and seeing more engaged and motivated students as they interact with technology”
(Peterson, 2005, p. 18). Students agree that they are more engaged in lessons when technology tools are used (Shenton & Pagett, 2007; Smith, Higgins, Wall, & Miller, 2005; Wall, Higgins, & Smith, 2005). If students are fully engaged and motivated, greater learning takes place.

“Motivation grabs students’ interest and gets them excited about what they are going to do, but engagement takes this excitement to another level” (Delaney, 1998, p. 115). If using document cameras, interactive whiteboards, or other educational technologies have shown increased motivation and engagement in students, it is very worthwhile to further investigate the use of such teaching tools.

**Teachers’ perspectives.**

Teachers in many different school environments report similar experiences when using educational technologies in their classrooms. Students often become more involved in learning because of the interactive nature of technology-based lessons. “Teachers cite countless instances in which their students gained a deeper and quicker grasp of concepts thanks to the new tools” (Peterson, 2005, p. 18). Many teachers have noted that the use of certain educational technologies, such as interactive whiteboards, can sometimes “quicken the pace of lessons” (Smith, Higgins, Wall, & Miller, 2005, p. 91) allowing more time for other learning activities. Many teachers have also seen an increase in student understanding of material due to “interactive instruction, which engages students and encourages participation” (Peterson, 2005, p. 18).

Learning to use digital projectors, interactive whiteboards, and document cameras, and knowing how to incorporate them into pedagogy can be challenging. Creating lessons using these technologies may also be time consuming at first, but as teachers become more familiar, “planning time should eventually be reduced” as these technology tools allow them “to save, share and reuse lesson materials” (Smith, Higgins, Wall, & Miller, 2005, p. 94). Such
collaboration allows teachers to borrow from colleagues, “modify lessons to fit their students’ needs…and make the most of their colleagues’ creative ideas” (Peterson, 2005, p. 19).

*Students’ perspectives.*

Students today are immersed in technology in every aspect of their lives (Black & Browning, 2011; Tillander, 2006; Unrath & Mudd, 2011). Students have expressed how the uses of technology to present new concepts in school “assisted their understanding” (Wall, Higgins, & Smith, 2005, p. 858) and helped them to better remember new information. In particular, students felt that when they participated in technology-based lessons they were more motivated, had more fun, paid closer attention to the lessons (Wall, Higgins, & Smith, 2005; Smith, Higgins, Wall, & Miller, 2005), and found it to be “more helpful for learning compared to a traditional classroom” (Peterson, 2005, p. 18).

As art is a visual language, it stands to reason that students respond well to enhanced visuals used in art instruction. Students have expressed how much easier it is to see images displayed on an interactive whiteboard (Wall, Higgins, & Smith; Smith, Higgins, Wall, & Miller, 2005) or projected using a document camera. Using technology for art demonstrations allows students to get a better view of what is being taught. “Demonstration is a mainstay of the studio art lesson. Students usually need to actually see how to manipulate materials and tools properly and safely” (Burton, 2001, p. 137). While using a document camera, “an art teacher can give students a close-up look at exactly what her hands are creating without the chaos of an entire class trying to squeeze around a demonstration table” (Peterson, 2005, p. 18). These technology enhanced visuals are not only easier to see, but students also express that they make “learning more memorable” (Smith, Higgins, Wall, & Miller, 2005, p. 97).
Challenges associated with educational technologies.

Many teachers do not feel confident using technology tools in their classrooms. Some feel their technology skills are not adequate for learning to use these tools. Others believe that, although they are able to use the equipment, they are not certain how to use it in ways that will enhance their teaching pedagogies and benefit student learning (Gregory, 2009, p. 49). Understandably, those who have been teaching for many years have the greatest difficulty incorporating new technology into their teaching strategies. One would think that new teachers would be better prepared to use technology-based lessons, yet they also lack necessary training through their pre-service programs (Delacruz, 2004, p. 8-9). Although teachers may be strongly encouraged by administrators to incorporate such tools as an interactive whiteboard or a document camera into their lessons, teachers often do not feel they are supported enough to make this happen (Black & Browning, 2011; Delacruz, 2004).

Teacher training.

A lack of training keeps teachers from using these technologies “to their full potential” (Smith, Higgins, Wall, & Miller, 2005, p. 98). “School districts expect teachers to apply new technologies in their classrooms” (Delacruz, 2004, p. 6), yet “the majority of teachers in all subject areas remain virtually untrained in uses of technology that foster higher order thinking and creative activity” (Dunn, 1996, p. 8). Sufficient technology training for teachers is lacking (Black & Browning, 2011; Delacruz, 2004; Smith, Higgins, Wall, & Miller, 2005) and often art teachers are the last to be provided with technology tools to use in their classrooms (Dunn, 1996; McKay, 2006) due to the greater importance placed on subjects required to meet certain standards through testing. Teachers are, therefore, often left on their own to learn how to use these tools and incorporate them into their pedagogy (Black & Browning, 2011, p. 21). Most
teachers are “learning ‘on the job’, spending considerable time preparing their own materials” for
lessons using various educational technologies (Shenton & Pagett, 2007, p. 132).

“Lack of time to learn new technologies and adapt them to classroom practice” (Delacruz, 2009, p. 14) is another common obstacle expressed by teachers (Delacruz, 2009; Gregory, 2009; Shenton & Pagett, 2007). The less training a teacher has in using educational technologies, the longer it takes to prepare lessons using these tools. As a result, these teachers are less likely to incorporate technology-based lessons into their pedagogies (Shenton & Pagett, 2007; p. 132). Teachers’ time is burdened with planning, grading, interacting with parents, committee meetings and the like. It is often difficult to find the extra time necessary to learn and create technology-based lessons.

Simply a substitute for old practices.

Often educational technologies are used in ways that simply take the place of older tools without taking full advantage of their potential to impact student learning. A criticism of the use of these expensive tools is that some teachers “merely substitute one didactic presentation method for another” (Delacruz, 2004, p. 15). Posting homework or vocabulary on an interactive whiteboard instead of the chalkboard is not a true use of this technology. Technologies, such as the interactive whiteboard or document cameras, “should be used in unique and creative ways above and beyond that which is possible with normal white boards or other projection methods” (Smith, Higgins, Wall, & Miller, 2005).

Technical difficulties.

A significant complaint among teachers and students is that often equipment breaks down, takes a while to download information, or requires adjustment that takes time out from learning (Smith, Higgins, Wall, & Miller, 2005; Wall, Higgins, & Smith, 2005). Technical
assistance is not always readily available if the teacher is unable to fix the technical issue. Certainly there is a “need for: a supportive and informed administrative staff, a flexible and responsive technical staff,” (Delacruz, 2004, p. 10) as well as useful teacher training.

**Conclusion**

The literature discussed in this chapter has reinforced and supported the tacit understandings of the researcher. It has also provided additional information which was considered when creating and planning specific methodologies for this research.

**Tacit understanding.**

The literature supports the researcher’s belief that students are often able to form clearer understandings of concepts when technology tools, such as a digital camera or an interactive white board, are used to present new information. Enabling students to more clearly see material being presented, as well as getting students more involved in lessons, encourages learning. Art class abounds with both visual instruction and visual creations making it an ideal environment for incorporating visual technologies. Interactive technologies get students more involved and engaged, making them active participants in the classroom.

The literature also supports the idea that learning to use these technology tools takes time and effort, but should also prove rewarding. Increased teacher training would help to alleviate some of the time constraints. Training geared toward teachers’ specific needs and specific subject areas is needed to help teachers get the most from these educational technologies.

**Theoretical understanding.**

Based on what has been learned through the literature, research methods were created that incorporate the best use of educational technologies in the classroom. The literature reveals the importance of how educational technology tools should be used in order for students and
teachers to reap the greatest benefits from their use. The methodologies chosen to conduct this study were influenced by the literature and will be fully outlined and discussed in the next chapter.
Chapter Three: Methodology

“The primary goal of research is to understand; the primary goal of teaching is to help students learn” (Wong, 1995, p. 23). As Wong implies, when the researcher is also the participant in an action research study, these two goals might conflict. This classroom-based action research study took place in three sixth grade art classes where the researcher was also the teacher. Additional sources of data were used to provide different perspectives to similar classroom settings and situations, and to assist in focusing the data in order to report personal findings accurately.

Design of the Study

The primary research in this study took place at St. James School in Arlington Heights, Illinois. St. James is a Catholic PreK through eighth grade school located in a middle class suburb of Chicago. Arlington Heights is a very family oriented community and provides excellent education opportunities in both public and private schools. Sixth graders in three art classes were the participants in this case study. Sixth grade attended art class every day for the third trimester which began March 4, 2013.

The focus of the study was to determine if art instruction using educational technologies impacts the understanding, motivation, and art production of middle school students. Interviews of classroom teachers and art teachers, classroom observations, and a review of the literature provided various perspectives regarding the use of educational technologies in the classroom. Two teachers from St. James School as well as two art teachers from the public middle schools in town were interviewed to gain their perspectives of their own use of educational technologies. Classes were then observed as these teachers conducted technology-based lessons. The “Research Matrix” below (see Figure 3.1) outlines the questions asked in the study, the various
sources and methods used to answer these questions, and the type of data collected through these methods.

![Research Matrix](image)

**Figure 3.1 Research Matrix:**

<table>
<thead>
<tr>
<th>Research Questions: What do I need to know?</th>
<th>Why do I need to know this?</th>
<th>Sampling: Where will I find this data?</th>
<th>Data Collection Methods: What kind of data will answer these questions?</th>
<th>Whom do I contact for access?</th>
<th>Data Analysis: Charted in a matrix for comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does the literature say about technologies used for classroom instruction?</td>
<td>-To find out what others have researched and discovered regarding educational technologies.</td>
<td>Boston University online library</td>
<td>Scholarly journal articles</td>
<td>-4th grade classroom teacher -7th and 8th math teacher</td>
<td>Notes and memos reviewed</td>
</tr>
<tr>
<td>How are different educational technology tools used in the classroom?</td>
<td>-To learn and understand about educational technologies. -To improve teaching practices.</td>
<td>St. James School teachers (Researcher’s school colleagues)</td>
<td>-Formal interview -Classroom observation -Informal interview</td>
<td>-South Middle School art teacher -Thomas Middle School art teacher</td>
<td>Interview and Observation Notes compared</td>
</tr>
<tr>
<td>How are different educational technology tools used in the art classroom?</td>
<td>-To improve teaching practices in the art classroom.</td>
<td>Local public middle schools</td>
<td>-Formal interview -Classroom observation -Informal interview</td>
<td>-South Middle School art teacher -Thomas Middle School art teacher</td>
<td>Interview and Observation Notes compared</td>
</tr>
<tr>
<td>Do these technology tools impact student learning/ motivation/ art production?</td>
<td>-To enhance and improve student art experience and production. -To learn student perceptions of these educational technologies.</td>
<td>-Local public middle schools</td>
<td>-Formal interview -Classroom observation -Informal interview -Researcher participation and observation of 6th grade art students -Some technology used with 8th grade students</td>
<td>-South Middle School art teacher -Thomas Middle School art teacher -Researcher/ art teacher -6th grade students</td>
<td>-Interview and Observation Notes -Researcher memos -Student surveys</td>
</tr>
</tbody>
</table>

(Adapted from Maxwell, 2013, p. 117)
Research Methods

This study began with a review of the literature. The literature provided information on how other researchers studied educational technologies in the classroom, revealed findings on how educational technologies impact student learning, and provided guidance for designing the classroom-based portion of the research. The literature, along with some additional research methods, was also used to provide several different perspectives to the study, “testing the validity of [the researcher’s] ideas to theirs” (McNiff & Whitehead, 2009, p.65).

Interviews.

Structured interviews (see Figure B1) were conducted with two teachers from St. James School in order to obtain their input and opinions regarding technology-based lessons. One is a fourth grade teacher who often uses an interactive whiteboard to teach science and language arts. The other instructor teaches seventh and eighth grade math and uses the interactive whiteboard nearly every day. He also uses a document camera to go over tests and homework with his students. “Particular settings, persons, or activities are selected deliberately to provide information that is particularly relevant to [the researcher’s] questions and goals, and that can’t be gotten as well from other choices” (Maxwell, 2013, p. 97). These teachers were chosen for three reasons: (a) the frequency of their technology use, (b) their experiences teaching before these technology tools became available, and (c) they teach in the same learning environment where the case study took place.

In order to gain the perspective of art teachers and their use of technology tools in the art classroom, two middle school art teachers were also interviewed using prepared questions (see Figure B1). The original intention was to interview art teachers at local Catholic schools because these schools would provide the most similar environment to St. James School, however, a few
phone calls revealed that none of these art teachers use technology tools for instruction. As a result, two art teachers, one from each of the public middle schools in Arlington Heights, were interviewed. It was assumed that these public school teachers have more technology available to them and likely have much more experience using technology in their classrooms. Although this provided very different experiences from the teachers at St. James School, the impact on student learning is similar.

**Observations.**

In order to understand fully how these four teachers use educational technologies for instruction, each agreed to allow their classes to be observed. “Although interviewing is often an efficient and valid way of understanding someone’s perspective, observation can enable [the researcher] to draw inferences about this perspective that [she] couldn’t obtain by relying exclusively on interview data” (Maxwell, 2013, p. 103). A checklist (see Figure B2) was prepared and notes were taken to document the use of technology tools, student behaviors, and how students interacted with these tools. A slightly different checklist (see Figure B3) was prepared for observing the art classes to capture student behaviors related to art and art production.

Informal interviews were conducted with each of the teachers following the observations in order to clarify what was observed. “Interviews can also provide additional information that was missed in observation, and can be used to check the accuracy of the observation” (Maxwell, 2013, p. 103).

**Classroom implementation.**

The actual case study took place in three sixth grade art classes at St. James School. An art unit (see Figure A1) resulting in the creation of a personal shield using Heraldic images from
the Middle Ages was used to direct the study. This particular art unit has been taught twice to past sixth grade art classes, but without any type of technology used for instruction. The art unit was rewritten to incorporate the use of three different technology tools to present information, provide interactive activities for students, and demonstrate art making techniques. A PowerPoint presentation was used to begin the unit and provided historic background, information regarding the symbolism of these Heraldic images, and the purposes for these symbols. A lesson using an interactive whiteboard followed, allowing students to experiment with different symbols and lines so they could design the composition for their personal shields. Throughout the art-making process a document camera was used to demonstrate different techniques for manipulating the materials and completing the shields.

A brief pilot study was conducted during the second trimester. Lessons using some of these technology tools were tested with eighth grade students. A PowerPoint presentation and demonstrations using a document camera were added to enhance a self-portrait lesson which was used many times over the years. The observed impact on student learning encouraged the researcher to pursue this study.

**Student surveys.**

When the art unit was completed, sixth grade students were asked to answer survey questions regarding their experiences throughout the unit. Simple open-ended questions (see Figure 3.2) were projected on the board for students to answer anonymously on paper. So as not to influence student answers the technology lessons were not specifically mentioned in the survey questions. Data from student surveys is discussed with the results of the study in the following chapter.
Data Collection

Data collection took place throughout the study, and all data was charted and compared when interviews, observations, implementation, and student surveys were completed. Using the structured interview form, notes were taken during the four teacher interviews. Following each interview, detailed memos were written to clarify notes and recall information that may not have been immediately recorded. During classroom observations, prepared checklists (see Figures B2 and B3) were used to insure that certain student behaviors were observed. Additional notes were taken during the informal interviews that followed each observation. The researcher reflected on these experiences, composing memos to recall additional observations and impressions of the classroom experiences.

Before beginning the art unit notes were made recalling the frustrations, misunderstandings, as well as successes experienced by both teacher and students when the unit was previously taught without the technology lessons. These were later compared to observation notes taken while teaching the unit that includes the technology lessons. A prepared checklist (see Figure B3) was used to observe student behaviors during each lesson in the unit. Reflection notes were written at the completion of the unit as well. As Maxwell (2013) points out, “the data

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Figure 3.2 6th Grade – Student Survey Questions – End of Middle Ages Unit

Think about the Middle Ages unit just completed and please answer the following questions:

1. What did you learn while going through this unit?
2. What was your favorite part of the unit?
3. What was your least favorite part of the unit?
4. What is something you know now that you did not know before?
5. What helped you to learn this new information?
6. What helped you to learn and understand the expectations of the shield project?
7. Are you happy with the way your shield turned out? Why or why not?
in a qualitative study can include virtually anything that you see, hear, or whatever is otherwise communicated to you while conducting the study” (p. 87).

Data Analysis

All data collected from the various sources were compared for commonalities. Teacher interviews, classroom observations, student surveys, existing literature, and memos, including the notes and memos from the classroom study, were compared and analyzed. The views of each participant in the study were organized in matrices for comparison. These matrices were designed to compare how the various perspectives answer the specific research questions. Additional rows were added to the matrices to accommodate unexpected findings that related to the study.

Throughout the process of rereading and analyzing data, memos were taken not only to aid in reflecting on the gathered information, “but also facilitate [analytic] thinking, stimulating analytic insights” (Maxwell, 2013, p. 105). This not only aided in the discovery of similarities and differences outlined on the matrices, but also helped to see “the influence of one thing on another…and seeing actual connections between things” (Maxwell, 2013, p. 106). Making these connections as well as comparing through matrices provided a more thorough understanding of the research.

Conclusion

The goal of this action research study was to improve teaching practices by increasing student understanding, motivation, and overall experience in the art classroom. The described research methods were intended to discover if educational technologies might provide strategies to help achieve this goal. McNiff & Whitehead (2009) explain that action research is “an attitude of enquiry that enables people to question and improve taken-for-granted ways of thinking and
acting” (p. 7). Learning how to use an interactive whiteboard and a document camera, and implementing them in art lessons, was a way to personally experience their impact. Investigating how other teachers use these tools provided additional support for the study. Chapter Four will explain the participants’ perspectives and provide the findings of this study.
Chapter Four: Results of the Study

The purpose of this study was to determine how technology-based art lessons might impact student motivation, understanding, and art production. Forty-seven students in three sixth grade art classes were the participants in this study. Students were presented with an art unit previously taught to sixth graders without the benefit of any technology tools. As part of the study, a PowerPoint presentation and an interactive white board (IWB) activity were added to the unit. In addition, a document camera was used to demonstrate procedures and techniques throughout the art-making process. Student behaviors were observed while each technology tool was being used and while students worked on their art projects. Students’ motivation and understanding of information and processes were of particular interest to the researcher. At the conclusion of the art unit, students shared their own opinions through an anonymous survey (see Figure 3.2) regarding their motivation and understanding.

Significance of the Study

Student surveys provided a great deal of useful information. Student responses were very thorough and represented very positive experiences due to technology-based lessons and art production. Observation notes were compared with data from student surveys in a matrix and sorted to indicate which activities were most engaging and which helped students to best learn new information and art processes. Student feedback strongly agreed with the observations of the teacher/researcher. Although the viewpoints of the participants varied slightly, the overall data collected supports the positive impact technology-based lessons have on student learning.

The goal of this study was to improve teaching practices through the use of educational technology tools to enhance art instruction. The intended results would be increased motivation, clearer understanding, and a more meaningful art experience for middle school students. Data
collected in this study indicates that students are more motivated and understanding is increased when taught through technology-based lessons. Students are not only engaged with the interactive nature of some of these lessons, but seem to be most influenced by the visual impact of these technologies. Many students commented on the power of the visuals provided by all three technology tools (PowerPoint, IWB, and document camera), how the visuals helped in learning, organizing and planning their project, to see clearly, and therefore to understand the steps in the art making process.

The findings in this study are supported by similar studies found in literature. Dhindsa and Emran (2006) indicate that the use of an “interactive whiteboard enhances students’ enjoyment and motivation in their lessons as it allows greater opportunities for participation” (p. 179). Student surveys reflect this same idea, and indicate that not only was the IWB activity “fun,” but it also helped them to visually plan their art projects. Students also indicated in their surveys that the PowerPoint presentation helped them to learn and understand new material, and provided visual information needed to create their art projects. In her own research, Gregory (2009) states “that integration of learning technologies into a variety of classroom settings improves student learning” and believes that “art teachers can and should use learning technologies to improve student learning in art” (p. 48).

The findings of this study provide encouraging data that indicate the many ways technology tools may be used to motivate students and improve understanding. Students’ responses to technology-based lessons strongly agree with existing research, as well as the observations that took place within this study. Realizing that students are more engaged and their understanding is increased through interaction and visual learning should impel art teachers to investigate useful and meaningful ways to incorporate educational technologies into their
lessons.

**Bias and Validity**

It is challenging to remain neutral when the researcher is also the teacher in the classroom being observed. The teacher has an interest in helping students learn while the researcher looks for answers to questions in the study. Reflecting and making memos on past experiences with this art unit without the use of technology tools aided in creating a checklist of specific behaviors to be noted during observation. This helped to eliminate bias and kept the research focused on certain behaviors during observations.

In order to validate classroom observations, students’ survey responses were sorted with observation notes into a matrix. Common categories were used to compare observed behaviors with student perspectives of their own responses to the technology-based lessons. These results were in turn compared with reflections of past teachings of this same art unit without the use of technology. Notes from teacher interviews were compared with observations conducted in their classrooms. Notes from follow up interviews and emails were also used to validate and clarify collected data.

**Analysis of the Data**

The art unit used for this study (see Figure A1) was used with sixth graders in the past but without any technology-based lessons. The lesson takes a historical and artistic look at the use of Heraldic symbolism during the Middle Ages and has students design and create a personal shield using symbols that represent themselves and their families. This art unit parallels sixth graders’ study of the Middle Ages in social studies class.

**The Study**

The classroom study began with a PowerPoint presentation (see Figure 4.1) that provided
historical and symbolic information regarding the use and meaning of Heraldic symbolism during the Middle Ages. After the historical information was presented, students were told they would be designing their own shield using Heraldic symbols that would represent characteristics of themselves and their families. They were encouraged to take notes as Heraldic symbols and their meanings were presented in the second half of the PowerPoint. Students’ notes were to contain symbols and colors that would pertain to them personally and would be good options to choose when designing their personal shields. As expected, students were attentive and took pertinent notes. Printouts of the symbols in the PowerPoint, and others, were posted in the classroom which allowed students to reference this information throughout the project.

Figure 4.1: Examples of PowerPoint slides

Over the following two days an activity using the interactive white board (IWB) was provided to help students plan the basic composition of their shield. This activity consisted of two shield outlines along with a variety of symbols and lines that could be moved into the shield shapes allowing students to see how a composition might look before drawing a plan on paper (see Figure 4.2). Students were able to come up to the board two at a time to test some compositional arrangements. When not working at the IWB students worked at their seats choosing symbols and colors, and making sketches for their shield designs.
Throughout the twelve days of the art unit, a document camera was used periodically to demonstrate processes and techniques for creating and completing the aluminum shields. By using the document camera in the front of the room, students were able to not only see artist’s hands working, they were also able to see the demonstration projected on the white board.

**Difficulties in the past.**

As noted, this art unit has been used in previous years without the use of any educational technology tools. This art unit allowed students to express themselves personally and artistically as they used symbolism to create their own unique design. However, it was also challenging to keep students motivated and to help them clearly understand the material. The goal of the research was to discover how the addition of technology-based instruction might help to alleviate these difficulties and also create a more meaningful experience for sixth grade students.

**Engaged and motivated.**

Students have always shown excitement when challenged with this art assignment. Extending their social studies learning to their art class broadened their experience and increased their motivation. In addition, being able to choose their own symbols to represent themselves
and their families engaged students in the art activities. Without the use of a digital projector, teacher attempts at clearly communicating all the different symbolism and meanings have proven to be overwhelming to students. They could not clearly see the printed pages used to show the different symbols, and it took two full class periods to go over the many different Heraldic symbols and their meanings. By the end of the second class, some students were bored and frustrated and often just choose the symbols they could remember, or an animal that they liked. Although the art project itself was enjoyable, it was not as meaningful and students did not seem to learn and understand as much as was hoped. Of course, the students that always work hard put forth their best effort and chose meaningful symbols for their shields.

**Understanding.**

Students often became frustrated with the construction of the project. A great deal of one-on-one assistance was necessary to show how to dent the aluminum and be sure to make the edges of their shapes crisp and obvious. Some students would apply too much color to their images, losing the details they had dented into the aluminum. Some trimmed too close when cutting and folding over the edges to finish off the shields. The teacher had to attach the hanging wire to the back of most shields because it was difficult for every student to see how it needed to be done.

Although many of the shields turned out very well, many lacked meaning. This was evident in the reflection questions (see Figure A2) that students answered when the project was completed. Many students did not provide meaningful explanations for choosing symbols and colors for their shield. They often did not understand the meanings behind their chosen symbols well enough to explain.
Results

The variety of data collected throughout this study provided a number of different perspectives. The views of other teachers, classroom observations, student behaviors, and student opinions all support the findings of this study.

**Significant findings.**

This art unit (see Figure A1) presented to three sixth grade art classes with the additional technology-based lessons was the main focus of this study. Although it was challenging to be both observer as well as participant in this study, deliberate efforts were made to periodically attend to the observation checklist (see Figure B3) and pay particular attention to student behaviors. Observation notes and student surveys provided the most significant findings and are supported by additional data from other sources.

*Engaged and motivated.*

The PowerPoint presentation immediately engaged students when they entered the classroom. They were curious about the projector being in the room and wanted to know what they were going to be doing. Students seemed to enjoy the images and were excited to be learning more about the Middle Ages. As the Heraldic symbols were displayed, students were observed comparing and choosing some favorites, jotting notes in their notebooks. They were heard discussing with others at their table the symbols they might want to use for their personal shield. In past years it had taken two forty-minute class periods to share all the symbols with students. With the PowerPoint technology the presentation took less than thirty minutes leaving students time to discuss with their classmates and consider some of the symbols they might want to use.

The interactive white board (IWB) activity was thoroughly enjoyed by students. It
appeared to be more fun than helpful to them, but many commented on this activity in their surveys. While some students did express the fun in this activity ("the most fun" and "it was fun and stretched my imagination"), others pointed out how helpful it was in planning their shield design ("It gave you a great idea of what your shield will look like;" "It gave me ideas of what to do and where to put my symbols;" and "I got a visual of what my shield could be like"). Though the actual art making was the favorite part of the unit for most students (56%), many others indicated in their surveys that the IWB was a favorite activity (33%) (see Figure 4.3). After two days with the IWB, students were very eager to create their own shield designs on paper. Only three out of forty-seven students did not bring their necessary images from home to complete their designs. (The following day, all students were prepared to create their designs.)

![Figure 4.3](image-url)  
**Figure 4.3 6th Grade Survey: Favorite/Least Favorite Part of Heraldic Shield Unit**

Understanding.

While creating their shields, students worked very independently. Some were overheard discussing their symbols and meanings with each other. Working on the IWB gave students not only the chance to work out compositions for their own designs, but they were also able to see what others were doing up at the board. This was an unexpected benefit to the IWB activity.
Students encouraged each other’s creativity while giving advice and offering ideas. Although this was a favorite activity, most students felt that the PowerPoint presentation was most helpful for learning new information (“It helped me understand the Heraldic symbols and [that] they represent things;” “The slide show helped me understand and learn;” and “It was very informative to me”). One student indicated in her survey that the PowerPoint was her least favorite activity because “we just sat there taking notes,” yet she also pointed out that she learned new information from the PowerPoint “notes, even though I didn’t like them” (see Figure 4.4).

Student answers to the reflection questions (see Figure A2) were remarkably more thoughtful than in the past, strongly indicating that students were motivated to make meaningful choices. Students developed a greater understanding of these traditional symbols of the Middle Ages. One student chose a swan, representing a musical person loving poetry and harmony, as her main charge (symbol) because “I love music and I love reading and writing poetry.” Another student chose a lion, meaning fierce courage, as her main charge. She explains in her reflection
that her middle name, which is also her mother’s maiden name, “means ‘lion’ and my grandparents showed courage immigrating to America.” A third student explained that he chose a snake, meaning wisdom, as one of his symbols “because my dad calls me ‘Wise William.’” Certainly these students put some careful and meaningful thought into the planning of their shields. Of the forty-seven sixth graders in the study, only two indicated in their reflections that the main charge was chosen because it is a favorite animal.

_Figure 4.5: Students work on various steps in making their Heraldic shields._

_Art production._

Students were very pleased with the completed shields (see Figures 4.5 and 4.6) and were thrilled to find out they would be attaching a wire to the back so they could be put on display in the hallway. Using the document camera to demonstrate the various steps throughout the process proved successful as the teacher had to provide very little re-teaching of these steps. Students were observed working very independently (see Figure 4.5) and the teacher had plenty of time to offer help to anyone in need. Students successfully finished off the edges of their shields on their own, and the teacher did not have to attach the hanging wire to any of the forty-seven shields.
Figure 4.6: Completed Shields.

Supportive data.

The findings of this classroom-based research study are supported by additional findings through teacher interviews and classroom observations. Perspectives shared by Mrs. D. Potenza, a fourth grade teacher, Mr. B. Callard, a seventh and eighth grade math teacher, as well as Mrs. E. Cook and Mr. M. Damico, art teachers from neighboring public middle schools, indicate similar observations when using technology-based lessons in their own classrooms. Observations of their classes in action also provided insight to the study.
The interactive white boards have only been available to St. James School teachers for a few years. Mrs. Potenza began using an IWB five years ago when one became available to be shared by the fourth and fifth grade teachers. For the past two years, she has had an IWB kept permanently in her classroom and available for everyday use. This is Mr. Callard’s second year with an IWB installed in his classroom, though he has much more experience using this teaching tool in his previous job and when teaching high school level summer classes. The art teachers from the local public middle schools, Mrs. Cook and Mr. Damico, have had a number of technologies available and in their classrooms for over ten years. This would account for some of the different experiences expressed by these teachers.

*Engaged and motivated.*

All four teachers indicated increased levels of student motivation when presented with technology-based instruction. Mr. Callard explains that when using the IWB, his students “participate more often, and they are more willing to go to the board to try a problem” (personal communication, March 21, 2013). He explained how he is able to prepare lessons on the IWB ahead of time, without running out of space like he would at a chalk or white board. This allows him to walk around the room interacting with students, keeping them engaged instead of wasting time writing on the board. He is able to move through a lesson more quickly with less down time to lose students’ attention. The time Mr. Callard would otherwise spend writing on the board, he was observed walking around the room giving individual help to students as needed. Mr. Callard also uses a document camera to go over tests and homework with students. This enables him to be sure all students are looking at the same thing and allows students to solve problems on the white board without rewriting the problem. Mr. Callard believes that he is able “to cover more material and move along at a faster pace, without losing meaning behind the
material” (personal communication, March 28, 2013).

Mrs. Potenza described similar experiences with her fourth graders, particularly those students that have a more difficult time staying on task, when using the IWB. She noticed that students “tend to pay more attention when technology is used [and] that students with attention issues tend to stay engaged for longer periods of time.” She believes they are motivated by the fun, sometimes “silly,” learning activities she finds for her students to use. The “hands-on, physical activity” keeps students engaged as they interact with activities that parallel concepts being covered in science (personal communication, March 28, 2013).

Both Mrs. Cook and Mr. Damico have access to interactive white boards but do not have much reason to use them to teach art. Showing video or slides using the digital projector, and using the document camera for demonstrations are used much more often in their art classrooms. Mrs. Cook indicated that her students are “better engaged” when viewing art works through the projector rather than using printed reproductions. They are better able to “clearly see” the art works, and many more works are available through the internet (personal communication, March 7, 2013). Mr. Damico believes that “technology based lessons definitely help to enhance the learning for the students and for presenting information to a larger group of students.” Being able to see pieces of art, particularly “large artworks,” from anywhere in the world is a great benefit (personal communication, March 1, 2013).

**Increased learning.**

An increase in learning has been observed by some teachers using technology-based teaching techniques. Mr. Callard believes that increased participation by his students has helped them to better learn and understand new materials. He explained that “the visual impact is huge!” (personal communication, March 28, 2013). Students were observed working at their
seats trying to quickly and correctly solve the problem so that they could go up to the IWB and solve for the entire class. When one student worked on the IWB, others were heard coaching him along, making sure not to miss a step in the process. This more efficient method of teaching allowed Mr. Callard to move more quickly through a lesson leaving him more time to offer one-on-one assistance to students who had difficulties (personal communication, February 22, 2013).

The activity observed in Mrs. Potenza’s fourth grade science class was the “Simple Machine Game” through the Museum of Science and Industry in Chicago. Several students had been absent when the class first engaged in this activity so they were participating for the first time. Other students were very eager to help out, to make the best choices and solve the problem. Mrs. Potenza explained that the first time she used this activity several students came in the next day very excited because they had gone online the night before and did the activity on their own – some competing against their parents. As Mrs. Potenza noted, “They want to learn more!” (personal communication, March 21, 2013).

A great deal of independent learning takes place in Mrs. Cook’s and Mr. Damico’s art classes. Besides having three or four computers on hand for students to use, a tech cart filled with laptops or iPads can be checked out so that all students in the class may have access to the internet at the same time. Mr. Damico requires students to do research to plan each art project. These tech carts enable students to do at least some of this research during class time. With the vast amount of information available, students are able to specifically learn about what interests them, which may be different from what is interesting to their classmates or the teacher. This independent research results in very diverse art works produced for the same assignment.

Mrs. Cook directs her students to explore a number of different web sites using the iPads or laptops. She has her eighth graders work independently through these sites and design their
own art projects. Through this exploration they are able to learn about a variety of artists, styles, materials, and techniques. This use of technology, Mrs. Cook believes, “speaks their language” and provides them the opportunity to learn much more about art that has meaning for them personally (personal communication, March 7, 2013). A number of students were observed spending their lunch hour in the art room to do additional research.

Improved performance.

In describing the first time she used the “Simple Machine Game” Mrs. Potenza explained that “the test scores were amazing. I could see a big difference from before” when they did not play the game (personal communication, January 31, 2013). This experience prompted her to look for other activities and resources to enhance various topics in both science and language arts. Since using the IWB regularly she has “noticed an increase in grades and [increased] understanding with more difficult concepts, such as force and motion and matter” (personal communication, March 28, 2013).

Mr. Callard has not taken note of increased test scores since using the IWB, but has “noticed overall, general improvement over the past three years.” He has only been teaching for four years so “there are too many variables” to determine if these changes have simply been impacted by technology (personal communication, April 8, 2013). Mr. Callard does believe, however, that because students enjoy working with the IWB, they become “more interested in the material” (personal communication, March 28, 2013). If they are more interested and more engaged, they are going to understand and remember the material better.

With all the information available on the internet, Mrs. Cook explained, students are able to explore art that is “more relevant” to their personal interests. She is able to speak “their language” and communicate better with her students through technology, and they are able to
design their own art problems. Choosing to further investigate something that has more meaning to them personally results in a more personal and meaningful approach to their art work (personal communication, March 7, 2013).

**Additional findings.**

It is important to remember that technology alone is not a simple solution for motivating and engaging students. Teachers must plan these lessons as thoughtfully and completely as any other lesson. Student learning must always be the goal of each lesson, and teachers need to always look for new and different ways to grab the attention of their students. Mr. Damico provided some insight on keeping student learning needs in mind when planning technology lessons.

**Routine use of technology tools.**

Mr. Damico has been teaching for eight years and has always used technology to teach art. About six years ago there was a “technology explosion” in the district and all teachers were expected to incorporate technology into their lessons (personal communication, March 1, 2013). He uses some form of technology nearly every day, but “students are being presented with the same technology for every class and the information isn't being presented in a unique way by teachers” (personal communication, March 28, 2013). This “was exciting for the students when it first came out but now it's getting old” (personal communication, March 1, 2013). As a result, Mr. Damico works to make all of his presentations unique and engaging, grabbing students’ attention in different ways.

The document camera is very handy to use for demonstrating art techniques and processes, but sometimes there is a “disconnect” with students (M. Damico, personal communication, March 1, 2013). Mr. Damico explained:
I think this happens because watching a screen tends to give the impression that it's like watching a movie and even though the teacher is close to the students, they aren't visually watching the teacher and just a screen. I once had a student tell me that by watching me in the act of showing them a skill, they saw me as an artist giving them tips and tricks to help their art. They said when I show a demonstration on a screen, they don't see me as an artist because it's like they are just watching a movie. (personal communication, March 28, 2013)

He admits that this may have something to do with his classroom set up. His document camera is connected to his computer in the back of the room and students sit with their backs to him, facing the screen at the front of the room. Because of student response, he occasionally will demonstrate art techniques sitting at a table surrounded by his students.

*Loss of hands-on process.*

Laptops and iPads are useful tools for creating art, especially graphic design pieces. Sometimes, Mr. Damico believes, art teachers use these tools too often and do not emphasize hands-on art work. When he uses these tools for design projects, students “still begin with paper and pencil” (personal communication, March 1, 2013). Mr. Damico appreciates the type of design work that can be done using computer programs but is concerned with students using technology too much for art.

I feel students are losing the tactile skills they need to be an artist. Even though there are computer applications and programs that show a student what a material should look like, the students lose the realness of physically touching oil pastels, chalk, clay, plaster, etc... (personal communication, March 28, 2013)
Conclusion

There seem to be a great number of benefits to technology-based lessons, but care should be taken in planning and preparing these lessons. PowerPoint presentations should not all follow the same format. Even technology-based lessons will become mundane if presented in the same manner every time. “New technology should not be used simply because it is available, but because it can build a richer classroom environment in which the teacher and students pursue worthwhile curriculum goals” (Roland, 2010, p. 19). Keeping students’ learning needs in mind should inspire more creative presentations, to grab their attention, make information relevant, and to help them learn. The final chapter will discuss the personal impact of this study and how the findings of the study will impact future teaching practices in the art classroom.
Chapter Five: Discussion and Conclusion

The findings of the research described in this paper provide insight into the impact of technology-based lessons on student learning, and incentive to continue to investigate this topic. This chapter will describe the personal impact this study has had on the researcher, as well as the impact on teaching practices. Also discussed are recommendations for further research and how this research may be used by other art educators.

Discussion

The purpose of this classroom-based study was to determine if using technology-based lessons to teach middle school art might impact student motivation, understanding, and art production. The positive impact on students, discovered through observations and student survey responses, has greatly influenced the pedagogy of the researcher.

Personal Impact of the Study

Technology tools can be very intimidating to someone who has had very little experience using them in the classroom. Realizing the growing use of technology-based lessons, and hearing of positive student responses to these lessons, the researcher was compelled to create this study. It was necessary to first learn how to use the digital projector, the interactive white board (IWB), and the document camera. Additional research was needed to discover how these technology tools could effectively enhance art instruction.

This study produced strong evidence indicating that students do indeed gain greater understanding through technology-based lessons. Student reflections (see Figure A2) of the art unit indicate very clear understandings of their chosen symbols and meaningful reasons for incorporating these in their shield designs. Observation notes of student activity throughout the art unit describe engaged and motivated students, working independently, and inspired to
produce a quality finished product. A particularly interesting discovery in this study was how clearly students articulated the visual impact of the technology lessons. In their surveys, many students indicated how the images in the PowerPoint presentation helped them to better understand and remember the meanings and traditions behind Heraldic symbols. Many also described how the IWB activity helped them to easily see different compositions that might be used for their shields.

These findings are supported by similar studies found in research literature. Those studies point to the visual impact provided by these technology tools and the interactive opportunities that help students to learn and understand more clearly (Dunn, 1996; Peterson, 2005; Shenton & Pagett, 2007; Smith, Higgins, Wall, & Miller, 2005; Wall, Higgins, & Smith, 2005). Teachers interviewed in this study also agree, but caution that the technology alone does not create this effect. It is extremely important to carefully plan technology-based lessons, keep them interesting and engaging, and make each one stand out as a unique presentation. Even technology can become mundane and lose the attention of the intended audience.

Impact on Practice

A primary goal of the study was to improve teaching practices. Discovering the impact that technology-based lessons can have on student motivation and understanding has greatly influenced the researcher’s practices in the art classroom. The art unit created for this study (see Figure A1) incorporates technology tools to communicate information and to provide students with interactive activities. Increased motivation and understanding observed in student behaviors and expressed in student surveys will have an enduring impact on pedagogy. The researcher intends to continue to create technology-based lessons to better communicate with and engage students in learning and art production.
Recommendations

This study revealed a great amount of insight in a short period of time, but was based on only one art unit and only forty-seven students, all in the sixth grade. Deeper understanding of the phenomenon could be gained by also conducting this study with both older and younger students. A brief pilot study was conducted with eighth graders a few months earlier, however time did not allow for student feedback regarding their experiences with the technology-based lessons that could be compared with observation notes.

Some additional questions came to light during the conduct of this study. How might students’ input be used to create technology-based lessons? There are many other technology tools that are used in classrooms. How might these be used for art instruction? Rather than the teacher using technology tools to provide all pertinent information, students could be required to visit particular websites to do their own research. How might using technology to do independent research impact student motivation and understanding? How might this personal investment impact student engagement and success with art production? Technology is evolving quickly, creating new tools and new and different ways in which they may be used in the classroom, and prompting new questions to be studied.

The findings from this study should encourage other teachers to enhance their pedagogy with technology-based lessons. Teachers with little experience using a digital projector, an interactive white board, or a document camera could confidently incorporate these into their lessons, as this very inexperienced researcher has done.

Conclusion to the Research

As educational technology tools made their way into various classrooms, some uneasiness was felt among teachers having little experience – and even less confidence –
working with technology. This researcher was one of those teachers. As Dunn (1996) states, in reference to artist/teachers: “While we may or may not relish change as a part of our personal or professional lives, we thrive during the struggle to achieve excellence in our artistic and classroom efforts” (Dunn, 1996, p. 8). Curiosity was piqued as teachers noted various successes, for teachers as well as students, as a result of technology-based lessons. As an art teacher continually searching for new methods to motivate middle school students and provide a more meaningful art experience, this investigation into the impact of technology-based art lessons seemed a worthy pursuit.

**Advice to the Field of Art Education**

The resulting classroom-based study has spurred a desire for continued research into educational technology tools and the many ways they may be used in the art classroom. This research should include students from different grade levels and a variety of technology-based lessons. Technology will continue to evolve and the art classroom is an ideal environment to work with these changes. As Tillander (2011) notes, “I continue to imagine pedagogical experiences with technology as a creative works-in-progress” (p. 46).

**Advice to Art Teachers**

Technology tools may be used in varying degrees depending on their availability, the art teacher’s level of experience with these tools, and what they intend for their students to learn. Technology tools should not take the place of traditional, hands-on art practices. “Working with materials is fundamental in visual arts education – you cannot fully understand art without making art” (Wilks, Cutcher, & Wilks, 2012).

Art teachers should not let their lack of experience with technology keep them from trying it out in the classroom. “We can be co-learners in the classroom with our students,
particularly when it comes to technology” (Delacruz, 2009, 16). Begin slowly, perhaps mastering just one technology tool at a time. As with any new teaching method, observe student behavior to insure that technology methods are positively impacting student learning. Ask students to share their perspective on how they learn and what they think of the technology-based lessons. The goal is to find effective ways of teaching students to clearly understand, to be engaged in the learning process, and to find success in the creation of art. “Technology by itself is a hollow God….The answers do not lie inside machines; they lie, as they always have, within ourselves” (Gregory, 1996, p. 54).
References


**Appendix A**

Figure A1: *6th Grade Unit Plan*

**UNIT TITLE:**

Family Identity: Where do I come from?

<table>
<thead>
<tr>
<th>Component</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit Rationale:</td>
<td>This unit, “Family Identity: Where do I come from?” ties in with the study of the Middle Ages in sixth grade social studies. As Appel (2006) states: “it is critical to recognize the reciprocal relationships between the arts and other subject areas” (p. 15). Social studies class briefly discusses the symbols used by members of the various societies, particularly royalty, nobles, and knights, during the middle ages. In art class, students will investigate and discuss these symbols more thoroughly. While looking at images of these traditional symbols, students will offer their own ideas as to what these symbols might mean and why they were used. This unit will make connections between what students are learning in social studies and the images they are discussing and creating in art class. As Simpson (1998) tells us, “the use of a carefully chosen conceptual theme establishes a connection for the learner that provides a basis for paralleling concepts among art, other disciplines, and life. Art is about more than products and processes, it is about ideas” (p. 307). This lesson will be addressing Learning Standards set by the Archdiocese of Chicago Schools, particularly standard 6.27B.01 which states: “Investigate how the arts reflect different cultures, times and, places.” Following up this lesson, students will be able to choose heraldic symbols they feel best identify their place in their families. Over the centuries, heraldic symbols have come to be associated with family names, or crests, using symbols indicating heritage, occupations, and family ties. Among others, this lesson will specifically address Archdiocese of Chicago Standard 6.25B.01 which asks students to “analyze how the artistic components are combined within a work of art.” Using a variety of materials, students will design and construct a heraldic shield using these symbols, as well as a variety of colors, to symbolize their families.</td>
</tr>
<tr>
<td>Descriptive title for the unit:</td>
<td>Family Identity: Where do I come from?</td>
</tr>
</tbody>
</table>
| Goals: | Students should… (based on Archdiocese of Chicago Schools Fine Arts Curriculum Standards) Understand:  
  – How artistic components are combined within a work of art. (Using different shape, line, and materials; using positive and negative space.) [Language of the Arts 6.25B.01] |
| Instructional Concepts: | This unit will not only begin students’ investigation into their individual identities, but it will also connect to their study of the middle ages in social studies class. “Making use of the synergistic relationship between art and other subjects creates a learning climate that maximizes the odds of students truly understanding a shared concept” (Simpson, 1998, p. 317). Mirroring this theme with what students are discussing in social studies allows them to build on information they have already learned. Students are able to transfer information presented in social studies and apply new ideas through art investigation and production. Wiggins and McTighe (2005) explain how “the ability to transfer our knowledge and skill effectively involves the capacity to take what we know and use it creatively, flexibly, fluently, in different settings or problems, on our own” (p. 40).

In the first lesson, students will investigate heraldic symbols from the middle ages through a PowerPoint presentation and class discussion. They will discuss the various symbols found on banners, shields, and concrete markers that reflect the designs of this time in history, and interpret the meanings of these symbols. Through their interpretations, students can “provide a revealing historical or personal dimension to ideas and…make the object of understanding personal” (Wiggins & McTighe, 2005, p. 84). Creating this understanding will prepare students for the second and third lessons in this unit.

The second lesson will provide students the opportunity to have a hands-on planning experience using the interactive whiteboard. Students will be able to manipulate various symbols and shield designs on the interactive whiteboard. Teacher will provide a variety of symbols, shield divisions, and shield templates on the whiteboard. Students will be able to move pieces around and place them on to the shield templates to help them to plan their individual shields. The board will be set up so that two students will be able to work at the interactive whiteboard at a time. This exercise will help students to make some design choices before drawing out the composition plan for their personal shields. |

- How the arts reflect different cultures, times, and places. [The Arts in Civilizations, Past and Present 6.27B.01]

Know:
- How art may be used to communicate ideas. (Articulate how these symbols were used to communicate in the middle ages, and compare personal choices of symbols and how they communicate ideas relating to today.) [The Arts in Civilizations, Past and Present 6.27A.03]

Be able to:
- Create a work of art based on a plan incorporating research and problem solving. (Research symbols from the middle ages, making choices that relate to students’ family.) [How works of Art are Produced 6.26B.05]
- Compare similar symbols in 2-D and 3-D art work. (ex., banners v. carved stone and shields) [Language of the Arts 6.25A.08]
In the third lesson, students will be able to apply what they learned in their investigation and manipulation of heraldic symbols to create their own heraldic shield. Wiggins and McTighe (2005) explain that, through application, students “show [their] understanding of something by using it, adapting it, and customizing it” (p. 92). Students will choose heraldic symbols that represent their own family to plan and create a personal shield using a sheet of aluminum. Students will organize their shields to mimic those from the middle ages. Students will also apply their understanding of concepts learned in previous art problems, such as shape, line, and positive and negative space.

Students will present completed shields to their class, explaining their symbolism and their meanings. Shields will then be put on display in the sixth grade hallway. Displayed with each shield will be a reflection written by the students explaining the symbols, their meanings, and the reasons they were chosen to be included on their heraldic shield.

Lessons:

- **Lesson 1: Investigating Heraldic Symbolism**
  As a class, students will investigate and discuss various art examples with heraldic symbols while viewing a PowerPoint presentation. Using Feldman guidelines, students will discuss what they see, relate these images to what has been learned in social studies, and provide their own interpretations of the meanings behind the symbols. Students will compare 2-dimensional images, such as banners and flags, with 3-dimensional images, found on shields and stone markers. Students will investigate the historical meanings behind these symbols using a variety of sources posted around the classroom.

- **Lesson 2: Planning Shield Designs**
  The interactive whiteboard will be set up with shield templates and a variety of heraldic symbols and shapes. Students will be able to move shapes and symbols around, fit them on to the shield templates, making choices for the composition they will create for their personal shields. This lesson will be conducted during two art classes, enabling all students to have ample opportunity to work with the interactive whiteboard and plan their compositions. Students will then draw their designs out on paper before beginning Lesson 3.

- **Lesson 3: Personal Shields**
  Considering the meanings of heraldic symbols, students will design a personal shield using symbols that represents themselves personally as well as their family. Students should keep in mind their family heritage and traditions, as well as their own ideas of which symbols should be used when designing their shields. Additional shapes and lines, borrowed from heraldic traditions, will be added to organize compositions. Students will use tools to bend and dent the aluminum to create a relief on the surface of the aluminum. Permanent markers will be used to add colors to their
heraldic animals and symbolic shapes. The various steps and techniques will be demonstrated using a document camera throughout the art production.

**Lesson 4: Presenting Nobles, Knights, and Royalty**

To add closure to the unit, students will present their shields to the class. (Students may choose to use the document camera to present their shields.) As part of their presentation, students will explain their symbol and color choices, their meanings, and reasons for their choices. They will also explain how positive and negative space adds interest to their compositions. Based on their symbolism and presentation, students will announce if their shields represent a family of nobles, knights, or royalty.

**Materials:**

- **Student Materials:**
  - Pencils, erasers, scissors
  - Information regarding family culture, heritage, and traditions

- **Technology tools:**
  - Digital projector (used with all other tech tools)
  - Interactive whiteboard
  - Document camera

- **Classroom Materials:**
  - Newsprint (9x12”) for sketching and planning
  - Aluminum sheets (9x12”)
  - Newspapers (to use as pads when denting aluminum)
  - Variety of tools for denting aluminum
  - Wire (for hanging finished shields)
  - Permanent markers

- **Exemplars:**
  - Heraldic Shield at “Royal Air Force Memorial” Runnymead, Berkshire, (n.d.)
  - *Wolves, Castle, Knights, Serfs*, (n.d)
  - *Knights of the Order of the Garter Supported by Single Beasts*, (mid-16th Century)
  - Marker between Mason-Dixon Line with Penn and Calvert family crests, (1763-67)
  - *Crest of King of Portugal*, (n.d.) Marker where ships stopped to claim land for King
  - *Medieval Shield*, (n.d.), Reproduction
  - *Richard the Lion Heart Shield* (late 12th Century), Reproduction
  - *Coat of Arms Shield*, (n.d.), Reproduction
  - *Fleur de lis Shield*, (n.d.), Reproduction
  - *El Cid Shield*, (n.d.), Reproduction

- **Teacher's process and product visuals:**
  - PowerPoint presentation
  - IWB activity
  - Heraldry symbols (poster and images from internet)
  - Info on Art of Middle Ages: (Byzantine, Romanesque, Gothic) [http://www.middle-ages.org.uk/middle-ages-art.htm](http://www.middle-ages.org.uk/middle-ages-art.htm)
  - Info on Shields: [http://www.regia.org/shields.htm](http://www.regia.org/shields.htm)
<table>
<thead>
<tr>
<th>Assessment:</th>
<th>Formative:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Check for understanding through student participation in class discussions of heraldic symbols and work with interactive whiteboard.</td>
<td></td>
</tr>
<tr>
<td>- Present Rubric at beginning of Lesson 3 to inform students of expectations. Rubric objectives will be readdressed throughout the project to keep students on track with expectations.</td>
<td></td>
</tr>
<tr>
<td>- Circulate through classroom to meet one on one with students while they are planning and creating.</td>
<td></td>
</tr>
<tr>
<td>- Self-evaluation – Students will keep a log of their symbol choices, what they mean, and why they were chosen.</td>
<td></td>
</tr>
<tr>
<td>- Sketches need teacher “ok” as final check before beginning finished product.</td>
<td></td>
</tr>
</tbody>
</table>

| Summative: |
| - Rubric used to grade completed shields. |
| - Effort |
| - Use of Symbolism/Color |
| - 3-D Effect |
| - Overall Composition/Design |
| - Neatness |
| - Self-Evaluation: When shields are complete, students will fill out a ‘reflection’ describing the chosen symbols, their meanings, and their reasons for these choices. Students will also include an explanation for their color choices. |

| References: |
Exemplars (included in PowerPoint):

<table>
<thead>
<tr>
<th>Image</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="http://corinsands-art.de/Data/commissions/Raf.HTML" alt="Heraldic Shield" /></td>
<td>Heraldic Shield at “Royal Air Force Memorial” Runnymead, Berkshire, (n.d.)</td>
</tr>
<tr>
<td><img src="http://www.photoready.co.uk/objects/heraldic-banner-4.html" alt="Wolves, Castle, Knights, Serfs" /></td>
<td>Wolves, Castle, Knights, Serfs, (n.d.)</td>
</tr>
<tr>
<td><img src="http://www.photoready.co.uk/objects/heraldic-banner.html" alt="Fleur De Lis, Lions Passant" /></td>
<td>Fleur De Lis, Lions Passant, (n.d.)</td>
</tr>
<tr>
<td><img src="http://www.oocities.org/heartland/ranch/5212/crownstones.html" alt="Marker between Mason-Dixon Line with Penn and Calvert family crests" /></td>
<td>Marker between Mason-Dixon Line with Penn and Calvert family crests, (1763-67)</td>
</tr>
<tr>
<td><img src="http://afmata-tropicalia.blogspot.com/2010/05/o-padrao-s-jorge.html" alt="Crest of King of Portugal" /></td>
<td>Crest of King of Portugal - mark where ships stopped to claim land for King, (n.d.)</td>
</tr>
</tbody>
</table>
Medieval Shield (n.d.), Reproduction
http://www.medievalweaponinfo.com/medieval shields/

Richard the Lion Heart Shield (late 12th Century), Reproduction
http://www.swordsandarmor.com/browseproducts/Medieval-Knights-Of-The-Shield-Armor.HTML

Coat of Arms Shield, (n.d.), Reproduction
http://lacsknights.pbworks.com/w/page/141657/Knighthood

Fleur de lis Shield, (n.d.), Reproduction
http://www.highlandarmoury.com/products_all.html?page=5&disp_order=4

Jerusalem Shield, (n.d.), Reproduction
http://www.swordsandarmor.com/mall/shield-SH875-Jerusalem.htm

El Cid Shield, (n.d.), Reproduction
http://www.swordsandarmor.com/mall/shield-SH875-Jerusalem.htm
Figure A2: **Student Reflection**

Name: __________________________________________ ART: _____ DATE: ___________

**“Hanging (Shields) with my Family”**

What is your main charge? _______________________________________________________

What does it mean? _____________________________________________________________

Why did you choose it? ____________________________________________________________

______________________________________________________________________________

List additional charges/symbols below. (A) Explain what each of them means and (B) why you chose to include them on your shield.

- ____________________________________ - (A)______________________________________
  (B)____________________________________
  ______________________________________

- ____________________________________ - (A)______________________________________
  (B)____________________________________
  ______________________________________

- ____________________________________ - (A)______________________________________
  (B)____________________________________
  ______________________________________

List your colors below. (A) Explain what each of them means and (B) why you chose to include them on your shield.

- ____________________________________ - (A)______________________________________
  (B)____________________________________
  ______________________________________

- ____________________________________ - (A)______________________________________
  (B)____________________________________
  ______________________________________

- ____________________________________ - (A)______________________________________
  (B)____________________________________
  ______________________________________
Appendix B

Figure B1

TEACHER INTERVIEW QUESTIONS

TEACHER:                                      GRADE:       SUBJECT:       #YEARS TEACHING:

INTERVIEW QUESTIONS:
What educational technologies are available to you?
What do you think about technology-based lessons?
What educational technologies do you use in your classroom?
What prompted you to use these technology tools?
How often do you use these technology tools?
Are any always available to you? (Or do you need to reserve them?)
When did you begin using technology in your classroom?
How did your students react the first time you tried a technology-based lesson?
What different behaviors have you observed with your students since using technology-based lessons? (If any)
Why do you suppose this happened?
What have been some of your experiences since adding technology to your lessons?
Which types of lessons offer the best results for your students?
What makes you think so?
What difficulties/challenges have you experienced with these technology tools?
Figure B2

General Classroom Observation Checklist

<table>
<thead>
<tr>
<th>Students:</th>
<th>Beginning of class</th>
<th>First 10 minutes</th>
<th>10 – 20 minutes</th>
<th>20 – 30 minutes</th>
<th>30 – 40 minutes</th>
<th>End of class observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excited about lesson</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Engaged in lesson</td>
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<tr>
<td>Want to participate</td>
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<tr>
<td>Demonstrate learning</td>
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<tr>
<td>Interact with each other (help each other)</td>
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<tr>
<td>Interact with teacher</td>
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<tr>
<td>Interact with lesson (try something new)</td>
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<tr>
<td>Students using tech</td>
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<td>Teacher using tech</td>
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<tr>
<td>Pace of lesson</td>
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NOTES:
Figure B3

Art Classroom Observation Checklist

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<th>Grade:</th>
<th># of Students:</th>
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<td><strong>Students:</strong></td>
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<tr>
<td>Excited about lesson</td>
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<tr>
<td>Engaged in lesson</td>
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<tr>
<td>Want to participate</td>
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<tr>
<td>Demonstrate learning</td>
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<tr>
<td>Interact with each</td>
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<tr>
<td>other (help each other)</td>
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<td>Processes/techniques?</td>
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<td>production?</td>
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**NOTES:**
Figure B4

6th Grade Unit Plan Observation Checklist (Middle Ages Unit)

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<th>First 10 minutes</th>
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<th>End of class observations</th>
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<td>Demonstrate learning/understanding</td>
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<td>Understand concepts?</td>
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<td>Understand processes/techniques?</td>
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<td>Pace of lesson?</td>
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NOTES: