The Impact of a Geographic Information System on Middle School Students’ Geographic Literacy and Historical Empathy

A dissertation presented to
the faculty of
The Gladys W. and David H. Patton College of Education and Human Services
of Ohio University

In partial fulfillment
of the requirements for the degree
Doctor of Philosophy

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August 2010

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This dissertation titled
The Impact of a Geographic Information System on Middle School Students’ Geographic
Literacy and Historical Empathy

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ABSTRACT

TESAR, JENNIFER EILEEN, Ph.D., August 2010, Curriculum and Instruction, Social Studies Education. The Impact of a Geographic Information System on Middle School Students’ Geographic Literacy and Historical Empathy (227 pp.)

Director of Dissertation: Frans H. Doppen

This study looked at three seventh-grade classrooms in Southeast Ohio to examine the extent to which Google Earth can be used as an effective tool to enhance middle school students’ historical empathy and develop geographic literacy. This study draws its inspiration from the literature in three areas: an extensive research base supporting the use of historical empathy in the social studies classroom; commentary related to the use of technology in social studies instruction; and recent research connecting historical empathy, geographic literacy, and technology use in the middle school classroom.

The study investigated both the teachers’ perceptions and students’ attitudes toward using Google Earth in their social studies class. Both quantitative and qualitative data were gathered to explain and describe the use of Google Earth in three seventh-grade social studies classrooms consisting of 143 students and their teachers.

In the quantitative segment of the study, a 22-item pre- and post-study survey was administered to determine changes in students’ attitudes towards social studies, using computers, the importance of learning geography and history in school, their use of Google Earth, barriers to using Google Earth, and their ability to apply Google Earth to what they were learning in history. A paired sample t-test at the .05 significance level
was conducted to examine students’ change in attitudes regarding each item. The results did not show a change in students’ attitudes towards using Google Earth.

In contrast to the quantitative data, the qualitative data suggest a significant change in students’ attitudes toward using Google Earth. The qualitative data was derived from interviews with 18 seventh-grade boys and girls as well with their classroom teachers prior to and after the use of Google Earth. The qualitative results suggest the positive influences Google Earth had on students’ perceptions of geography and developing historical empathy.

Approved: __________________________________________________________

Frans H. Doppen

Associate Professor of Teacher Education
This dissertation is dedicated to my Aunt Dorothy who did not live to see me finish my dissertation. It was her expectation that inspired me to move forward and achieve more.

She lived so that I could pursue my dreams and passion for education. She helped provide endless emotional, spiritual, and financial support throughout the greater part of my doctoral program. She will be very much missed.
ACKNOWLEDGEMENTS

I am deeply appreciative and grateful to those who have been influential and indispensable throughout the time I have spent obtaining a doctoral degree. Through the years of pursuing this degree, I have endured many challenges. I will always relish this grand opportunity to further my education. I wish to extend my profound gratitude to the people who have played significant roles at various stages of my doctoral program. Many have shared their expertise, support, advice, and have encouraged me from the beginning of this endeavor to the end. Although the following list is not exhaustive, the following deserve a special mention.

I would first like to thank my husband, Tom and my son Andrew who endured many hours of mom “working on her paper”. It was Tom’s lack of complaining and understanding that allowed me to complete my doctoral program.

I wish to express my gratitude to my committee members for their support and direction in this endeavor. The unique contributions from each member are truly appreciated. Dr. Dianne Gut who provided support and guidance and served as my qualitative research methodologist who was always available to offer her assistance. Dr. Richard Moore for guiding my research interest over the past several years and helping me develop my background in educational technology. Dr. Ginger Weade who took precious time and effort to read and reread my dissertation and at the same time give suggestions for improving my research and dissertation writing. And last, but in no way least, my advisor and chairperson of my doctoral and dissertation committees, Dr. Frans Doppen. Without him this dissertation would not have been possible. He worked tirelessly to ensure my success through professional interest, expertise, and patience. He
is a true mentor who helped me find my path, and then guide me along it with kindness, enthusiasm, and professionalism.

I would like to give special thanks Dr. George Lipscomb at Furman University and Dr. John K Lee at North Carolina State University, who provided support, help, and were always willing to give their best suggestions throughout my doctoral program. They both conveyed a spirit of adventure in regard to research and scholarship and most importantly an excitement to teaching social studies education. I also wish to thank Dr. Robin Foster at the University of Puget Sound and Jae Ahn for their help with the statistical analysis.

I extend my gratitude to my family and friends whose support clearly transcends the many months of writing this dissertation who patiently and earnestly asked how I was progressing and were willing to listen as I explained what I was doing. I have been blessed to have so many amazing people in my life who have pushed me to become much more than I ever thought possible. I wish to thank my parents who always believed that I was capable of doing anything I set my mind to.

I would like to acknowledge the teachers and students of the schools that welcomed me and my research endeavor. I also wish to give a special thanks to the administrators, teachers, and students at Meigs Middle School who supported, guided, and encouraged me throughout my doctoral program. I will very much miss my days at Meigs Middle School and will always have found memories of the time spent with these individuals as they filled my days in the classroom with joy and happiness.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>3</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>6</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>13</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>14</td>
</tr>
<tr>
<td><strong>CHAPTER 1: INTRODUCTION</strong></td>
<td>15</td>
</tr>
<tr>
<td>Background</td>
<td>15</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>22</td>
</tr>
<tr>
<td>Research Questions</td>
<td>24</td>
</tr>
<tr>
<td>Overview of Methodology</td>
<td>24</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>25</td>
</tr>
<tr>
<td>Limitations</td>
<td>25</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>26</td>
</tr>
<tr>
<td>Summary</td>
<td>28</td>
</tr>
<tr>
<td><strong>CHAPTER 2: REVIEW OF THE LITERATURE</strong></td>
<td>29</td>
</tr>
<tr>
<td>Introduction</td>
<td>29</td>
</tr>
<tr>
<td>Middle School Students</td>
<td>29</td>
</tr>
<tr>
<td>Defining a Middle School</td>
<td>30</td>
</tr>
<tr>
<td>21st Century Students</td>
<td>32</td>
</tr>
<tr>
<td>Low Income Students Technology Use</td>
<td>34</td>
</tr>
<tr>
<td>Technology in the Middle School</td>
<td>36</td>
</tr>
<tr>
<td>Technology Use in Middle School Social Studies</td>
<td>38</td>
</tr>
<tr>
<td>Summary</td>
<td>40</td>
</tr>
<tr>
<td>Geographic Literacy</td>
<td>41</td>
</tr>
<tr>
<td>What is Geography?</td>
<td>41</td>
</tr>
<tr>
<td>Why Geography?</td>
<td>42</td>
</tr>
<tr>
<td>Geography and the Social Studies</td>
<td>43</td>
</tr>
<tr>
<td>Research on Geography in the Social Studies</td>
<td>44</td>
</tr>
</tbody>
</table>
Credibility ........................................................................................................... 86
Member Checking ................................................................................................. 87
Transferability ....................................................................................................... 88
Dependability ........................................................................................................ 88
Confirmability ......................................................................................................... 89
Investigator Qualifications ..................................................................................... 89
Participants and Setting ........................................................................................ 89
Schools ...................................................................................................................... 91
Teacher # 1 ............................................................................................................ 92
Teacher # 2 ............................................................................................................ 93
Teacher # 3 ............................................................................................................ 94
Design of the Study ................................................................................................. 95
Collecting Data ......................................................................................................... 95
Document Analysis ................................................................................................ 96
Interviews .................................................................................................................. 96
Survey ...................................................................................................................... 98
Observations ............................................................................................................ 98
Analyzing the Data ................................................................................................. 100
Validity .................................................................................................................... 101
Pilot Study ............................................................................................................... 101
Using Google Earth ................................................................................................ 102
Pilot Survey ............................................................................................................. 105
Pilot Interview Questions ....................................................................................... 107
Summary .................................................................................................................. 107
CHAPTER 4: FINDINGS ......................................................................................... 109
Introduction ............................................................................................................. 109
Participants ............................................................................................................. 110
Use of Google Earth ............................................................................................... 110
The Students .......................................................................................................... 111
Quantitative Results ............................................................................................... 112
Survey Results ....................................................................................................... 112
Quantitative Summary .................................................................................................................116

Qualitative Results ........................................................................................................................117

Question 1: How does the use of the Internet-based GIS program Google Earth in a middle school social studies unit affect students’ geographic literacy and development of historical empathy? .................................................................................................118

Summary ......................................................................................................................................121

Question 2: What is the teacher’s role when using the Internet-based GIS program Google Earth for instruction in the classroom? .................................................................................................122

Teacher Reported Technology Use ..............................................................................................122

Student Reported Teacher Use ....................................................................................................123

Teaching Historical Empathy using Google Earth .........................................................................126

Guiding Student Development of Empathy using Google Earth ..................................................129

Hillsdale Springs Middle School ..................................................................................................130

Madison Middle School ................................................................................................................131

Aspen Middle School ....................................................................................................................136

Google Earth Limitations ..............................................................................................................140

Students’ perception of their social studies teachers ....................................................................142

Summary ......................................................................................................................................145

Question 3: What background factors are related to student learning outcomes as defined in this study? .................................................................................................................................146

Summary ......................................................................................................................................145

Question 4: What benefits do students report when using the Internet-based GIS program Google Earth? .................................................................................................................................156

Summary ......................................................................................................................................156

Conclusion ....................................................................................................................................162

CHAPTER 5: DISCUSSION AND FUTURE RESEARCH ..................................................................164

Introduction ..................................................................................................................................164

Geographic Literacy ......................................................................................................................165

Historical Empathy .......................................................................................................................166

Visuals ..........................................................................................................................................167

Teacher Role ..................................................................................................................................168

Middle Schools ..............................................................................................................................169

Background Factors ....................................................................................................................170
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1</td>
<td>K-12 National Geography Standards</td>
<td>47</td>
</tr>
<tr>
<td>Table 2</td>
<td>Ohio’s Geography Content Standards, Grade 7</td>
<td>49</td>
</tr>
<tr>
<td>Table 3</td>
<td>Guidelines and Strategies for Effective Technology Use within the Social</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>Studies Classroom</td>
<td></td>
</tr>
<tr>
<td>Table 4</td>
<td>Participants and Field Sites</td>
<td>95</td>
</tr>
<tr>
<td>Table 5</td>
<td>Cronbach Alpha</td>
<td>114</td>
</tr>
<tr>
<td>Table 6</td>
<td>Paired t-test</td>
<td>115</td>
</tr>
<tr>
<td>Figure</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Figure 1</td>
<td>Student computer and Internet available at home.</td>
<td>148</td>
</tr>
</tbody>
</table>
CHAPTER 1: INTRODUCTION

Educators should strive to make history functional by,

Relating the past to present as if the past were a projected present in which all the elements are enlarged…past events cannot be separated from the living present and retain meaning. The true starting point of history is always some present situation with its own problems. (Dewey, 1916, p. 251)

Background

As societies have evolved and changed over time, there has been a longstanding interest in social studies classrooms of how those changes impact the course of history. “The lessons to be learned from history typically revolve around the premise that past events can teach us about patterns of behavior that have been replicated over time (Berson & Berson, 2007, p. 136). As George Santayana (1905) famously stated, “Those who cannot remember the past are condemned to repeat it” (p. 284). The central goal of a historian is to be able to understand and interpret past events in a way that he/she can provide the general public with the most accurate view of how history and events have occurred over time.

Unfortunately, historians are hindered by the fact that information available about the past is incomplete. Thus, they must use the best available evidence to construct a reasonably accurate portrayal of the past, thereby making it impossible to provide a complete array of perspectives and facts (Yeager & Foster, 2001). Because historians are forced to use the evidence available to them in order for history to be told, “it is often difficult to identify a direct link between cause and effect” (Berson & Berson, 2007, p. 136). Often students are inclined to accept at face value the interpretations of historians
and their teachers. Fortunately, as new technological “tools” are becoming more available, they provide students with the opportunity to explore how the past affects the present, the present might affect the future, and to interpret history for themselves (Berson & Berson, 2007).

Today, computers in the classroom are a fact of life, as basic as the electricity that powers them. Computers have altered the daily work of large businesses and industry around the world. Thus, “a significant benefit of using computers in education is that they are being used every day by professionals in the public and private sectors around the globe for a wide variety of tasks” (Milson & Curtis, 2009, p. 113). When students use computers in the classroom they are being exposed to the technological processes that are central to a multitude of 21st century careers (Hammond & Bodzin, 2009).

Computer technology can be used in many ways to make classroom instruction more meaningful. Integrating technology into the social studies classroom helps educators design “lessons that continually reference the real world, including their personal sense of place (geography), their sense of economic reality, as well as other aspects of the social studies” (Ohio Department of Education, 2009b, p. 316). In the field of social studies education, researchers have highlighted the role computers have in classrooms as they help engage students in critical thinking, problem-solving, and decision-making (Berson, 1996; Doppen, 2004; Hicks, Doolittle, & Lee, 2004; Mason, Berson, Diem, Hicks, Lee, & Dralle, 2000; van Hover, Berson, & Bolick, 2004; Whitworth & Berson, 2003). “The more students learn about the real world through a variety of experiences, the more they are engaged by the disciplines within the social studies” (ODE, 2009b, p. 317).
When students use the computer for educational tasks they are able to build their decision-making, problem-solving, and data-processing skills, as well as communication capabilities (Berson, 1996). Through the use of the computer, students are able to access expansive knowledge links and broaden their exposure to diverse peoples and perspectives (Berson & Berson, 2007). Likewise, educational organizations such as the National Council for the Social Studies (NCSS) have called for social studies educators to use technology to support learner-centered strategies that address the diverse needs of students and to apply technology in developing students’ higher order skills and creativity. Through the use of computers and the Internet it is possible for educators to address all ten NCSS themes (Culture; Time, Continuity and Change; People, Places, and Environments; Individual Development and Identity; Individuals, Groups, and Institutions; Power, Authority and Governance; Production, Distribution, and Consumption; Science, Technology, and Society; Global Connections; Civic Ideals and Practices) (NCSS, 2009). The College and University Faculty Assembly (CUFA) also recognizes the potential of computer integration to transform learning in social studies.

In standards-based education, content that all students should know is identified. Therefore, it is imperative for educators to make meaningful connections between the standards and their students’ lives outside the classroom in order for them to be successful. “Social studies educators are the storytellers and keepers of wisdom learned throughout history” (ODE, 2009b, p. 317). The challenge, however, is for social studies educators to pass their wisdom on to their students in order that they are able to connect the past with the world they live in now (ODE, 2009).
In order for students to build historical knowledge, develop empathy, and think historically, they must be actively involved in the process of doing social studies through their own uses of primary and secondary sources (Kobrin, 1996; Levstik & Barton, 2001; Swan, Hofer, & Gallicchio, 2006; Van Hover & Yeager, 2002; Wineburg, 1991). While often an evasive concept, Barton (1996) views historical empathy as the way people today, are able to understand how people of the past viewed their situation, evaluated opinions, made decisions, and how their experiences were shaped by their values, beliefs, and attitudes. Historical empathy does not demand our sympathy, acceptance, or forgiveness for the choices made by people of the past, which is an important concept for students to understand when studying history (Stern, 1998). When students develop historical empathy they are encouraged to,

- raise questions and collect solid evidence in support of their answers; “to go beyond the facts presented in their textbooks and examine the historical record for themselves; to consult documents, journals, diaries, artifacts, historic sites, works of art, quantitative data, and other evidence from the past; to do so imaginatively—taking into account the historical context in which these records were created and comparing the multiple points of view of those on the scene at the time; and to build understandings of historical significance. (Swan & Locascio, 2008, p. 176)

“Effective social studies education necessitates an interdisciplinary approach because inquiry into any real-world matter related to citizenship is holistic and multidisciplinary in nature” (ODE, 2009b, p. 297). The National Commission on Social Studies in the School declares:
The human experience cannot be taught and comprehended through a single
discipline. To be sure, students must know history and geography, must
understand the demands of self-government and appropriate civic behavior, must
understand how economic systems operate … to understand human behavior, but
they must also comprehend the interrelationships among those subjects and their
combined power to explain the past and the current human condition, and future
possibilities. (ODE, 2009b, p. 297)

The National Middle School Association (NMSA) (2003) recognizes the need to
educate middle school students for the 21st century. According to the Partnership for 21st
Century Skills (P21) (2005), in order for American students to succeed as effective
citizens, workers, and leaders in the 21st century they must be provided the opportunity to
use information and communication technologies within their original context.
Therefore, NMSA (2003) contends that educators, parents, and citizens should recognize
the importance of middle level education and understand the needs of young adolescents,
including their physical, social, and emotional needs.

Young adolescents, ages 10-15, undergo more rapid and profound personal
changes than at any other time in their lives (NMSA, 2003). Therefore, middle school
teachers have the unique opportunity to help their students develop effective learning
strategies that will take them on to high school and college, and help them become
productive citizens. This study focuses on middle school students as there is a lack of
research on how historical empathy and an Internet-based GIS program such as Google
Earth intersect within the middle school social studies classroom.
Geography is the holistic relationship of things physical and human, and the interactions between them. Geography is knowing where you have been, where you are, and where you are going and helps students understand the big and small picture of how students and their surroundings fit together. Geography tackles big questions about the world in which we live by focusing on real-world relationships and the connections of those relationships to place. (Songer, 2007, p. 1)

In order for citizens to be able to live in a global society in the 21st century they must be geographically literate. Unfortunately, in the United States today the majority of 18-to-24-year-olds are considered geographically illiterate. The National Geographic-Roper Public Affairs 2006 Geographic Literacy Study (National Geographic, 2006) found that over half the young men and women surveyed were not able to locate New York or Ohio on a map. The survey suggests “the most recent graduates of our educational system are unprepared for an increasingly global future” (National Geographic, 2006, p. 7). Geographic illiteracy is not just a problem for 18-to-24-year-olds; it is a problem that is seen in our K-12 schools. Unfortunately, elementary, middle and high schools have little time to include geography in their curriculum as much of their time is spent preparing for subjects included in “high-stakes” testing (Songer, 2007). As a result, students can pass through an entire K-12 program with little to no “exposure to geography” (p. 2).

Geography did not become a part of the curriculum standards in Ohio until December, 2004. According to VanLoon (1932), geography is not just about knowing where things are and memorizing associated facts. Geography is about exploring spatial
relationships, exploring the human/environmental interaction, and encouraging problem-solving and critical-thinking (Levstik & Barton, 2001). Thus, when students are equipped with geography skills they are able to understand historical and global issues, as well as human and physical phenomena, and can generate solutions to real-world problems. As Songer (2007) contends, when students are able to engage in real-world problems they become more motivated in the learning process.

Research shows that using Geographic Information Systems (GIS) in a K-12 classroom educators enhance students’ potential to become geographically literate (Songer, 2007). Educators believe that when using GIS technology they are able to improve the quality of classroom learning by widening the scope of teaching and exposing students to the information-rich society in which they live (Mackaness, 1994; Songer, 2007). Even further, GIS has the potential to help improve students’ knowledge of geography, technology-related skills, and motivate them to learn geography and history (Songer, 2007).

Using an Internet-based GIS program, such as Google Earth, to integrate geography education into the curriculum can contribute to geographic literacy finding its way back into K-12 classrooms. Google Earth provides students a view of the world and its surfaces that is unattainable when using a flat map, atlas, or even a globe. Google Earth provides students the opportunity to explore the world and its many surfaces, places, and regions, allowing them to begin making connections between what is discussed in their social studies classroom and the real world. When students know the geography of an area or place, they can begin to interpret the complexity of the...
characteristics, distribution, and migration of past and present populations on the Earth's surface and how history has been created (Songer, 2007).

However, current research documents scant implementation of GIS in K-12 classrooms (Baker & White, 2003; Kerski, 2001; Patterson, Reeve, & Page, 2003). Very few teachers have incorporated this technology into their classrooms. Integrating technology into the social studies classroom is to a large extent a function of time, training, and availability (Cuban, Kirkpatrick, & Peck, 2001; Diem, 1997; Hicks, Tlou, Lee, Parry, & Doolittle, 2002; Hofer & Owings, 2008). Moreover, many teachers do not have adequate access to the technology, the Internet, or the computing skills necessary to do research and are unable to engage in social studies best practice (Arafeh & Levin, 2002; Ross, 1988).

“As educators we need to design lessons that continually reference the real world, including [students’] personal sense of place (geography), their sense of economic reality, as well as other aspects of the social studies” (ODE, 2009b, p. 316). In order to excite students about the social studies, teachers need to provide them with real world experiences (ODE, 2009b). GIS technology can provide students with a meaningful and authentic learning experience in social studies by having them ask and answer core geographic questions such as: (1) What is located there…? (2) Where is…? (3) What has changed since…? (4) What spatial pattern exists…? and (5) What if…? (Geography Education Standards Project, 1994).

Statement of the Problem

To date, very little research has been conducted that ascertains how historical empathy and an Internet-based GIS program such as Google Earth intersect within the K-
The expectations for GIS in middle school education have become more critical than at any other time (Keiper, 1998). However, no social studies curriculum includes GIS. As a result of the exclusion of GIS from the curriculum, it is very difficult to know whether GIS can help students learn geography and develop historical empathy effectively or whether GIS is merely another “technology”.

The purpose of this study, therefore, was to determine whether the Internet-based GIS program Google Earth can be used as an effective tool to enhance middle school students’ historical empathy and geographic literacy. The results of this study will provide a cognitive map from which to draw future research efforts and offer insights into how to support students to not only think historically and become geographically literate but also to support teachers in order to facilitate history instruction with the use of Google Earth technology.

This study also examined the extent to which Google Earth can be used to engage students in doing history, and the current and contextual influences that either inhibit or promote the use of this technology to help students develop historical empathy and geographic literacy in the middle school social studies classroom. The present study draws its inspiration from the literature in three areas: the extensive research base supporting the use of historical empathy in the social studies classroom; the commentary related to the use of technology in social studies instruction; and the recent research connecting both historical empathy and technology in the middle school classroom.

The research questions that framed this study have been divided into two categories: questions that specifically address Google Earth/GIS use and historical
empathy, and those that address the use of technology. To achieve this, the following questions guided this study:

**Research Questions**

1. How does the use of the Internet-based GIS program Google Earth in a middle school social studies classroom affect students’ geographic literacy and development of historical empathy?

2. What is the teacher’s role when using the Internet-based GIS program Google Earth for instruction in the classroom?

3. What background factors are related to student learning outcomes as defined in this study?

4. What benefits do students report when using the Internet-based GIS program Google Earth?

**Overview of Methodology**

This study entailed observing three seventh grade social studies teachers and their students in Southeast Ohio during the 2009-2010 academic year. The research design for this study included an examination of data from classroom observations, student- and teacher-created documents, interviews, and surveys in order to explore the use of Google Earth in an instructional and participatory process. Interviews with the participating teachers were conducted prior to and after the Google Earth intervention. Interviews with selected students were conducted after the Google Earth intervention. Additionally, all students completed a pre-and-post Likert scale survey regarding their use of technology and the use of Google Earth. Data was analyzed to establish whether Google Earth
supported students developing historical empathy and geographic literacy in the middle school social studies classroom.

Significance of the Study

This research study was designed to expand the concept of geographic literacy by providing empirical data related to the impact of a Web-based GIS on student learning. Today, computer technology can be used to support students’ learning of geography and developing historical empathy in the social studies classroom. The results of this study provide insight into how three teachers used Google Earth and whether their use matches the findings in the research literature. The study further clarifies the role technology can play in supporting best practice as well as describes contextual factors that limit or promote its use in developing historical empathy and geographic literacy in the middle school social studies classroom.

Limitations

While every effort was made to design and implement a mixed method study, limitations remain unavoidable. The study is limited in scope to three rural middle schools located in Southeast Ohio. The results of the study may be relevant to other middle schools, but the generalization beyond these schools may be limited to the extent that other schools are different from the three rural middle schools in this study. The sample for this study is biased in that only students from Southeast Ohio were used for this study limiting the generalizations of the results.

Time availability was also a limitation in this study. The teachers and students were limited in the amount of classroom time they had to incorporate Google Earth. Each of the three schools that were part this study operated on a 43-minute class period.
Furthermore, this study’s data reflects less than a full academic year to implement Google Earth as it was conducted between January to March 2010. Ideally, to truly determine a change in the development of historical empathy and geographic literacy a pre-assessment would come at the beginning of the school year and then at the end of a school year in which Google Earth had been used on a regular basis in order to identify change and growth. Finally, integrating Google Earth in the social studies curriculum throughout an entire academic year would mitigate the novelty factor of using this geographic information system with students.

Using participant observations also posed a limitation in this study as individuals being observed or interviewed often behave differently than when they are not being observed or interviewed (Patton, 2002). Patton further advises that the observer or interviewer is limited seeing things at face-value and not may be able to see what is occurring inside a person’s mind. He explains that the interviewee’s personal bias can come into play as the person may deal with issues of politics, opinion, or even anger. Bias on the part of the researcher can also be a major limitation as one contends with certain personal attitudes and opinions. In order to clarify and reduce researcher bias, I utilized member checks to provide feedback and clarification.

Another limitation is this study relied primarily on student and teacher self-report. Students can sometimes be reluctant to reveal their true experiences or they might inflate them to impress the researcher or peers. Teachers might also be reluctant to reveal their true experiences or inflate them in order to impress the researcher.

Definition of Terms

For the purpose of this study, the following terms were defined as follows:
Content Standards: called “Academic Content Standards” in Ohio, describe the knowledge and skills students should know and be able to do at the end of a particular grade level.

Geographic Information Systems is a combination of hardware, software, and geospatial data that facilitate complex geospatial analyses.

Geography: is the study of the Earth and its lands, features, inhabitants, and seeks to understand the Earth and all of its human and natural complexities in how they have changed and come to be.

Geographic literacy: thinking skills which include specific ways of understanding space, representation, and reasoning which can be applied to a variety of disciplines. According to the National Geography Standards (1994), a person who is geographically literate is able to see meaning in the arrangement of thinking in space, sees relations between people, places, and environments, and applies spatial and ecological perspectives to life situations.

Google Earth: is a free Geographic Information System that provides the user a virtual globe/map.

Historical empathy: is the ability to describe the past through the eyes and experiences of those who were there and to avoid “present-mindedness”.

Integration: The use of computer technology throughout the social studies.

Middle School: a middle school as one that is specifically structured to meet the developmental needs of young adolescents, ages 10-15.

Standards-based curriculum: A curriculum that is defined by a state’s curriculum standards.
**Social studies:** The social studies represent the content area of “anthropology, archaeology, economics, geography, history, law, philosophy, political science, psychology, religion, and sociology, as well as appropriate content from the humanities, mathematics, and natural sciences” (National Council for the Social Studies, 1994, p. vii).

**Technology:** Information technology such as computers, devices that can be attached to computers (e.g., LCD projector, interactive whiteboard, digital camera), networks (e.g., Internet) and computer software.

**Summary**

A number of researchers have identified the need for integrating technology into the social studies classroom in order for students to develop historical empathy, decision-making and problem-solving skills, data-processing skills, and communication abilities (Berson, 1996; Berson & Berson, 2007; Doppen, 2004; Hicks et al., 2004; Kobrin, 1996; Levstik & Barton, 2001; Mason et al., 2000; van Hover, Berson, & Bolick, 2004; van Hover & Yeager, 2002; Whitworth & Berson, 2003; Wineburg, 1991). Research also contends that there is a lack of geography education in K-12 programs (Keiper, 1999; National Geographic, 2006; Songer, 2007). In order for students to understand historical and global issues they need to be geographically literate. Further, knowledge on how Geographic Information Systems can be integrated into a social studies classroom can provide educators with the needed resources and information to revise and refine their curriculum in order for their students to develop historical empathy and become geographically literate.
CHAPTER 2: REVIEW OF THE LITERATURE

Introduction

Marshall and Rossman (1999) recommend the literature review provide the framework for the study and identify areas of knowledge the study intends to expand. The purpose of this research study is to examine the extent to which Google Earth can be used as an effective tool to help students develop geographic literacy and historical empathy. Therefore, this chapter begins with an examination of the growing body of research that encourages middle school social studies educators to incorporate a Geographic Information System, such as Google Earth, into their curriculum in order to help students develop geographic literacy and historical empathy.

Middle School Students

The National Middle School Association (NMSA) (2003) has recognized the need to prepare middle school students for the 21st Century. Adolescents, ages 10-15, experience a multitude of changes that are more rapid and profound than at any other time in their lives (NMSA, 2003). Therefore, middle level educators need to understand the physical, social, and emotional needs of their students in order to provide an education best suited to their developmental growth.

Middle school teachers are provided the unique opportunity to help students develop effective learning strategies that will take them onto high school and college, and help them become informed citizens. Unfortunately, the literature reveals a lack of research related to middle school education, especially in how technology integration can strengthen students’ thinking about and understanding of the social studies.
Defining a Middle School

For the purpose of this study, NMSA’s definition of a middle school was used. NMSA defines a middle school as one that is specifically structured to meet the developmental needs of young adolescents, ages 10-15 (McEwin, Dickinson, & Jenkins, 1996; Powell, 2005). As espoused in This We Believe, 14 essential elements characterize a successful middle school (NMSA, 2003, p. 7):

1. Educators who value working with this age group and are prepared to do so.
2. Courageous, collaborative leadership.
3. A shared vision that guides decisions.
4. An inviting, supportive, and safe environment.
5. High expectations for every member of the learning community.
7. An adult advocate for every student.
8. School-initiated family and community partnerships.
9. Curriculum that is relevant, challenging, integrative, and exploratory.
10. Multiple learning and teaching approaches that respond to their diversity.
11. Assessment and evaluation programs that promote quality learning.
12. Organizational structures that support meaningful relationships and learning.
13. School-wide efforts and policies that foster health, wellness, and safety.
14. Multifaceted guidance and support services.

There are also several definitions that support and add to NMSA’s definition of the middle school concept that are important to note as they support this research study. Maning and Bucher (2001) define a middle school as,
A school organization containing grades 6 to 8 (and sometimes grade 5) that, first, provides developmentally appropriate and responsive curricular, instructional, organizational, guidance, and overall educational experiences and, second, places major emphasis on 10 to 14 year olds’ developmental and instructional needs. (p. 7)

Alexander (1968) defined a middle school as, “a school having at least three grades and not more than five grades, and including at least grades six and seven” (p. 1). Kellough and Kellough (1999) defined a middle school as, “a school that has been planned and organized especially for students of ages ten through fourteen and that generally has grades 5-8, with grades 6-8 being the most popular grade-span organization” (p. 442). Pollak and Hartman (1999) suggest several important elements a middle school should possess:

1. Advocating for each student to avoid isolation or loneliness.
2. Building bridges between elementary and high school, between students and teachers, between family and community partners.
3. Helping students to become responsible community citizens.
4. Being responsible to students’ personal changes: intellectual, physical, emotional, social, and moral.
5. Providing flexible teams to best meet the needs of a particular group of students.
6. Grouping students flexibly to achieve academic and social success.
7. Enhancing students’ physical and emotional health.
8. Adopting interdisciplinary curriculum to help students prepare for and cope with real life.

9. Working together as a teacher group to create a common core, instead of each discrete subject.

10. Helping students to see school as an integral, not a separate, part of their lives. Helping them to become lifelong learners that can connect relevant learning to their real lives.

11. Building a nurturing climate and positive attitude.

12. Using group work and peer interactions to help students develop their own identities, values, beliefs, and attitudes.

13. Encouraging students to celebrate their uniqueness.

14. Providing varied teaching and learning approaches to accommodate individual learning styles, interests, and diverse ways of thinking.

21st Century Students

According to the Partnership for 21st century Skills (P21) (2005), in order for American students to succeed as effective citizens, workers, and leaders in the 21st century, they must be provided with the opportunity to use information and communication technologies in authentic contexts. Unfortunately, the P21 (2005) has identified a “profound gap between the knowledge and skills most students learn in school and the knowledge and skills they need in typical 21st century communities and workplaces” (“Why do students need 21st century skills?,” para. 1). In order for students to be successful in post-secondary education and to compete in a global economy,
schools must provide an environment in which students are introduced to 21st century skills. These skills include the following (P21, 2005):

- Information and communication skills (information and media literacy skills; communication skills).
- Thinking and problem-solving (critical and systems thinking; problem identification, formulation and solution; creativity and intellectual curiosity).
- Interpersonal and self-direction skills (interpersonal and collaborative skills; self-direction; accountability and adaptability; social responsibility).
- Global awareness.
- Financial, economic and business literacy, and developing entrepreneurial skills to enhance workplace productivity and career options.
- Civic literacy.

In Ohio, Governor Ted Strickland in his 2009 State of the State report addressed the need for 21st century skills by stating,

First, what we teach and how we teach will prepare Ohioans to thrive in the 21st Century. Students will, of course, continue to learn the timeless core subjects like math and science that are critical to their success. But we will also add new topics including global awareness and life skills to the curriculum. And we will use teaching methods that foster creativity and innovation, critical thinking and problem solving, communication and collaboration, media literacy, leadership and productivity, cultural awareness, adaptability and accountability. (Strickland, 2009a, para. 96)
In her analysis of the Partnership of 21st Century skills, Gut (2009) found several resources designed to assist social studies educators with infusing 21st century skills into their instruction. The Internet resources Gut (2009) identified help educators by providing links to lesson plans that teach or require the application of 21st century skills related to information, resources, and community tools. Some of the Internet sources found in the study also provide students the opportunity to investigate the world in spatial terms. There are also lessons and activities aligned with the U. S. National Geography standards, printer-friendly maps and a link to Xpedition Hall (an interactive “museum” created by National Geographic).

**Low Income Students Technology Use**

New technologies have the ability to provide students with access to knowledge-building and communication tools as well as individualize learning opportunities. However, access to technology is not equitable across all socio-demographic categories. Despite the rapid increase of personal computer and Internet use in the last 20 years, there remains a formidable gap that separates households who have computers and the Internet and those who do not (Pew Internet & American Life Project, 2005; Wilhelm, Carmen, & Reynolds, 2002).

A study by Wilhelm et al. (2002) found significant differences in the ways that students from various income groups use computers at home. They found low-socioeconomic status (SES) students were more likely to use their home computer for games while higher-SES students were more likely to use their computers for school assignments, word processing, and other standard software applications. Low-SES students living in households without a computer or the Internet are at a disadvantage as
they are the least likely to have access to new technologies. Even further, access to new technologies at home has a great deal to do with how technology is learned in school (Wilhelm et al., 2002).

There are vast differences between how teachers in high and low-SES schools use the Internet and computers to instruct their students (Du, Havard, Sansing, & Yu, 2004). “Students whose families provide ready access to a computer and the Internet at home are more likely to take advanced computer classes at school that involve such tasks as the analysis of complex systems and college-oriented academic work” (Du et al., 2004, p. 24).

In contrast, disadvantaged students who have little to no experience with computer use at home, often take unchallenging computer-related courses that emphasize routine learning skills or workplace-oriented training (Wilhelm et al., 2002). Low-SES students are more likely to take computer literacy classes than to use a computer in an authentic context (Du et al., 2004; Wilhelm et al., 2002). “Teachers and students in low-SES schools are more likely to use the computer for drill practice and less likely to use it for research work when compared with their counterparts in affluent schools” (Du, et al., 2004, p. 23).

Students in high-SES schools are more likely to engage in computer programming activities as opposed to low-SES students who rarely use the computer to do more than drill-and-practice activities. High-SES students disproportionately receive better learning opportunities with computer related tasks than poor and minority students (Du et al., 2004).
Technology in the Middle School

In a successful middle school, educators should strive to create a curriculum that is student-centered, relevant, challenging, integrative, exploratory, and capable of reaching multiple learning styles (NMSA, 2003). Middle school students growing up today are becoming increasingly comfortable with using digital technologies (e.g., Web, hand-held devices, cell phones, gaming consoles, etc.) to access new information and to interact with each other (e.g., Facebook, Myspace) (Spires, Lee, & Turner, 2008).

“The manner in which new information and communication technologies are being used suggests that children today are creating understandings and knowledge in new and different ways” (Spires et al., 2008, p. 497). Therefore, “teaching approaches should enhance and accommodate the diverse skills, abilities, and prior knowledge of young adolescents, cultivate multiple intelligences, and draw upon students’ individual learning styles” (NMSA, 2003, p. 25).

“Articles and testimonials tell us that students spend more time reading, writing, and problem solving when technology is involved” (Powell, 2005, p. 200). A national survey of 12 to 17-year-olds by the Pew Internet and American Life Project (2005) found that 87% of students go online daily in order to quickly locate information, communicate with friends, and satisfy curiosity. “Most adolescents and their parents believe the Internet has enormous potential to improve study habits and schoolwork” (Strom, Strom, Wing, & Beckert, 2010, p. 11).

Through the use of technology, middle school educators can help advance learning as “technology can develop higher-order thinking skills and provide the most current information from many sources, enabling teachers and students to interact with
real world resources in unprecedented ways” (NMSA, 2003, p. 26). While students are often more enthusiastic when a project involves working on a computer, technology should not be used for the sake of technology (Powell, 2005). When educators use technology within the context of the planned curriculum, sound technological decisions should be based on educational principles (Powell, 2005). The technology computers provide supports students’ knowledge construction, explorations, learning by doing, learning by collaborating with others, and learning by reflecting (Jonassen, 2000).

A study in which researchers surveyed and interviewed 4,000 middle school students in grades six, seven, and eight in North Carolina, Spires, Johnson, Lee, and Turner (2008) found that most students use computers more at home than at school. They also found that students want to be more engaged and stimulated in school especially when conducting projects that use technology as a tool to learn new information. As one student reported,

> When you do projects you get to find the information. When you take a test, you already knew the information. They gave it to you and you just have to study and have a test on it the next day. But with a project you get to look for yourself. I learn better if I look for myself rather than studying something somebody else already gave me. (p. 508)

In addition, Spires et al. (2008) study found that students “view school as a place that often restricts their access to technology” (p. 510). Students also reported a clear link between the use of technologies in school and motivation. As one student stated, “When you get to use technology, learning is more fun” (p. 511). Students in this study wanted more creative and ubiquitous technology use. Finally, this study found that
“using computers is the one activity that all ethnic groups referred to as their favorite activity in school” (p. 511).

*Technology Use in Middle School Social Studies*

Teaching and learning social studies in middle school holds tremendous possibilities for engaging young adolescents in a critical analysis of the world around them at a time in their lives when they are developing values and gaining new ways of thinking (Byrnes, 2003; Keeting, 2004). P21 and NCSS developed a social studies map that exhibits the integration of 21st century skills into the social studies that helps support teaching and learning in order to prepare students to become effective and productive citizens in the 21st century. The map identifies student outcomes for grades 4, 8, and 12, as well as provides project models that could result in an increase in student success.

Good teaching focuses on helping students study topics in enough depth to understand them and reflect on the meaning and significance of what they have studied (Levstik & Barton, 2001). Unfortunately, social studies teachers are often the worst offenders when it comes to having students understand and reflect on the meaning and significance of history. Levstik and Barton (2001) suggest that in a typical social studies classroom, students experience history, geography, economics, and related topics in a race-like manner to get through the standards in preparation for a state-mandated test. Teachers spend very little time helping their students develop an understanding of complicated concepts like culture, environment, and the development of societies (Levstik & Barton, 2001). When students are rushed through social studies content without understanding the reasons or significance of the material, they are unlikely to learn anything important (Levstik & Barton, 2001). As Lipscomb (2002) found in his
study of a lesson unit on the Civil War, students are often provided massive amounts of factual information (i.e., dates, places, etc.) but are not provided the opportunity to “experience” the human side of war. In order for students to truly appreciate and understand history, they need to be provided with multiple sources and perspectives (Lipscomb, 2002).

To understand information, students must be able to make connections to prior knowledge. Therefore, educators should help students build on the knowledge they bring with them to school whenever possible (Levstik & Barton, 2001; Lipscomb, 2002). Meaningful learning means integrating new material with existing knowledge or parts of the prior-knowledge structure (Ausubel, 2000). “Research on learning and instruction consistently shows that when school experiences aren’t linked to prior understanding, students learn very little” (Levstik & Baron, 2001, p. 12).

People learn when they seek answers to the questions that matter to them (Levstik & Barton, 2001). Thus, when students use technology in the form of a computer, they are required to “think in a meaningful way in order to use the application to represent what they know” (Jonassen, 2000, p. 4). Just as carpenters cannot build furniture or houses, students cannot construct meaning without access to a set of intellectual tools to help them assemble and construct knowledge (Jonassen, 2000).

Education is no longer thought of as filling in the “blank slates” (Levstik & Barton, 2001) but rather focuses on the students’ own process of knowledge construction and inquiry. For example, Jonassen (2000) introduced the term Mindtools to highlight the fact that all instruction requires a number of different technologies to present, communicate, organize, and construct knowledge. “Mindtools, therefore, are computer
applications that require students to think in meaningful ways in order to use the application to represent what they know” (Moore, 2006, p. 4). As middle school students work with computers, the technology the computer provides enhances their thinking and learning (Moore, 2006). The result of this partnership is that the whole of learning becomes greater than its parts. Jonassen, Peck and Wilson (1999) argued that meaningful learning is active, constructive, intentional, authentic, and cooperative.

Summary

A middle school is structured to meet the developmental, instructional, emotional and physical needs of adolescents, ages 10-15 in grades 6-8 (Powell, 2005). The middle school curriculum provides students with an educational experience that is supportive, relevant, challenging, integrative, and exploratory, and prepares them to become responsible citizens (McEwin, Dickinson & Jenkins, 1996; NMSA, 2003). In order to prepare all students, regardless of their socio-economic status, to become responsible productive citizens, they must be provided a curriculum that offers them the opportunity to develop and enhance knowledge and skills they will need to succeed in a 21st century environment (NMSA, 2003; P21, 2005).

Research has found that students in middle school are avid technology users (NMSA, 2004; Powell, 2005; Spires et al., 2008, Strom et al., 2010). Middle school students, regardless of age, gender, ethnicity, and learning ability, are more motivated and enthusiastic about learning when working with computers (NMSA, 2003; Powell, 2005; Spires et al., 2008; Strom et al., 2010). However, research has found that the gap between the use of technology in and out of school is widening (De et al., 2004; Pew Internet & American Life Project, 2005; Wilhelm et al., 2002). Research has also found
that students find the integration of technology in school as limited (Levstik & Baron, 2001; Spires et al., 2008). Technology integration in schools should reflect the student working with the technology to facilitate knowledge construction and foster meaningful learning.

Geographic Literacy

Geography is rooted in the human need for survival; in the necessity of knowing and making sense of the resources and dangers of our human and physical environment. But it also seeks the bigger picture: geography helps us imagine that there is meaning and sense in the world. Geography allows us to see order in, and impose order on, what otherwise would be chaos. (Bonnett, 2008, p. 121)

What is Geography?

“Geography is to space what history is to time. It is a spatial way of thinking, a science with distinctive methods and tools, a body of knowledge about places, and a set of information technologies that have been around for centuries” (Environmental Systems Research Institute, 2008, p. 48). The concept of geography was discovered over 2,500 years ago and was advanced by Greek, Roman, and Chinese scholars throughout the Classical Age. For thousands of years, geography was recognized and valued. “How excellent inventions are geography, arithmetic, astrology, and the rest!” wrote Saint Augustine in The City of God in the early 5th century (ESRI, 2008). However, until recently, geography education was a discipline largely expunged from colleges, universities, and K-12 classrooms throughout the United States. Lately, geography is experiencing resurgence due to the phenomenal success of Geographic Information
Systmes (GIS) and the need for a better understanding of our world in this age of globalization and geopolitical turmoil (ESRI, 2008).

Why Geography?

Geographic literacy is crucial for the future of America in order for Americans to better understand historical and global issues, as well as human and physical phenomena, and to generate solutions to real-world problems (Songer, 2007). However, as research indicates, American students are far behind their international counterparts. The Global Geographic Literacy Survey (National Geographic, 2002) found that of nine countries, the United States ranked eighth only above Mexico in geographic knowledge. The “astonishing degree of ignorance in the United States about the rest of the world” (National Research Council, 1997, p. 1) has put pressure on our federal government to improve geography education in K-12 classrooms in order that students may develop competitively, economically, politically, and environmentally. In the last several decades a series of efforts has been aimed at improving and transforming K-12 geography education (e.g., A Nation at Risk, 1984; Goals 2000: Educate America Act, 2000; No Child Left Behind, 2002) which “reflects a widespread acceptance among the people of the United States that being literate in geography is essential for being an informed and responsible citizen” (NRC, 1997, p. 146).

Geography education helps create citizens who are able to “understand and do something about some of the major issues and problems facing our world, including climate change, energy dependence, war and regional conflicts, globalization, and international terrorism” (Alvarez, Deal, Gress, Gritzher, Morrell, Pavlovic et al., 2006, p. 1). Geography education helps to develop geospatial thinking skills that includes specific
ways of understanding space, representation, and reasoning that can be applied to a variety of disciplines (ESRI, 2008; NRC, 2006). The purpose of “geography education is to create a geographically informed person who (1) sees meaning in the arrangement of thinking in space, (2) sees relations between people, places, and environments, and (3) applies spatial and ecological perspectives to life situations” (National Geographic, n.d. a). “Geography is about understanding people and places and how real-world places function in a viscerally organic sense” (ESRI, 2008, p. 48).

Geography is about more than place names and locations. It analyzes and illuminates interconnections between people, places, and environments. In a world increasingly defined by a global economy, cultural migration, and mounting environmental challenges, geography is an essential prerequisite to citizenship and success in the future. (National Geographic, n.d. b)

Therefore, geography is a subject in which “students learn ‘through’ and ‘about’ geography” (Farrinton, 2000, p. 414) and is a subject that needs to integrated into the K-12 social studies curriculum.

*Geography and the Social Studies*

Geography education in the United States has been included in the social studies since the 1920s and has traditionally been part of all social studies coursework rather than as a separate subject. Unfortunately, within the social studies, history, government, and civics overshadow geography, and when geography is offered as a separate course, it is usually an elective in senior high schools (Vuicich & Stoltman, 1975). The National Geographic-Roper Public Affairs 2006 Geographic Literacy Study (National Geographic, 2006) found that only “48% of 18- to 24-year-olds say they had a class devoted entirely
to geography at least once between the sixth grade and senior year in high school” (p. 17). “There are few students that have investigated the appropriate content, concept development, and sequence of learning in geography curriculum at the secondary level” (Stoltman, 1997, p. 139). Gerber (2003) further states that “Geographic knowledge and skills are especially important for environmental and intercultural education. People need to know how to use geographic information in their lives” (p. 17). Unfortunately, as the following section outlines, geography in the K-12 social studies curriculum is a subject that is often overlooked and under-taught.

Research on Geography in the Social Studies

A review of the research literature on geography education suggests a relatively limited number of studies in which geography has been the research focus (Boehm & Peterson, 1997; Segall & Helfenbein, 2008) even though it is considered one of the field’s core disciplines (Segall & Helfenbien, 2008). “Theory & Research in Social Education, the leading scholarly journal in social studies, has published one article [on geography education] since 1990” (Segall & Helfenbien, 2008, p. 259). Social Education and The Social Studies have done better with 35 and 22 articles respectively, though a large majority of those publications were lesson plans for teachers or reflections by teachers about having taught a lesson/unit in geography (Segall & Helfenbien, 2008). Research studies on geography education are far less than those on history, political science, or economics (Segall & Helfenbien, 2008). Boehm (1997) states, Never before in recent history has the profession been so unified in its requirement for quality geographic education. How to deliver that product
continues to be a significant puzzle…research in geographic education may be the only insurance that the process will continue. (p. 1)

As part of the summary and conclusions of his in-depth study of research in geography and social studies, Stoltman (1997) states,

Two elements of research within the general realm of geography curriculum stand out as a result of the review. First, the research in the field is mainly descriptive, with relatively little attention to theory. This is in part due to the fact that theory within educational curriculum building remains an emerging research topic. The second is that curriculum building and validation is a sociopolitical process. There are special interest groups that find themselves at risk as curriculum begins to be questioned and change. Subject matter specialists, those expecting the curriculum to reflect the diversity of the community or country, and others who view a particular school experience, to name only a few, have vested interests in curriculum. The social and political interplays that emerge in curriculum debate and decisions are as broad as a special interest wants them to be. (pp. 159-160)

As the literature reveals there, has been little integration of geography into the social studies. National geography standards have been established and if integrated into the social studies, have the potential to influence how geography is taught in K-12 schools.

The National Geography Standards

In 1994 the National Geography Standards were established in response to a growing decline in geography education in the United States. The National Geography Standards expand the idea of geography by emphasizing the vibrant nature and interactions that occur both within and between places (Haas, 2000). A group of
educators, parents, and members of business, professional, and civic organizations built a national consensus regarding the study of geography and produced *Geography for Life: National Geography Standards 1994*. To strengthen geography knowledge, the American Geographical Society, the Association of American Geographers, the National Council for Geographic Education, and the National Geographic Society (Pitts, 2005) developed K-12 geography standards (Table 1) that help students understand the world in spatial terms, places and regions, physical systems, human systems, environment and society, and the uses of geography.
### Table 1

**K-12 National Geography Standards**

| The World in Spatial Terms | 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.  
2. How to use mental maps to organize information about people, places, and environments in a spatial context.  
3. How to analyze the spatial organization of people, places, and environments on Earth's surface. |
|---|---|
| Places and Regions | 4. The physical and human characteristics of places.  
5. That people create regions to interpret Earth's complexity.  
6. How culture and experience influence people's perceptions of places and regions. |
| Physical Systems | 7. The physical processes that shape the patterns of Earth's surface.  
8. The characteristics, distribution, and migration of human populations on Earth's surface. |
| Human Systems | 9. The characteristics and spatial distribution of ecosystems on Earth's surface.  
10. The characteristics, distribution, and complexity of Earth's cultural mosaics.  
11. The patterns and networks of economic interdependence on Earth's surface.  
12. The processes, patterns, and functions of human settlement.  
13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface.  
14. How human actions modify the physical environment. |
| Environment and Society | 15. How physical systems affect human systems.  
16. The changes that occur in the meaning, use, distribution, and importance of resources. |
| The Uses of Geography | 17. How to apply geography to interpret the past.  
18. How to apply geography to interpret the present and plan for the future. |
The degree to which these standards have influenced geography classrooms is still unclear but in reviewing state standards, they have had an impact on geography education in some ways. One way the standards have impacted geography education is that states have begun to add geography standards. In 1989 not one state had standards for geography, by 2004, all states except Iowa and Rhode Island had established some geography standards (often under the umbrella of social studies) (Segall & Helfenbien, 2008). In 1997, the Ohio Department of Education began the process of developing the Ohio Academic Content Standards for the social studies which included geography. In December 2002, the social studies content standards for the state of Ohio were unanimously adopted. Because this study focuses on seventh grade students in the state of Ohio, Table 2 has been included to identify Ohio’s geography standards for the seventh grade.
Table 2

*Ohio’s Geography Content Standards, Grade 7*

| Geography          | 1. For each of the societies studied, identify the location of significant physical and human characteristics on a map of the relevant region.  
|                   | 2. On a map, identify places related to the historical events being studied and explain their significance. |
| Places and Regions | 3. Describe changes in the physical and human characteristics of regions that occur over time and identify the consequences of such changes. |
| Human Environmental Interaction | 4. Use physical and historical maps to analyze the reasons that human features are located in particular places. |
| Movement          | 5. Describe the geographic factors and processes that contribute to and impede the diffusion of people, products and ideas from place to place including:  
|                   | a) Physical features;  
|                   | b) Culture;  
|                   | c) War;  
|                   | d) Trade;  
|                   | e) Technological innovations. |

*The Need for Geography Education*

While the federal government and state departments of education have put forth efforts to educate students in the field of geography, research shows that more needs to be done. The 2006 National Geographic Survey of Geographic Literacy found that,

- Young adults between the ages of 18 and 24 demonstrate a limited understanding of the world beyond their country’s borders, and they place insufficient importance on the basic geographic skills that might enhance their knowledge. In this survey, young Americans answered about half (54%) of all
the questions correctly. But, by and large, majorities of young adults failed at a range of questions testing their basic geographic literacy.

- Six in ten (63%) cannot find Iraq on a map of the Middle East, despite near-constant news coverage since the U.S. invasion of March 2003.
- 75% cannot find Indonesia on a map even after images of the tsunami and the damage it caused to this region of the world played prominently across television screens and in the pages of print media over many months in 2005.
- 74% believe English is the most commonly spoken native language in the world, rather than Mandarin Chinese.
- 71% do not know the U.S. is the world’s largest exporter of goods and services.
- 50% and 43%, respectively of young men and women 18-24 cannot identify the states of New York or Ohio on a map.
- 50% think it is important but not absolutely necessary to know where countries in the news are located. (p. 6)

Summary

As globalization changes the scale and intensity of humans interacting with each other and their environment, and as advances in information technology make it possible for more people to have daily use of spatial information, the need for a geographically literate society intensifies. Spatial literacy needs to be taught in the K-12 curriculum. Given the state of the nation’s geographic literacy and geography education, it can be
assumed students are not being provided educational foundations in geospatial thinking (Songer, 2007).

**Historical Empathy**

Historical “empathy” (Einfühlung) is derived from the German idealism of the nineteenth century and is a term that Wilhelm Dilthey saw as an essential element in the study of human sciences, especially in understanding history (Portal, 1987). However, the definition of empathy is confusing, problematic, and often a contested term (Lee & Ashby, 2001). While some researchers have found the term to be useless, others believe empathy helps students examine, appreciate, and understand the perspectives of people of the past and renders them intelligible to contemporary minds (Foster, 2001).

**Defining Historical Empathy**

The National Standards for History define empathy as “the ability to describe the past through the eyes and experiences of those who were there, as revealed through their literature, arts, artifacts, and the like, and to avoid ‘present-mindedness,’ judging the past solely in terms of the norms and values of today” (as cited in Yilmaz, 2007, pp. 332-333). Portal (1987) perceives empathy as “a way of thinking imaginatively” along with “other cognitive skills in order to see human values in history…a high level of expertise in the whole range of historical skills” (pp. 89-90). Stern (1998) defines empathy as the ability to understand events in history in order for students to gain insight into how and why people acted the way they did within the context of their time. Historical empathy is the skill to recreate the thoughts or actions of a historical figure/event and “to view the world as it was seen by the people in the past without imposing today’s values on the past”
(Yilmaz, 2007, p. 331). VanSledright (2001) explains historical empathy in terms of what it is not:

Empathy does not take the form of a simple and temporary propensity 'to feel like' or 'walk in the shoes of' those who lived before us 'as though they were us.'

Rather historical empathy, although a mysterious accomplishment, is one that demands considerable thoughtful effort. (p. 55)

Ashby and Lee (1987) define historical empathy as an achievement:

…it is where we get to when we have successfully reconstructed other peoples’ beliefs, values, goals, and attendant feelings…it is to say that he or she is in a position to entertain a set of beliefs and values which are not necessarily his or her own. (p. 63)

According to Barton (1997), historical empathy is the skill to recognize how people in the past viewed their situation, assessed their beliefs, made decisions, and how their ideas were shaped by their values, ways of thinking, and attitudes. However, historical empathy does not demand our sympathy, acceptance, or forgiveness for the choices people of the past made, which is an important concept for students to understand when studying history (Stern, 1998).

Historical empathy provides an enriched understanding of the past within context. For the most part, empathy is intellectual in nature, but often also includes an emotional dimension. The emotional dimension about historical empathy “arises or develops from the active engagement in thinking about particular people, events, and situations in their context, and from wonderment about reasonable and possible meanings within, in a time that no one can really know” (Davis, 2001, p. 3). When students think about several
different points of view or perspectives, empathy springs from the considerations of more than one, even several different, points of view or perspectives (Davis, 2001). Historical empathy does, however, ask that we “wrestle with the complexity of historical events and perspectives within the context of their times” (Yeager, Foster, Maley, Anderson, & Morris, 1998, p. 21).

*Developing Historical Empathy*

In their research among students in England, Ashby and Lee (1987) found that the most important task in teaching history is for students to acquire the “disposition to empathize” (p. 64). Students who are able to develop empathy understand why it is important and the difference it makes in understanding history. They have not only taken a step forward in the study of history, but are also more likely “to be able to cope with the present world and can better discern how what they do affects other people” (p. 64).

Based on their findings, Lee and Ashby (2001) constructed a set of five categories for the development of students’ understanding of and strategies for achieving empathy; (1) the ‘divi’ past (people in the past were mentally defective), (2) generalized stereotypes (use conventional stereotypes to explain people’s intentions, situations, values, and goals), (3) everyday empathy (look at specific situations as seen in modern terms without appreciating the differences between their own beliefs and values and those of another society), (4) restricted historical empathy (start to see that people in the past saw things in a different way from us), and (5) contextual historical empathy (able to understand and explain a wider picture). It is important to note that each of the categories represents a “logical hierarchy” meaning that as students pass through each category they either include or replace an existing category.
The Inquiry Process

Historical empathy has the potential to engage students in the process of inquiry and interpretation and encourages them to think critically about the past. Even though historical empathy provides no absolute truths it is still a worthwhile practice in order for students to develop a richer understanding of the past (Foster & Yeager, 1999). Empathy is important for historians as they must bring it into their analysis in order for them to examine the events, actions and words of key figures and events in history (Riley, 2001). It is important for students to understand the way in which people of the past saw their world, at various times and in various places. It is also important for students to understand why people took the actions they did (Lee & Ashby, 2001). Riley (2001) defines empathy as the ability to understand the motives, words, and actions of those of the past whose decisions affected the course of history, such as Truman’s decision to drop the atomic bomb. Empathy should “include the voices, words, actions and intentions of ordinary people whose personal choices singularly or collectively contributed to the course of history” (p. 6).

According to Portal (1987) students have to take five steps to be able to engage in empathy and develop their perspective-taking skills. To practice historical empathy, students should be able to:

1. Project their own thoughts and feelings into a particular historical situation,
2. Distinguish the historical period under study from their own,
3. Employ a variety of reference materials and contemporary sources related to the topic they are studying,
4. Present a particular person or situation in a way that extends beyond the merely typical to encompass the unique circumstances of the case, and,

5. Make use of the two-sided narrative to illustrate the role of inadequately empathic relationships between the historical participants in giving rise to misunderstandings, conflict or tragedy. (p. 334)

**Teaching Historical Empathy**

Foster (1999) and Foster and Yeager (1999) found that in order for students to develop historical empathy, educators should not use exercises based on imagination (e.g., "Imagine you are an Apache warrior"), over-identification (e.g., asking students to identify with Adolf Hitler), or sympathy (e.g., encouraging students to sympathize with victims of slavery). Although many interpret historical empathy in terms of imagination or sympathy, it is in fact an “active process, embedded in the historical method” involving four interrelated phases: (1) the introduction of an historical event necessitating the analysis of human action, (2) the understanding of historical context and chronology, (3) the analysis of a variety of historical evidence and interpretations and (4) the construction of a narrative framework through which historical conclusions are reached (Foster & Yeager, 1999, p. 1; Davis et al., 2001, pp. 13-14).

Foster’s research (1999, 2001) suggests that translating historical empathy into meaningful classroom practices incorporates six fundamental qualities. According to Foster, historical empathy,

1. Is a process that leads to an understanding and an explanation of why people in the past acted as they did,
2. Involves an appreciation of historical context and chronology in the evaluation of past events,

3. Is reliant upon a thorough analysis and evaluation of historical evidence,

4. Involves an appreciation of the consequences of actions perpetrated in the past,

5. Demands an intuitive sense of a bygone era and an implicit recognition that the past is different from the present, and,

6. Requires a respect for, an appreciation of, and a sensitivity toward, the complexity of human action and achievement. (pp. 169-175)

Foster (2001) further suggests that teachers are the key component in order for students to be engaged in meaningful empathic inquiry. Unfortunately, according to Davis (2001), most practicing history teachers have little personal and direct experience with serious historical thinking tasks. While the research is scarce many teachers have reported never being engaged in such “thinking tasks” with historical sources during their undergraduate studies (Davis, 2001, p. 10). If historical thinking is to occur in our classrooms, teachers themselves must learn to think historically, and when they do, they will understand that historical empathy can truly engage their students.

Empathic inquiry requires significant classroom time, energy, and resources and teachers must balance between providing students with structure and resources while at the same time allowing time for independent thought and group deliberation. “The role of the teacher in selecting appropriate materials, asking probing questions, stimulating thoughtful investigation, leading in-class discussion, and maintaining the momentum of inquiry is undoubtedly central to the success of any classroom assignment involving
historical empathy‖ (Foster, 2001, p. 178). In order for students to think and gain increased experiences involving historical empathy they need to have sound historical knowledge, or simply, know more history (Davis, 2001). While students’ possession of knowledge does not guarantee their ability to think with it, the point remains that “students must know, rather more than fewer, historical facts, concepts, and interpretations as they continue their engagement in historical thinking” (p. 6).

In their study of fourth and fifth grade history students, VanSledright and Brophy (1992) found that when students are taught history in context and are provided a framework for understanding, they can make better connections between historical events and avoid misinterpretation and “fanciful elaboration”. Foster and Yeager (1999), in their study of 12-year-old history, students in England, found that even when they had little exposure to academic history they still had a basic understanding of how different people can have different views of history. These research studies further suggest that in order to promote historical thinking the “curriculum should build on students’ knowledge and help them expand on this base of knowledge through participation in activities such as theme-based units” (Yeager, Foster, & Greer, 2002, p. 201).

**Perspective Taking**

“Education researchers have usually explained the nature of historical empathy within the context of historical inquiry and historical understanding” (Yilmaz, 2007, p. 333). The term empathy is sometimes used as a synonym for "perspective taking" and is referred to and used to clarify the features of historical empathy (Yilmaz, 2007). Downey (1996) used the term “perspective taking” rather than empathy in which he defined “perspective taking” as an activity in which students are able to “establish
motivation…build causal (historical) links” (p. 133) and explain actions and attitudes other than their own. Likewise, Doppen (2000) found that when students “do history themselves they learn history better and in greater depth” (p. 167).

Historical perspective refers to the ability to construct, on the basis of facts and evidence, an understanding of the historical character’s frame of reference without trying to identify or sympathize with his or her feelings. Downey (1996) has held that one of the most difficult tasks in historical thinking is perspective “construction” as it involves trying to escape one’s own attitudes and world views in order to understand those of the past. He offered several recommendations for evaluating evidence of students’ successful historical perspective taking. As synthesized by Yeager and Foster (2001) perspective taking involves (1) understanding the past is different from the present and that outcomes are specific to time and place, (2) being able to shift from the past to present in distinguishing various perspectives, (3) being able to explain the perspectives they take and their consequences for the historical participants involved, and (4) must be grounded in historical evidence and be factually accurate (pp. 16-17).

Yeager and Foster (2001) contend that the central aim of the historian is to understand and interpret the past. However, historians are hindered by the fact they are not provided with a complete picture of the past and must rely on the best available evidence to construct a reasonably accurate portrayal. Historical empathy applied to available evidence helps the historian bridge the gaps between what is known and is not known. Historical empathy combines the adductive and logical thinking associated with the use of evidence and the inferential and appropriately creative skills that seek to bridge the gap between what is known and what may be inferred from history (p. 14). Yeager
and Foster (2001) argue that historical empathy is both a process and an outcome (p. 15). Riley (1998) believes that the “theory and practice of historical empathy extends a key to historians and students, one which can be used to unlock the complex nature of historical investigation” (p. 6).

**Summary**

Historical empathy provides students with the ability to understand history without imposing today’s values and recognizing how people of the past viewed their circumstances (Ashby & Lee, 1987; Barton, 1997; Doppen, 2000; VanSledright, 2001). Historical empathy is about developing the ability to consider several different points of view or perspectives (Davis, 2001). As students develop historical empathy they move through several stages, as described by Lee and Ashby (2001), but once they move through this logical hierarchy they are better prepared to engage in historical empathy. One of the most important roles of the social studies teacher is to foster his or her students’ development of historical empathy in order for them to better appreciate humans of the past.

**Geographic Information Systems**

**Defining GIS**

According to Clarke (2003), “Good science starts with clear definitions. In the case of geographic information systems, however, definitions have sometimes been as clear as mud” (p. 2). For the purpose of this study, the use of “GIS” will refer to the technology that is used to support geographic thinking skills.

Understanding geography enables us to learn about people’s relationship to their environment so they can make informed decisions about the way they live on our planet.
(ESRI, 2008). In 1994 the National Council for Geography Education’s Standards Project viewed Geographic Information Systems (GIS) as a powerful tool for developing students’ geographic skills and perspectives. GIS is a combination of hardware, software, and geospatial data that facilitates complex geospatial analyses. GIS is a technological tool for understanding geography and making informed decisions (ESRI, 2008).

In a GIS, maps are stored as data layers so that a person reading a map can select data required for a specific project or task. These layers and associated spatial databases can be stored, updated, visualized, manipulated, and analyzed simultaneously, enabling users to ask and answer spatial questions about places on the planet. GIS offers students a virtual globe, in comparison to a conventional globe, in which GIS maps allow for interaction. This means that on the computer screen the user can scan a GIS map in any direction, zoom in or out, and view the Earth and its surface in many different views (Ramirez, 1996; ESRI, 2008).

GIS in the Classroom

“GIS allows students to choose whether to see roads, how many roads to see, and/or how roads should be depicted” (ESRI, 2008, p.1). They can select additional items they wish to view alongside these roads such as storm drains, gas lines, rare plants, hospitals or even abstract representations of demographic features such as population density (ESRI, 2008). GIS offers students the opportunity to compare and contrast data across countries, regions and continents to identify trends, as well as envision people, places, things, events, and other phenomena.
GIS technology can help students provide a meaningful and authentic learning experience in social studies by having them ask and answer core geographic questions such as: (1) What is located there…? (2) Where is…? (3) What has changed since…? (4) What spatial pattern exists…? and (5) What if…? (Geography Education Standards Project, 1994). GIS programs further help students imagine the world. They allow users to add new layers, such as aerial photographs (e.g., comparative pictures of ancient and modern Greece) or labels. GIS programs can literally guide, inform, and persuade us (ESRI, 1998).

Within the past few years there has been an increase in the importance and availability of GIS in society. As the National Council for Geography Education’s Standards Projects (1994) predicted, GIS would eventually permeate business, industry, government, and educational organizations. Its prediction proved to be true as GIS is currently used for military intelligence, market analysis, assessing real estate taxes, and monitoring animal migrations (Hammond & Bodzin, 2009). GIS has also permeated among the public. For example in 2005, people were able to see first-hand the events in New Orleans, Louisiana, following the devastation of Hurricane Katrina. Since the advent of Google Earth in early 2005, along with many other equally compelling and accessible GIS services, such as ArcExplorer GIS, Live Local, Amazon's A9, MyWorld GIS, satellite navigation systems, and online maps and driving directions, the general public has become far more aware of the power of spatial data and the degree to which technology now allows easy sharing, visualization, and exploration of information about the planet's surface. (Goodchild, 2006, p. 11)
Today’s technological tools make it possible to teach in new ways or even to do things entirely different. Technological advances continue to make computers more available to an ever-widening community of users. One of the most promising technological tools entering the classroom is GIS. GIS provides an opportunity for educators to integrate geography with technology. GIS technology integrated with the social studies curriculum enables students to examine the relationships among places, cultures, and people, and reveals relationships among them, their community, and the world. Solem and Gersmehl (2005) found that when students use online sources to learn geography they not only have an improved comprehension of major concepts and skills, they are more confident in their knowledge of geography. GIS can essentially improve the quality of learning in the classroom, widen the capacity of instruction, and help transition students into the information-rich world in which we live (Mackaness, 1994).

Mackaness (1994) gives nine reasons why GIS technology and geography should be used together in the classroom:

1. The development of spatial competence (spatial literacy), problem solving abilities, and geographic competence through interactive learning.

2. Development of interpersonal skills such as collective/team problem solving skills and troubleshooting.

3. To sustain international competitiveness through education.

4. Improved sense of the existence of the wider world around us and increased awareness of world cultures.

5. The nature, potential benefits and constraints of computer technology (specific nature of computer interaction).
6. Teaching principles of graphic design (revealing the capacity to bias interpretation of the image). The use of visual variables in representing the phenomenon within a spatial/temporal context.

7. Understanding issues of scale and resolution (both temporal and spatial) the significance of scale in interpretation and meaningful observation.

8. The acquisition/maintenance/interpretation of geospatial information.

9. The mixing of maps, charts, text, and tables. (pp. 562-563)

To further support Mackaness (1994), Hammond and Bodzin (2009) suggest three reasons why GIS should be used in social studies education: a) GIS in some capacity helps teach all ten NCSS themes, b) GIS can support and challenge many types of learners as many units offer inquiry-based projects, and c) research has found that students who use GIS show an increase in interest, motivation, and improved academic outcomes. “In geography, the use of GIS can prompt teachers and students to move beyond a focus on map reading skills to engage in data interpretation, analysis, and even map-making” (p. 119).

ESRI (2008) also supports the use of GIS in teaching history as “it is difficult to convey to readers of a written text a complex, multidimensional history, even a linear one” (p. 35). A large percentage of the human brain is engaged with visual tasks and when studying geography, visualization is an important component of developing an understanding of past events and people. GIS visualizations can play an important role in increasing the understanding of geography in subjects like U.S. History, World History, and European History. Psychological studies have demonstrated that the ability to recall information is greater with visual images than with text (Wager, 2005). Thus, “GIS
offers great promise as a means to develop high-quality classroom materials for history teaching” (ESRI, 2008, p. 35).

In the past decade, there has been a rise in the amount of historians, especially those studying world history or the history of large geographic regions, who have started using GIS for research and teaching (ESRI, 2008). One of the most important concepts in understanding history is to grasp that most of the world’s people have been connected by large geographic area.

Understanding history means understanding that the history of a particular place has been shaped by and is connected to other places (ESRI, 2008, p. 44). The Middle East, for example, is a sacred place for Jews, Christians, and Muslims. In understanding the larger geographic picture of why these three major religions were founded in one place, students would begin to understand past and present conflict in that part of the world. “The lessons and patterns of history, the cause and effects, the sequences of events, and the rise and fall of spheres of influence all have geographic bases” (Alibrandi & Sarnoff, 2006, p. 138). Alibrandi and Sarnoff (2006) suggest that spatial and geographic analysis is a different type of problem solving skill that allows “students [to] construct their own understandings of the relationships of economics, geography, and policy in a historical context through data analysis. This differs greatly from reading passages about [history]… therefore [GIS is] an important supplement to developing historical understanding” (p. 141).

Reforming Geography Education

Until recently, Geographic Information Systems have been implemented in very few K-12 classrooms (Baker & White, 2003; Kerski, 2001; Patterson, Reeve, & Page,
2003). However, many educators consider Geographic Information Systems to have the most potential for implementing geography into the curriculum across a variety of subjects (Baker, 2005; Bowman, Kilian-Smith & Brown, 2005; Kerski, 2001). The growing interest in Geographic Information Systems, however, may reflect frustration with its slow implementation, its minimum integration into national curricula, and a lack of clarity concerning its effectiveness in teaching and learning (Kerski, 2001; Meyer, Butterick, Olkin & Zack, 1999). Two separate case studies by Kerski (2003b) and Meyer et al. (1999) found that GIS implementation in K-12 classrooms motivates students to learn about geography, helps them develop spatial reasoning, and provides better methods of content delivery than textbooks.

Kerski (2003b) examined the implementation of GIS in K-12 education. His study included surveying 1,520 high school teachers who owned a GIS software package. His findings suggested that, a) the majority of teachers who implemented GIS into their classroom were science teachers, b) teachers are not implementing GIS because they do not see its importance in a standards-based curriculum, c) many teachers are using GIS for a single task such as looking at global demographics or wetland projects, d) GIS is still seen as difficult to be used in K-12 classrooms, and e) non-traditional learners had the greatest gains in motivation for geography, changing communication patterns with students and with teachers, and stimulated visual learners. The study further found that “teachers felt that the most important benefit that GIS brings to the classroom is real-world relevance to curricular areas” (p. 16).

Ramirez (1996) investigated the use of GIS in an inner city middle school (grades six through eight) in Palm Beach, Florida. Prior to being permitted to work with the GIS
software, students were required to demonstrate mastery of a series of core principles in geography and earth science, such as latitude, longitude, contour lines, and landforms. One of Ramirez’s (1996) major findings was that students were able to distinguish between data collection methods and recognize that scientific data is subject to various interpretations. As one educator helping students in this program summarized, “the innovative efforts of GIS once a ‘daring step to close the gap between what is and what should be or what will be in years to come’” (p. 36).

Baker and White (2003) tested the effect of using GIS on student learning in middle school science classes. “GIS is emerging as one those technologies that can foster contextually rich student learning and aid in-depth analyses, giving greater meaning to the work of student researchers” (p. 243). Baker and White (2003) further researched differences in student mastery of spatial reasoning and problem-solving skills using GIS and paper maps, and measured the effect each method had on the self-efficacy, science attitudes, and achievement of sixth, seventh, and eighth grade students. They documented significant improvement in attitudes toward technology and science, and moderate increases in the spatial analysis abilities of students who used GIS.

Milson and Curtis (2009) developed and implemented a project for a high school geography course. In their study, students used MyWorld, a GIS software specifically designed for educational use, to determine the best location for starting a new business. While the software was educationally friendly, “students struggled with computers that crashed as they ran their queries and a lack of time needed to be familiar with a new interface and tool” (Milson and Curtis, 2009p. 118). The results of the project, however, revealed that the geo-analysis tool can be used successfully in a classroom to enhance
students’ spatial thinking. Students also learned to task manage by dividing the project into stages of planning, exploring, analyzing, and deciding. Even further, “students commented positively about the opportunity to see how geography and GIS are applied in the real world” (p. 118).

Google Earth

Google Earth was first introduced under the name Earth Viewer in 2001 by a company called Keyhole, Inc. Keyhole Inc., was a pioneer software development company that specialized in geospatial data visualization applications. Earth Viewer provided its users a 3-D view of the Earth. Google purchased Keyhole, Inc. in 2004 and subsequently in 2005 renamed Earth Viewer as Google Earth (Google Earth, 2010).

Education researchers have identified that one of the major reasons GIS applications have not been implemented into K-12 classroom instruction is due to availability and the financial costs associated with purchasing a GIS program (even though major producers of GIS software offer attractive financial discounts for K-12 schools) (Kerski, 2001; Mackaness, 1994; Meyer et al, 1999). Ely (1992) asserts that GIS technology must be accessible to the instructor and students and not simply housed somewhere in the school building to be used only during school hours. Google Earth (GE) satisfies this notion as it is one of the most popular and regularly used Internet-based GIS programs and is available (with limited functionality) for free.

According to Patterson (2007) GE is not considered a “true” GIS because it is not able to perform analysis of layers, but can still be incorporated into classrooms to help make spatial information more relevant to students and teachers at all levels. Nonetheless, GE is similar to other GIS programs that allow the user to move freely
around the world in a virtual environment by changing the viewing angle (pan and zoom) and position (location). “The advent of Google Earth, is a formidable technological tool to help strengthen the weaknesses in the geography curriculum” (Patterson, 2007, p. 145). GE provides learners with an active mapping experience using an easy interface that makes geospatial analysis comprehensible and feasible for classroom use (Bodzin & Cirucci, 2009).

Students are provided with a window to the planet via their computer screens. Students are able to zoom to any location on the planet and navigate such places as the Grand Canyon, circle Mount St. Helens, or even “walk” the streets of Rome. “National Geographic and numerous other organizations have created layers and Web links that interact with the Google Earth program” (Siegle, 2007, p. 26). While the quality of the satellite images varies from place to place, students can actually see people walking on the sidewalk or calculate the ratio of cars to cabs on a particular city street (Siegle, 2007). “GE has created a continuous mosaic of [images] of the planet by merging aerial photographs with low and high [resolutions] satellite images” (Siegle, 2007, p. 24). GE not only takes students out of their classroom into a virtual world, but it extends learning and satisfies curiosity (Siegle, 2007).

Summary

GIS programs such as GE represent spatial ways of viewing the world and solving everyday problems. Through the use of GE, students learn to describe and communicate knowledge in the form of a map, understand and identify the world as viewed from above, recognize and interpret patterns, and develop critical analytical skills. Even more, students start to understand that history and geography are more than just a list of places
or events on the earth. Students begin to value geography and history as a basis for organizing and discovering information, comprehend historical events and grasp basic concepts as scale and spatial resolution (Goodchild, 2006, p. 64). Through the use of GE, students can acquire the skills they need to use more advanced features found in a true GIS view in order to analyze, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts (Patterson, 2007, p. 146).

Technology Integration in the Social Studies

The social studies represent a content area of “anthropology, archaeology, economics, geography, history, law, philosophy, political science, psychology, religion, and sociology, as well as appropriate content the humanities, mathematics, and natural sciences” (National Council for the Social Studies, 1994, p. vii). The purpose of social studies is to promote competent and productive citizens. According to the National Council for the Social Studies, “the primary purpose of social studies is to help young people develop the ability to make informed and reasoned decisions for the public good as citizens” (p. vii). When technology is integrated into the social studies curriculum, it has the power to influence students’ critical thinking and decision making skills as well as to develop reflective inquiry in order that they learn to function in a democratic society (Berson, 1996; Crowe, 2006; Hammond & Bodzin, 2009).

To help educators enhance citizenship, standards movements within the social studies have embraced efforts to promote students’ exposure to computers as an important technological development that is playing an increasingly pervasive role in American society (Center for Civic Education, 1994; Geography Education Standards
“Within the social studies, computers have served dual roles, as both important instructional tools and as objects that have had a significant effect on the political, social, and economic functioning of American society” (Berson, 1996, p. 1).

According to Crowe (2006) technology can impact democracy and citizenship in at least three ways: a) access to information, b) access to the political process; and c) access to the topics or issues that are debated, discussed, and legislated (p. 111).

**Teaching with Technology**

“Recent advances in technology and access to computers and the Internet have created almost unimaginable opportunities for social studies teachers to use computers in their classroom” (Doppen, 2004, p. 254) in a way that goes beyond basic computer skills to include such things as web searching and publishing, presentation software, and multimedia (Becker, 1991, 1994, 1999; Davis 1997; Hammond & Bodzin, 2009; Milson & Curtis, 2009; Ohler, 2000; White & Hubbard, 1988; Willis, 1997; Zhao, 2001). There is increased support among social studies researchers and educators (Bennett & Pye, 1999; Berson, 1996; Berson & Balyta, 2004; Boyer & Semrau, 1995; Cassutto, 2000; Dils, 2000; Doppen, 2004; Fontana, 1997; Hammond & Bodzin, 2009; Hicks et al., 2002; Larson 1999; March, 2003; Milson & Curtis, 2009; Rice & Wilson, 1999; Rose & Ferlund, 1997; Saye & Brush, 1999; Shiveley & VanFossen, 1999; Whitworth & Berson, 2003; Zukas, 2000) as well as among organizations such as the National Council for the Social Studies (NCSS) and the College and University Faculty Assembly (CUFA) (Hicks et al., 2004; Mason et al., 2000; NCSS, 1994; van Hover, Berson, & Bolick, 2004) for the crucial role of computer-supported instruction in changing teaching and learning in the social studies from a traditional teacher-centered education to a more student-centered
and constructivist education. Through the use of computers, and the technology they provide, social studies education should provide students an education in which high-order thinking, critical thinking, problem solving, and decision-making skills are facilitated.

State of Technology Integration

Despite the near universal availability of computers and Internet access in schools (National Center for Educational Statistics, 2008) some social studies’ teachers continue to resist integrating technology. Widely cited barriers are (a) lack of training in technologies’ effective use (Ehman & Glen, 1991; Gibson & Nocente, 1999; Keiper, Hardwood, & Larson, 2000; Sunal, Smith, Sunal, & Britt, 1998; VanFossen, 2000, 2001), (b) lack of training in how to apply the computer and Internet supported instructional strategies in the classroom (Rice, Wilson & Bagley, 2001; VanFossen 2001), (c) lack of time (Rice et al., 2001; Sunal et al., 1998;), (d) lack of funding (Rice et al., 2001), and (e) teacher reliance on traditional, teacher-centered strategies (Cuban, 2001; Swan, 2004).

Social studies educators need to step into the “new” technological age, one in which students are active participants, technology is not relegated to one hour a week, but threaded throughout the curriculum and where the curriculum emphasizes citizenship and students are involved in the implementation of technology (Clark & Gorski, 2001; Doolittle & Hicks, 2003; Mason et al., 2000; Tapscott, 1998). As Margaret Crocco (2001), past president of CUFA, commented,

I believe the importance of technology lies in its ability to leverage constructivist approaches in the teaching of social studies…The chief value of technology lies, therefore, in providing the leverage so urgently needed for moving social studies
instruction away from passive, teacher-dominated approaches emphasizing recall
and regurgitation toward active student centered forms of learning demanding
critical and conceptual thinking from all students at all levels. (p. 367)

In order for social studies educators to be able to teach with technology they need
to be trained on how to use technology according to the prevailing guidelines and
strategies. Table 3 provides Doolittle and Hicks’ (2003) and Mason et al.’s (2000)
principles that can help guide technology integration strategies in the social studies, as
synthesized by Swan (2004).
Table 3

*Guidelines and Strategies for Effective Technology Use within the Social Studies Classroom*

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<tr>
<td>Strategies for effective technology integration for social studies instruction</td>
<td>Guidelines for using technology to prepare social studies teachers</td>
</tr>
<tr>
<td>1. Teachers and students should be prepared to implement technology as a tool for inquiry.</td>
<td>1. Extend learning beyond what could be done without technology</td>
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<tr>
<td>2. Teachers should use technology to create authenticity, which facilitates the process of student inquiry and action.</td>
<td>2. Introduce technology in context.</td>
</tr>
<tr>
<td>3. Teachers should use technology to foster local and global social interaction such that students attain multiple perspectives on people, issues, and events.</td>
<td>3. Include opportunities for students to study relationships among science, technology, and society.</td>
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<tr>
<td>4. Teachers should facilitate student knowledge construction by using technology to build on students’ prior knowledge and interest.</td>
<td>4. Foster the development of the skills, knowledge, and participation as good citizens in a democratic society.</td>
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<tr>
<td>5. Teachers should embrace the vitality of student knowledge by using technology to provide timely and meaningful feedback.</td>
<td>5. Contribute to the research and evaluation of social studies and technology.</td>
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<tr>
<td>6. Teachers should cultivate students’ academic independence by using technology to foster autonomous, creative, and intellectual thinking.</td>
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*Student Achievement*

While new demands on schools are always emerging, a substantial effort has been made to transform teaching and learning through technology. Every year since 1995, the federal government alone has spent at least $4 billion on technology-related items for
public schools (Anglin, 1995; Arafeh & Levin, 2002; Becker, 2000; Cuban, 2001). The percent of schools with Internet access increased from 35% in 1994 to 100% in 2008 (National Center for Educational Statistics, 2008; Wells & Lewis, 2006). Papert (1980) has argued that computers enable students to take control of their own learning, thus changing the learning dynamic of the classroom. Schacter and Fagnano (1999) found that “students in technology rich environments showed increased achievement in preschool through higher education, and their attitudes toward learning improved consistently when computers were used for instruction” (p. 332).

According to Whitworth and Berson (2003), technology-based learning has the capability to facilitate improvement of students’ decision-making and problem solving skills, data processing skills, and communication capabilities. “Through the computer, students may gain access to expansive knowledge links and broaden their exposure to diverse people and perspectives; hence, affording students the opportunity to become active participants in an increasingly global and interactive world” (p. 1). Papert (1980) and Schacter and Fagnano, (1999) argue that computer technology, when carefully aligned with sound learning theories, can positively impact student learning. Likewise, Vockell and Brown (1992) held that computers can enhance academic learning and improve the effectiveness of instruction by: a) providing immediate feedback to the learner, b) allowing for instruction at an individual pace with specialized modifications to promote mastery learning, c) incorporate interactive exercises, d) facilitate cooperative learning to enhance higher order thinking skills, and e) allow for drill and practice to promote automaticity. Lakkala, Ilomaki, and Palonene (2007) further note that “positive
impact of technology depends on how teachers implement technology in their pedagogical practice” (p. 39).

Preparing Students for Citizenship

The expansion of computer technology in American society has contributed to increased exposure to and greater availability of software, especially in the social studies. With the surge of computers and digital technologies in our everyday lives, the social studies have increasingly focused on preparing students to contribute to this technological age. The result of this technology increase is the steady integration of computer-assisted instruction into the classroom (Berson, 1996). As Crowe (2006) noted in her study of education for democracy in a technological age,

For students to develop into and remain informed citizens who can make reasoned decisions in today’s information rich and computer-dependent world, they must develop the ability to decode and interpret the numeric and narrative information they encounter, develop the ability to evaluate the source of the information, and develop a respect for and desire to hear, and learn ways to find multiple perspectives. (p. 114)

Many social studies educators have argued that preparing students for the responsibility of the office of citizen is in fact the perfect place to let students learn to critically explore their world through the use of interactive technologies (Braun & Risinger, 1999; Cogan, Crossman & Lei, 2000). Having access to up-to-date knowledge resources, archives, and experts via information technology can only benefit a teaching field that understands the important implications for the teaching and learning of social studies from a constructivist perspective (Doolittle & Hicks, 2003; Molebash, 2002).
Even further, educators in the field recognize the importance of allowing students to develop the intellectual skills necessary to critically use primary sources and to work with data sets, while inquiring into past and present issues (Doolittle & Hicks, 2003; Lakkala et al., 2007; Mason et al., 2000; Mehmet, 2005). When educators guide students through ideological websites in order for students to fully understand the discussions, disagreements, and arguments over a particular topic, they are helping students develop the ability to recognize and uncover biases, which is an important skill in becoming an informed citizen (Crowe, 2006, p. 116). As one social studies educator noted,

- I use the computer in my U.S. History course because students like computers.
- Since they like computers, I decided that I needed to integrate the computer technology into my course so that I can gain students’ attention on the first day of class…I want my freshmen and sophomore students to love the study of history as much as I do…I must find a way to engage my students in the study of history so that they will want to read history books, so that historical documentaries on television will interest them, and that later in life they will plan to visit a few historic sites on family vacations. (Hogue, 2001, Opening section, para. 1-2)

**Implementing Technology**

Diem (1999) has suggested that the challenge for the social studies teacher is to find “how to use the new tools and techniques in ways that will increase content understanding and hone the skills needed to effectively use technology” (p. 2). Fontana (1997) warns of the dangers of not implementing technology into social studies education:
Others who know nothing of the discipline will shape these important networking tools without the needs of the social studies in mind. Waiting is also dangerous because current curriculum trends that place great emphasis on reading, writing, and mathematics in the elementary schools, and upon math, science, and technology have led to reduced time, attention, and resources for teaching the social studies. If social studies educators fail to be at the forefront of technology, they risk having parents and policy makers conclude that the social studies are not relevant in the information age. (p. 6)

Technology can help social studies teachers make their classrooms more meaningful and less textbook heavy (Hope, 1996). As Diem (2000) has suggested, technology has so profoundly changed social studies education that researchers have begun to look at newly-emerging pedagogical content and social issues. Much of the social studies research now shows that technology integration offers the opportunity for educators to move away from teacher-centered classrooms to educational settings in which students construct their own knowledge (Crocco, 2001; Crowe, 2006; Dawson, Mason, Berson, & Lee, 1999; Doppen, 2004, Hope, 1996; Lipscomb, 2002, 2003; Mason & Gerler, 1998; Merryfield, 2000; Saye, 2000; White, 1996). Especially when studying history, students now have access to enormous amounts of information that until recently were only available to scholars, which allows them to “do history” by analyzing and interpreting primary documents (Dawson et al., 1999; Dawson, Bull, & Swain, 2000; Hope, 1996; Mason & Carter, 1999; Rice & Wilson, 1999; Saye, 2000; White, 1996).

Constructivist approaches to teaching and learning social studies have been suggested as a way to engage students in higher-order thinking and build communities of
learners in which students have the opportunity to create their own learning outcomes (Dawson et al., 1999; Doppen, 2004, Hope, 1996; Jonassen, 1996; Jonassen, Carr, & Yueh, 1998; Rice & Wilson, 1999; Saye, 2000; Sherman & Hicks, 2000; White, 1999a).

**Social Studies and the Internet**

The literature focusing on technology integration in the social studies favors the use of the Internet with its nearly unlimited collection of sources, and its ability to link individuals and groups over time and space (Berson, Cruz, Duplass & Johnson, 2001; Braun & Risinger, 1999; Scott & O’Sullivan, 2000). Berson et al. (2001) state that, “mastery of the Internet and its resources can greatly enhance the quality of learning experiences in social studies classrooms” (p. v). Becker’s (1999) research suggested that “along with word processing, the Internet may be the most valuable of the many computer technologies available to teachers and students” (p. 32).

As Internet access has increased in K-12 schools, social studies teachers are now able to engage students in more varied learning activities such as accessing information from digital archives, going on virtual fieldtrips, participating in telecollaborative activities, and even creating their own virtual reality projects (Dawson & Harris, 1999; Dawson et al., 1999; Keiper et al., 2000; Mason & Carter, 1999). Going beyond what traditional libraries can hold in print and other media, the web provides access to much of the world’s knowledge.

Teachers and students can access knowledge from all over the world in order to help students think critically and globally and help balance the Americanized knowledge and perspectives that dominate US texts and media (Merryfield, 2007). Chan and Ahern (1999) highlighted the unique opportunities provided by the Internet, particularly noting
the Web offers opportunities for education to revamp itself. Using the Web, teachers can create individualized lessons in order for their students to become motivated and achieve their full academic potential. Schacter and Fagnano (1999) noted that the Internet and other technological advances can revolutionize teaching in such that the planet and all humankind will become the classroom for all students.

Summary

Researchers in the field of social studies stress the role of technology integration in the gathering of written and visual information in order to help students develop multiple and global perspectives, think, analyze, synthesize, and make informed decisions based on the available information they have. Research also reveals that Internet use has become the most accepted technological integration in social studies which might explain the rapid developments and innovations in computer and Internet technologies.

The research literature has found that social studies educators are often reluctant to integrate technology (Ehman & Glen, 1991; Gibson & Nocente, 1999; Keiper et al., 2000; Sunal et al., 1998; VanFossen, 2000, 2001) even though research has repeatedly suggested that computer-supported instruction is the best way to help students develop problem solving skills, critical thinking, high-order thinking, and decision-making skills (Bennett & Pye, 1999; Berson, 1996; Berson & Balyta, 2004; Boyer & Semrau, 1995; Cassutto, 2000; Crowe, 2006; Dils, 2000; Doppen, 2004; Lipscomb, 2002, 2003; Fontana, 1997; Hicks et al., 2002; Larson 1999; March, 2003; Rice & Wilson, 1999; Rose & Ferlund, 1997; Saye & Brush, 1999; Shiveley & VanFossen, 1999; Whitworth & Berson, 2003; Zukas, 2000). Technology integration has the ability to prepare students for the 21st century in order for them to become productive citizens.
Literature Review Summary

Recent research suggests that Americans are geographically illiterate and that there is a need for more and better geography education in our K-12 schools. More than half of all young adults between the ages of 18-24 have a limited understanding of the world beyond the U.S. and appear to think that geography skills are not important (National Geographic Survey, 2006). More disappointing is that more than half of those same students have never had a geography course between grades 6 and 12.

The National Middle School Association (2003) has recognized the need to prepare middle school students for the 21st century. In order to prepare students for the 21st century, educators need to understand the physical, social and emotional needs of their students in order to provide an education best suited to their developmental growth. Middle school is a transition period in the lives of all young adults. It should serve as a guidance period to help students develop effective learning strategies that will take them onto high school, college and help them become informed citizens.

Geography in our K-12 classrooms is vitally important as it helps to create productive and effective citizens who are able to understand the ever-changing global world (ESRI, 2008; Gerber, 2003; National Geographic, 2002). Further research is needed to gain a better understanding of how social studies teachers can integrate geography standards into their curriculum in order for students to better understand the scale and intensity of human interaction with each other and their environment, both past and present.

Historical empathy is a progression that leads to an understanding and explanation of why people of the past acted as they did (Davis et al., 2001; Doppen, 2004; Foster,
Social studies educators are the key component for engaging students in the development of meaningful perspective taking (Davis, 2001). When students are able to empathize with events and people in history, they are able to make better connections with historical content. When teachers allow their students to construct their own interpretations based on multiple perspectives, history tends to become more meaningful and students are better able to remember the past (Crowe, 2006; Doppen, 2004; Grant, 2001; Levstik, 1997; Lipscomb, 2002, 2003; Seixas, 1996; VanSledright, 1996; Yeager & Davis, 1996). Educators should be careful when helping students develop historical empathy as it does not involve imagination, identification, or sympathy. Historical empathy should be taught in a context that “involves an understanding of people’s past actions, a thorough appreciation of historical context through multiple forms of evidence and perspectives, an examination of students’ own perspectives, and encouragement of well-grounded but tentative conclusions” (Foster, 2001, 168).

Geographic Information Systems (GIS) are becoming increasingly important in the lives of everyday citizens (Hammond & Bodzin, 2009) and educators are finding GIS programs to be powerful tools for helping students develop geography skills and understand multiple perspectives. Geography is more than learning the names of state capitals. Teaching geography means focusing on human-environmental interactions, and the movement of people, goods, and ideas through space (Levstik & Barton, 2001). Therefore, when GIS programs are integrated in the social studies curriculum, regardless of content, they provide students with the opportunity to examine past and present relationships among places, cultures, and people, as well as focus on human-
environmental actions, the movement of people, goods, and ideas through space (Levstik & Barton, 2001, p. 10). Through the use of GIS, social studies educators are able to incorporate all NCSS curriculum standards into their curriculum (Hammond & Bodzin, 2009), improve a student’s sense of existence, and help him or her develop spatial literacy. Very little is known about the connection between geographic literacy and historical empathy. This study sought to make a contribution to the virtually non-existent research literature on the connection between geography and history in order for students to develop geographic literacy and historical empathy.

GIS provides social studies educators the opportunity to demonstrate how most of the world’s people are connected in some form or fashion (ESRI, 2008). When students use Google Earth they are able to access a free Internet-based GIS program from outside the school where learning is student-centered (Patterson, 2007). Google Earth, like other GIS programs, has the potential to help students understand and recognize the world from above and how geography and history are intertwined.

Middle school students in grades 6 through 8 need a curriculum that is student-centered, relevant, challenging, integrative, and exploratory (NMSA, 2003). The integration of technology in a middle school social studies classroom meets this need. As Spires et al. (2008) suggest middle school students use technology (e.g., Webs, cell phones, gaming, etc.) on a daily basis and are motivated to learn when technology is integrated into their schoolwork. Unfortunately, many middle school students find school to be a place that often restricts their technology use.

When technology is integrated into the social studies curriculum, teachers are provided with unimaginable opportunities to link students to the rest of the world to
foster local and global interaction, allowing them to attain multiple perspectives on people, issues, and events (Becker, 1991, 1994, 1999; Crowe, 2006; Davis 1997; Doolittle & Hicks, 2003; Doppen, 2004; Gut, 2009; Lipscomb, 2002, 2003; Mason et al., 2000; Ohler, 2000; White & Hubbard, 1988; Willis, 1997; Zhao, 2001). The literature also reveals that in spite of the availability of computers and Internet access in schools (National Center for Educational Statistics, 2008), social studies teachers are reluctant in using computer-supported instruction (Bagley, 2001; Cuban, 2001; Ehman & Glen, 1991; Gibson & Nocente, 1999; Keiper et al., 2000; Rice et al., 2001; Sunal, et al., 1998; Swan, 2004; VanFossen, 2000, 2001).

This review of the literature has identified the aspects of human learning that best provide guidance for the teaching of middle school social studies and the integration of technology to foster geography literacy. It suggests that best teaching focuses on building on what students already know, accommodating diverse skills and abilities, and drawing upon their individual learning styles (Jonassen, 2000; NMSA, 2003). Technology integration provides students with the opportunity to utilize what they know in a structured classroom, to explore and construct knowledge, as well as build skills that will prepare them for the 21st century. There is a need for new practical research on the use of GIS programs, such as Google Earth, in the social studies classroom and the power these computer-supported methodologies can have on developing students’ geographic literacy and historical empathy.
CHAPTER 3: METHODOLOGY

Introduction

The primary purpose of this study was to determine whether the Internet-based Geographic Information System (GIS) program Google Earth can be used as an effective tool to develop middle school students’ geographic literacy and historical empathy by establishing a deeper understanding of the relationship between geography and history.

The research questions guiding this study were:

1. How does the use of the Internet-based GIS program Google Earth in a middle school social studies classroom affect students’ geographic literacy and development of historical empathy?
2. What is the teacher’s role when using the Internet-based GIS program Google Earth for instruction in the classroom?
3. What background factors are related to student learning outcomes as defined in this study?
4. What benefits do students report when using the Internet-based GIS program Google Earth?

Methodology

Rationale for Mixed Method Design

Qualitative research broadly means to understand the meaning of human action (Schwandt, 2001). Merriam (1998) defines qualitative research as “an umbrella concept covering several forms of inquiry that help us understand and explain the meaning of social phenomena with little disruption of natural setting as possible” (p. 5). The best known representations of qualitative research studies are those that “employ the
techniques of participant observation and in-depth interviewing” (Bogdan & Biklen, 1998, p. 2). “Qualitative researchers set up strategies and procedures that enable them to consider experiences from the informants’ perspectives” (Bogdan & Biklen, 1998, p. 2). Even further, qualitative research provides researchers with the opportunity to develop a better understanding of the subject matter at hand (Denzin & Lincoln, 2000).

While qualitative research was the primary research method used in this study, it also used descriptive statistics based on a student survey. This mixed method approach was used to supplement the researcher’s interpretive analysis of the interviews and observational data.

In order to collect data from different perspectives and be able to compare the findings from different settings, this was a multi-case study. A multi-case study is conducted “when two or more cases studies are done and then compared and contrasted” (Bogden & Biklen, 1998, p. 62). There were two reasons for selecting three different seventh grade social studies classrooms for this study. The first reason was that the setting might have a significant impact on the findings. For instance, limited computer availability or technical support in a school may impact a teacher’s decision about how to integrate Google Earth into the curriculum. The second reason for utilizing a multi-case approach was that it allows for a comparison of participants’ perspectives, ideas, and classroom practices.

*Investigator Bias*

While I conducted the present study, I was an advocate for technology use in the social studies classroom, but at the same time, aware of possible pro-innovation bias. Bias on the part of the researcher can be a limitation as one contends with predisposed
attitudes and opinions. Bogdan and Biklen (1998) suggest the qualitative researcher should keep this limitation in mind and be concerned about how his or her own subjectivity can influence the results and outcomes of studies. Bogdan and Biklen (1998) suggest the researcher should, “…objectively study the subjective states of their subjects” (p. 33). Such advice was followed. The following section outlines the steps I took to ensure data collection was objective and free of researcher bias. I attempted to convey the idea that technology is only a tool that can support teachers and is not a panacea that will solve all of education’s problems.

Trustworthiness

Researcher trustworthiness was crucial for this study. Qualitative data analysis requires close attention to the issues of validity to strengthen and develop the internal validity of the research. I increased trustworthiness by building a case for credibility, transferability, dependability, and conformability (Lincoln & Guba, 1985). The next sections detail how these four major issues were addressed.

Credibility

Three major activities were incorporated to support the probability of credible findings: prolonged engagement, persistent observations, and triangulation (Lincoln & Guba, 1985). To ensure credibility, I engaged in a prolonged engagement with the teachers and students. Time spent in the field allowed for rapport to be established with the teachers and students in order for them to tell me “anything without prompting my favor or disfavor with regard to the content of his or her response” (Patton, 2002, p. 365). In order to gain this comfort status I visited the classroom approximately two to three
times a week at the same times and days prior to the study in order to gain acceptance and not be seen as a “stranger”.

As Lincoln and Guba (1985) define, “the purpose of persistent observation is to identify those characteristics and elements in the situation that are most relevant to the problem or issues being pursued and focusing on them in detail” (p. 304). Persistent observations were focused on in order to provide depth to the study. Persistent observation allowed me to find depth and focus on my research questions, yet also allowed me to avoid closing myself off from other events in the classroom.

Finally, triangulation (Lincoln & Guba, 1985; Denzin & Lincoln, 2000) incorporates multiple sources of data types that support each other in a study. To support the triangulation of the data types, interviews, observations, document analysis and field notes were utilized and collected in this study in order to provide multiple sources of data. Observing and interviewing teachers and students in three different school districts, in three different counties in Southeast Ohio helped make the data more authentic as it allowed for a comparison of each participants’ perspectives, ideas, and classroom practices.

**Member Checking**

I also built credibility through member checking in order to clarify researcher interpretations (Lincoln & Guba, 1985). As Lincoln and Guba (1985) emphatically state, the member check, “whereby data, analytic categories, interpretations, and conclusions are tested with members of those stake holding groups from whom the data were originally collected, is the most crucial technique for establishing credibility” (p. 314). To provide an additional outside look at the data analysis I consulted with members of
my dissertation committee in an effort to increase greater objectivity and reduce researcher bias.

Credibility was also built by keeping a log that contained not only the descriptions of what I observed but also noted my own “feelings, reactions to the experience, and reflections about the personal meaning and significance” (Patton, 2002, p. 303).

Transferability

While credibility is an important part of qualitative research, it is equally important to establish transferability. No qualitative study can directly transfer to another situation, yet categories or themes might be able to transfer to other situations similar to the ones encountered in the study (Creswell, 2005). This potential transferability lies in the description of the research situation. The researcher must provide a “thick description necessary to enable someone interested in making a transfer to reach a conclusion about whether transfer can be contemplated as a possibility” (Lincoln & Guba, 1985, p. 316). For this purpose I have provided details and rich descriptions that will be helpful to others in their discretion towards transferability.

Dependability

In defining credibility, Lincoln and Guba (1985) also refer to dependability as the need for an “overlap” (p. 316) of data to ensure stability. In this study there were multiple ways in which overlap occurred. The researcher kept all records in order to create an audit trail that includes all the notes taken throughout the study, surveys, transcripts of the interviews, and notes of the developing themes and codes. The review of the research and theoretical perspectives detailed in Chapter Two were used to support
the research process, data analysis, and the development of findings. This process allowed for an overlap of the research throughout the development of the study.

Confirmability

Lincoln and Guba (1985) compare confirmability to objectivity. The findings need to demonstrate neutrality in interpretations (Hoepfl, 1997) rather than pre-conceived researcher notions or pre-determined positions.

Investigator Qualifications

While I am by no means an expert technology user, I have made numerous attempts to incorporate technology into my classroom during my five years of middle school teaching. I have used everything from video clips and WebQuests to Podcasts in my seventh grade social studies classes. I have taken a number of technology classes as part of my doctoral program and engaged in other studies such as how to use technology to prepare students for the Ohio Graduation Test, to enhance student self-efficacy, and use the Internet to explore the Silk Road. These studies explored the impact that technology can have in the social studies classroom. Furthermore, I have presented at both the National Council for the Social Studies and the Ohio Council for the Social Studies annual conferences on technology integration in the social studies. Through classroom teaching and university experiences, I believe that I am qualified to support social studies classroom teachers in their use of Google Earth in order for their students to develop historical empathy.

Participants and Setting

Participants and sites were selected based on “purposeful sampling” in which I “intentionally selected individuals and sites to learn or understand the central
phenomenon” (Creswell, 2005, p. 204). Patton (2002) states that, “information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the inquiry. Studying information-rich cases yields insights and in-depth understanding rather than empirical generalizations” (p. 230). Each participant was a seventh grade social studies teacher who used technology in his/her social studies classroom and/or was interested in incorporating other technologies into the curriculum.

One teacher, who participated in this study I worked with during the preceding school year, expressed an interest in participating during preliminary discussions of implementing Google Earth into the social studies classroom. In order to attain the other two teachers, I contacted them via email explaining my research and asking them whether they were interested in my study. They both consented and we tentatively planned for a data collection time.

Prior to the start of this study and in compliance with the university’s research protocol, I contacted each participant’s superintendent and principal to seek formal permission for each teacher to participate. The letter of consent assured each teacher’s anonymity, assured that all collected data would be kept confidential, and established that their participation or non-participation in the study would have no effect whatsoever on any evaluation of their professional performance (Appendix A). In addition, the students’ parents received a letter of consent to request formal permission for their child to participate in the study (Appendix B). This letter of consent assured each student’s anonymity, promised that all collected data would be kept confidential, and established that participation or non-participation would have no effect whatsoever on their child’s grade in the course (Appendix C). The selected participant teachers for this study were
two Caucasian males and one Caucasian female. All three participating teachers taught in a public middle school located in Southeast Ohio. Years of teaching experience varied among the participants from two to ten years. To protect their identity, each participating school, all teachers and students were assigned a pseudonym.

**Schools**

The three schools in this study were located in three different counties and school districts. Aspen Middle School is a rural school that serves a community with a population of approximately 5,000 people (Public School Review, 2009). The school serves students six through eighth grade. At the time of this study, Aspen Middle School enrolled a total of 383 students; 140 of those students were in the seventh grade (Public School Review, 2009). According to the Ohio Department of Education 2008-09 school year report card (ODE, 2009c) 95.3% of the total student population was White and 3.2% Multi-Racial with students coming from families with a median income of $35,051 (Public School Review, 2009). Aspen Middle School is a Title I school, 49.2% of the students qualified for a free or reduced lunch (Ohio Department of Education, School report card 2008-09). “Title I schools are schools in low income areas that receive extra federal funding to pay for reduced or free lunches, before or after school tutoring programs, and improvements to schools” (Local School Directory, 2010, para. 3).

Madison Middle School is a rural school that serves a community with a population of approximately 6,500 (Public School Review, 2009). The school serves students six through eighth grade. At the time of this study it enrolled a total of 455 students; 130 of those students were in the seventh grade (Public School Review, 2009). According to the Ohio Department of Education 2008-09 school year report card (ODE,
2009d), 96.7% of the student population was White, with students coming from families with a median income of $26,492 (Public School Review, 2009). Madison Middle School is a Title I school and 67.5% of the students qualified for a free or reduced lunch (ODE, School report card 2008-09).

Hillsdale Springs Middle School is the largest of the three rural schools that participated in this study. Hillsdale Springs Middle School is a school that serves a community with a population of approximately 17,700 (Public School Review, 2009). The school serves students six through eighth grade. At the time of this study it enrolled a total of 937 students; 309 of those students were in the seventh grade (Public School Review, 2009). According to the Ohio Department of Education 2008-09 school year report card (ODE, 2009e), 98.7% of the total student population was White with students coming from families with a median income of $32,363 (Public School Review, 2009). Hillsdale Springs Middle School is a Title I school and 52.5% of the students qualified for a free or reduced lunch (ODE, School report card 2008-09 school year).

Teacher # 1

Laura Meyer at Aspen Middle School has been teaching social studies at for ten years. Laura became a teacher because,

My first grade teacher had such an impact on me and she made learning fun, and coming to school fun and I wanted to follow in her footsteps and do that for my students. My philosophy on education is to just try to make every learning experience fun for my students and hopefully they can carry that with them and it will help them to become life-long learners and hopefully later on in life that will make a difference to them somehow. (Interview, Mrs. Meyer, 12/17/10)
Mrs. Meyer taught six 43 minute periods of seventh grade social studies and had one study hall. There were approximately 26 students in each of her seventh grade social studies classes.

*Teacher # 2*

Tim Brown, at Madison Middle School, is in his first year teaching social studies. Tim became a teacher because,

> A couple of different reasons why I decided to become a teacher. Well, to be honest, I wanted to be a teacher while I was going through school in Junior High and High School, believe it or not, but I didn’t think I had the confidence through those years and I never thought it was going to be a possibility because I just didn’t have the confidence. As I was going through college to get my history degree, I realized that I had gained a bit of confidence and I realized that I was able to do those things and even though I thought that teaching was going to be hard I decided that was the way I wanted to go. Part of the reason was because I see a lot of the problems that we have in society and the struggles that these kids have to go through are a lot of the things that I had to do growing up and I wanted to be a positive role model to show them that they can get out it and make a difference in their lives. (Interview, Mr. Brown, 12/18/10)

Mr. Brown taught six 43 minute periods of seventh grade social studies and one class of reading intervention. There were approximately 22 students in each of his seventh grade social studies classes.
Teacher # 3

Nicholas (Nick) Marcum at Hillsdale Springs Middle School had been teaching social studies for two years. Nick became a teacher because,

I’m not sure if there is any one thing that ever pointed me in that direction.

Growing up I was involved in Boy Scouts and 4-H and I guess I always had a lot of good role models that were teachers and I guess in those programs I had the opportunity as I got older to help out the younger kids too and I always enjoyed that. Plus the whole schedule was a plus also. That is not the main reason why I did it, but it didn’t hurt. (Interview, Mr. Marcum, 12/16/10)

Mr. Marcum taught six 43 minute periods of seventh grade social studies and had one study hall. There were approximately 30 students in each of his seventh grade social studies classes. Table 4 provides descriptive demographic information for each school that participated in this study.
Design of the Study

Collecting Data

Data collection for this study included documents created in the classroom and observations in the participants’ classrooms at each of the three school sites from January through March 2010. Each of the three teachers participated in an interview prior to the beginning of the study as well as after the completion of the lesson unit that included Google Earth. Furthermore, using purposeful sampling, six students at each school were selected to participate in a post-interview about their use of technology, Google Earth, geographic literacy, and historical empathy. All students whose parents signed a consent form completed a pre- and post-survey.

Table 4

Participants and Field Sites

<table>
<thead>
<tr>
<th>Teacher</th>
<th>School</th>
<th># of students in school (grades 6-8)</th>
<th>School Demographics</th>
<th>N</th>
<th>Economically Disadvantaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laura Meyer</td>
<td>Aspen Middle School</td>
<td>383</td>
<td>95% White Non-Hispanic</td>
<td>44</td>
<td>49.2%</td>
</tr>
<tr>
<td>Tim Brown</td>
<td>Madison Middle School</td>
<td>455</td>
<td>97% White Non-Hispanic</td>
<td>47</td>
<td>67.5%</td>
</tr>
<tr>
<td>Nick Marcum</td>
<td>Hillsdale Springs Middle School</td>
<td>866</td>
<td>98.7% White Non-Hispanic</td>
<td>52</td>
<td>52.5%</td>
</tr>
</tbody>
</table>
Document Analysis

Throughout the course of this study I collected teacher-generated items including lesson plans, course syllabi, classroom activities, handouts, readings, and assessments of student work. I also collected documents created by the students during class time to provide additional insights into their understanding of history and geography.

Interviews

At the beginning and end of the study, each of the three teachers participated in a structured interview (Fontana & Frey, 2000). Each was asked the same questions (Appendix D & E). According to Bogdan and Biklen (1998) interviews provide participants the opportunity to talk freely about their points of view. “Good interviews provide rich data filled with words that reveal the respondents’ perspectives” (p. 95). Each interview took place at the participant’s school at a time and place (i.e., teachers lounge, classroom, etc.) chosen at their convenience. Each interview lasted approximately one hour and explored the teachers’ reasons for becoming a teacher; their personal understandings of historical empathy and geographic literacy; their assessment of how to use computers to teach social studies, especially geography; and their understanding of Geographic Information Systems (GIS). Each interview was audio taped, transcribed, analyzed, and then destroyed. Reflective field notes (Bogden & Biklen, 1998) were taken immediately after each interview was completed and subsequently transcribed in narrative format to include the interviewees’ mannerisms, facial expressions, as well as the researcher’s thoughts, ideas, patterns, or guesses since “personal experiences and insights are an important part of the inquiry and critical to understanding” (Patton, 2002, p. 40).
In addition to the teachers being interviewed, six students from each school were selected to participate in a post-interview. A purposeful sampling method was used to select the students. According to Merriam (1998), purposeful sampling is based on the notion that the researcher wants to discover, understand, and gain insight, and therefore must choose a sample from which the most can be learned. The selection of the post-interviewees was based on the students’ enjoyment or lack thereof in using Google Earth. In consultation with each social studies teacher, I chose two students from each school who appeared to enjoy using Google Earth, two who appeared neutral or indifferent, and two who appeared not to like using Google Earth.

Each of the respondents was individually interviewed and asked the same series of pre-established questions (Appendix F). Each interview lasted approximately 40 minutes and explored the student’s understanding of historical empathy, geographic literacy, his or her computer use in and out of school, his or her views on using computers in social studies, and his or her understanding of Geographic Information Systems (GIS).

The interviews took place immediately after the students completed their Google Earth lesson in a dedicated location within the school (i.e., the teacher’s lounge, conference room, etc.) chosen by the researcher. Each interview was audio taped, transcribed, analyzed, and then destroyed. Again, field notes were not taken during the interview in order for me to give full attention to the interviewee. However, reflective field notes (Bogden & Biklen, 1998) were taken immediately after the interview was complete.
Survey

At the beginning and the end of the Google Earth lessons/activities, all students who turned in consent letters signed by their parents completed a survey about the use of Google Earth in their social studies classroom (Appendix G). This survey was conducted anonymously. The pre-study survey was given on a date determined in consultation with the participating teacher prior to the teacher and student’s use of Google Earth and lasted approximately 10 minutes. The post-survey was given to the students the day after they completed the Google Earth project. Completion of the post-study survey lasted approximately 10 minutes.

The pre- and post-study survey used a five-point Likert scale. Available choices included 1 = Strongly disagree, 2= Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree. Sample items included: “I like social studies,” “Computers make learning more interesting” and “I think learning geography/history is a very important subject to learn in school”. Students were also asked how often computers were used in their social studies classes and whether they are more motivated to learn social studies when it involves using computers. Finally, the students were asked about their use of Google Earth, any barriers to using Google Earth, and their ability to apply Google Earth to what they were learning in history.

Observations

This study included observations from January through March 2010 at each of the schools. In consultation with the teachers, I established a regular visitation schedule to observe on the same days, and during the same times and class periods. My position in the classroom altered between being an observer in order not to interfere with the
students or activities under observation (Angrosino & Perez, 2000) and being a participant-observer. As Clifford (1988) has written, the role of participant-observer requires a careful balance between the inside and outside of events. The participant-observer must place him or herself within the context of the event he or she attempts to understand the specific circumstances of particular events but must also be able to step back and “situate those meanings in wider contexts” (Clifford, 1988, p. 34).

During my observations I positioned myself in the back of the classroom or computer lab in order to have minimal interaction, but was available to help both the teacher and students when prompted. While in the back of the classroom I was able to take careful observation notes. According to Bogden and Biklen (1998) field notes are a critical component of participant observation studies. In order for a study to be successful, field notes should be “detailed, accurate, and extensive” (107). Richardson (2000) and Bogden and Biklen (1998) assert that observation notes using thick, rich description are an important part of qualitative research as they provide concrete, detailed, and fairly accurate renditions of what was seen, heard, and felt. The descriptive field notes were handwritten and dated (Patton, 2002) in a notebook during observations and represented the researcher’s best efforts to objectively record the details of what was occurring in the field.

According to Bogden and Biklen (1998) there are two types of field notes, descriptive and reflective. There were also six aspects of descriptive notes (Bogden & Biklen, 1998) the researcher followed throughout the study: a) portraits of the subjects, b) reconstruction of the dialogue, c) description of the physical setting, d) accounts of particular events, e) depiction of activities, and f) observer’s behavior. “The reflective
field notes will reflect a more personal account of the course of inquiry that will emphasize speculation, feelings, problems, ideas, hunches, impressions, and prejudices” (Bogden & Biklen, 1998, p. 123). The reflective notes were taken immediately after leaving the observation site in order to capture my thoughts, ideas, patterns or guesses regarding the lesson and the study as a whole (Patton, 2002).

Analyzing the Data

Prior to the start of this study I created a provisional list of codes (Miles & Huberman, 1994) from the conceptual framework, list of research questions, and the key variables (Basit, 2003). After the data was collected, I read through it twice, as suggested by Bogden and Biklen (1998), to modify the preliminary coding categories of words, phrases, patterns of behavior, and subjects’ ways of thinking, and events that repeated and stood out. The preliminary codes served as a guide to modify or recreate more specific codes (Bogdan & Biklen, 2003; Creswell, 1998).

Glaser and Strauss’s (1967) *Grounded Theory* served as a guide for further coding processes which consists of open, axial, and selective coding, as advanced by Corbin and Strauss (1990). Open-coding allowed me to identify and categorize initial concepts that emerged from the data (Creswell, 1998). The intent of this process was to move the concepts from very general to more specific (Bogdan & Biklen, 2003; Creswell, 1998). The axial coding served to align and interconnect the data (Creswell, 1998). Finally, after the open-and axial coding was completed, I used selective coding to refine the categories in order to examine the relationships among the categories (Creswell, 1998). Member checks were completed with each of three teachers as themes emerged. Email and personal communication with the teachers was used in order to clarify a statement or
observation in order to confirm emerging themes. The goal of *Grounded Theory* data analysis is to find themes in order to explain the findings (Glaser & Strauss, 1967).

I triangulated my findings by relying on field notes, interviews, and documents collected throughout the course of the study in order to clarify meaning and to verify the repeatability of an observation or interpretation (Stake, 2000). Patton (2002) suggests using a variety of data sources as they can best assist a researcher in obtaining more valid results. Rather than be limited to one data set which can be susceptible to errors, multiple data sets allow for “cross-data validity checks” (p. 248). The data was triangulated using quantitative and qualitative measures to clarify meanings by identifying the various ways something can be seen (Stake, 2000). By comparing multiple data sources, I sought to find similarities and differences.

The analysis of the student surveys included the limited use of a descriptive statistical methodology. This analysis served to quantify some of the students’ attitudes towards social studies, computer use in and out of school, and their understanding of the concept of geographic literacy and historical empathy. Each school district’s report card was also used to analyze school performance data.

*Validity*

I ensured validity by using multiple sources of data and multiple researchers (Stake, 2000). In this study, multiple sources of data were used that included interview transcripts, field notes, documentations, and survey results.

*Pilot Study*

A pilot study aided in the development of this study. I carried out a single case study to explore the experiences of seventh grade students using Google Earth in a
seventh social studies classroom, the same grade level that was used in the research study. The school chosen for the pilot study was located in Southeast Ohio and was similar in size, 475 middle school students (Public School Review, 2009), to the three schools chosen for the study. The pilot school differed from the three schools chosen for the study only in that it was not considered to be as “economically disadvantaged” (39%) and was slightly more culturally diverse (88% White non-Hispanic, 5% Asian, 3% Black).

The context of this pilot study, while very similar to the classes for the proposed study, differed in three ways; the pilot study was with seventh grade students from a different school district, Google Earth was used for only two days, and both days I taught the lessons to all seventh grade social studies students. The first day involved an “introductory course” in using Google Earth. The second day involved the students actively using Google Earth themselves. The pilot data included interviews with two students, an interview with the classroom teacher, and observations of the students.

The interviews were recorded and transcribed after the study. The findings from the pilot study were used to revise the survey instruments and identify initial themes that might arise from the data.

Using Google Earth

On the first day of the pilot study, the students met in the school’s computer lab. I started each lesson by asking the students how many of them had ever used Google Earth? To my surprise only a handful of students in each class raised their hand. I then explained that Google Earth is a Geographic Information System that is available free to them and could be downloaded anywhere in the world. Since many of the students had
never used Google Earth, I asked each student to log on to his/her own computer and open up Google Earth. I explained how to use the direction buttons, search for locations by name, street address, or latitude and longitude, use the ruler to measure distances, overlay lines of latitude and longitude, change sunlight based on time of day, view the Earth, sky, or Mars, and how to turn on or off various layers, i.e., 3D Buildings, Street View, terrain, etc.

One of the challenges I found was that many of the students had a hard time following directions because they became too focused on zooming in and out of places or searching for various locations. Another challenge that presented itself was that many of the students had turned on too many “layers” causing their computer to crash or slow down. Students also became frustrated with the amount of choices provided in the layers. However, as the day proceeded, I limited the amount of layers students were allowed to turn on to Borders and Labels, 360 Cities, Webcams.travel, Roads, Street, Gigapxl Photo, National Geographic Magazine, and terrain. By limiting the number of layers, students were less likely to become frustrated with the images they were viewing and their computers ran more smoothly.

As the students learned how to use Google Earth, I walked around the classroom observing them and taking notes on their reactions and comments. Many of them were very interested in the images they were able to see from around the world as I heard them say things like, “COOL!” “This is awesome”, “Hey, I can see the Egyptian pyramids from all angles,” and “Can we do this again tomorrow?”

On the second day, I started the lesson by asking how many students had gone home and played around with Google Earth. Many of the students raised their hand and
shared with the class where and what they had explored. I asked the students who did not raise their hand why they didn’t explore Google Earth when they got home? Many of the students responded by saying they didn’t have a computer, they didn’t have Internet service at home, they had dial up Internet that took too long for them to download the program, and one student said her mom would not allow her to download Google Earth because her mother was unfamiliar with the program.

Next I divided the students into pairs or small work groups in which they were required to select a famous ancient city, landmark, ruin, or a natural wonder, that they had studied in their seventh grade social studies classroom. Once they had selected their famous city, landmark, ruin, or a natural wonder I asked them go to that location on Google Earth. Once they were at their location I taught them how to create a “place mark” on Google Earth. On their “place mark” they were to add a description of their location using the geographic features that surrounded their location (i.e., major rivers, deserts, mountains, etc.). Using their textbook or class notes, students were to provide historical information about their famous city, landmark, ruin, or a natural wonder. They were to describe changes they thought might have occurred in the physical characteristics of the region and why they thought their civilization was located in that particular place.

Once the students wrote their description, they were required to add a picture of what they thought their famous city, landmark, ancient ruin, or a natural wonder looked like in history. They were allowed to use photos that were hand-drawn and scanned into an electronic file. They also had the choice of finding a photo on the Internet.

One of the challenges I found during the lesson on the second day was that there was not enough time for the students to complete their “place marks”. Students also
spent too much time selecting and negotiating with their partner which famous city, landmark, ancient ruin, or a natural wonder they would choose. They also spent the majority of their time looking for photos rather than describing the changes in the physical characteristics of the region.

As the day progressed, the cooperating teacher suggested that I have students work independently in order to cut time on negotiating with their partners which historical location they were going to look up. I selected a location for them to practice placing their “place mark”, and I limited their pictures to ones that were found on the Internet using Google Images. The students again were impressed with the images Google Earth provides of the historical locations they had discussed in their social studies text. Many of the students commented “Wow, it really looks like the picture in our textbook!” or “That is not at all what I pictured the Sahara Desert to look like!” or “This is so cool!”, and “This is a lot of fun!”. Several students also commented that they, “Did not understand what they were supposed to look up” or “How to write a description of how the physical features have changed over time.” One student even commented to a friend that, “This is stupid”. Upon completion of the second lesson, many of the students asked their classroom teacher if they could use Google Earth again in future lessons.

Pilot Survey

Upon completion of the Google Earth pilot study 20 seventh grade social studies students completed the post-study survey with to determine: a) their perceptions of the questions (relevance, suggest additional questions), b) clarity, and c) the approximate amount of time it would take to complete the survey.
The post-study survey used a five-point Likert scale. Available choices included 1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree. Sample responses included: “I like social studies,” “Computers make learning more interesting” and “I think learning geography/history is a very important subject to learn in school.” Students were also asked how often computers were used in their social studies classes and whether they are more motivated to learn social studies when it involves using computers. Finally, the students were asked about their use of Google Earth, any barriers to using Google Earth, and their ability to apply Google Earth to what they were learning in history.

The survey took the students 20 minutes to complete. Four respondents mentioned problems with the verb *believes*. They thought it referred to their religious beliefs and suggested changing the verb. In revising of the survey, I decided to make the suggested changes in the final draft to *thoughts*.

Two respondents mentioned problems with questions that involved using a computer at home or having Internet service. They neither had a computer at home nor the Internet and could not accurately answer the question using the Likert scale. In consultation with committee members I added a ‘yes’ or ‘no’ response rather than the Likert scale. If ‘no’ was the respondent’s choice he/she was instructed to skip to a specified question as indicated in the survey.

Three respondents had a problem with the verb *barrier* as they did not know what the verb meant in context with the question. Upon review of the question, I changed the item to “Nothing blocks me from using computers at school”.
Three respondents had a problem with the question that stated *I have Internet service at home that is NOT dial-up*. The respondents did not understand the question item and after review of the survey I changed the question to *I have fast Internet service at home*.

The initial review of the pilot study data indicated that the survey items provided data that was relevant and sufficient to adequately answer the research questions.

*Pilot Interview Questions*

Individual interviews were conducted with the participating teacher and two randomly-selected students from different class periods. The teachers’ pre- and post-interview each took about 40 minutes to complete and were audio taped to ensure accuracy. The respondent did not have any issues with the wording of the questions.

The student post-interviews took 45 minutes each and were audio taped to ensure accuracy. Both students were relaxed and open during the interview and did not hesitate to ask for clarification when necessary. The students did not have any issues with the wording of any of the questions. The review of the data from the pilot interview questions indicated that the interview questions were relevant and sufficient to adequately answer the research questions.

Summary

The purpose of this mixed-method study was to determine whether the Internet-based GIS program, Google Earth, can be used as an effective tool to enhance middle school students’ geographic literacy and historical empathy. Sources of data collection included a pre- and post-study survey, classroom observations, teacher and student
documents, and in-depth interviews. Both qualitative and quantitative methods were used to collect and analyzed the data.
CHAPTER 4: FINDINGS

Introduction

Transporting oneself into the distant past necessitates careful navigation between the familiar and unfamiliar. As Wineburg (2001) states, “the tension between the knowing present and unknowing past functions as ‘an unnatural act’ that stretches our minds to conceptualize foreign people, places, and societies” (p. 3). Historical empathy demands a form of creativity in which one assumes a world far removed from his own. As Ricouer (1980, 1984) clarifies, exploring the past solely on its own terms may limit one’s ability to perceive the full impact of events, people, and movements over long periods of time. Although the development of mature historical thinking requires planning, persistence, and effort on the part of both the teacher and the student, the endeavor exists as a noteworthy achievement (Davis, 2001).

This chapter addresses the research questions based on the findings from both quantitative as well as qualitative data. Its purpose is to present the findings of this study as they relate to whether the Internet based GIS program Google Earth can be used as an effective tool to develop middle school students’ geographic literacy and historical empathy by establishing a deeper understanding of the relationship between geography and history. The research questions guiding this study were:

1. How does the use of the Internet-based GIS program Google Earth in a middle school social studies classroom affect students’ geographic literacy and development of historical empathy?

2. What is the teacher’s role when using the Internet-based GIS program Google Earth for instruction in the classroom?
3. What background factors are related to student learning outcomes as defined in this study?

4. What benefits do students report when using the Internet-based GIS program Google Earth?

Participants

Three seventh grade social studies teachers at three separate schools in Southeast Ohio agreed to participate in this study: Aspen Middle School, Madison Middle School, and Hillsdale Springs Middle School. A total of 143 seventh-grade students participated in a pre- and post-survey. In addition, I conducted 18 separate student interviews, six at each school. The teachers were interviewed prior to and after the use of Google Earth. I also observed the teachers’ and students’ use of Google Earth at school by attending their classes and observing their use of Google Earth.

Use of Google Earth

Google Earth was used in each of the three classrooms for a period of three months. The use of Google Earth in each classroom varied from school to school. Nick Marcum at Hillsdale Springs Middle School was the only teacher in this study who had regularly used Google Earth in his social studies classroom prior to participating in this study. Tim Brown at Madison Middle School had used Google Earth in his classroom at least once prior to this study, and Laura Meyer at Aspen Middle School had never used Google Earth in her classroom. In an effort to help the three teachers integrate Google Earth into their classrooms I met with each prior to implementing Google Earth and discussed ways it could be used in their classroom. Even though Mrs. Meyer had never used Google Earth, she spent a few days (less than an hour each day) “playing around
with Google Earth and quickly figured it out” (Mrs. Meyer, Interview, 1/12/10). In addition, Mrs. Meyer had a student teacher (Mr. Derek Carlyle) during the time of the study that was familiar with using Google Earth. In an effort to have the students use Google Earth, each teacher requested a lesson plan which was provided by the researcher (see Appendix H), however, each teacher adapted the lesson to meet the needs of his/her students and scheduled classroom time.

While the use of Google Earth varied, each teacher throughout this study used Google Earth at least once a week. Mr. Marcum, however, in addition to using Google Earth at least once a week, used Google Earth every day during an entire week for a geography unit, based on non-western history.

Towards the end of the study, two of the teachers required their students to complete a project using Google Earth that took three days of classroom time. The project provided an environment in which students personally used Google Earth to gain a global perspective on why past civilizations “did what they did”. In addition, students analyzed the geography surrounding a ruin or historical landmark and how it might or might not have affected the development of a civilization. Mr. Marcum however, was unable to have his students use Google Earth to complete a project similar to the other schools in this study due to a lack of infrastructure in the student computer labs.

The Students

All 18 students, nine girls and nine boys, who participated in the interviews were Caucasian. Five students participated in their school’s Special Education program and two students participated in a Talented and Gifted Program. All interviews were scheduled in advance on a date and time convenient to the student and his or her teacher.
All students were interviewed in a location (teachers’ lounge, an empty classroom, or a conference room) within their school that was quiet, free of distraction, and allowed them to talk openly. All 18 students were relaxed and open during the interviews and did not hesitate to ask for clarification when necessary.

Quantitative Results

In order to examine differences in students’ development of geographic literacy and historical empathy when using the Internet-based GIS program Google Earth, a Likert scale pre- and post-study survey was administered to 143 students (10 students were removed from the original data set because they were either absent when the pre- or post-survey was administered). The pre-survey was administered in January 2010 and the post-survey was administered in March 2010.

Survey Results

The pre- and post-study survey used a five-point Likert scale. Available choices included: 1 = Strongly disagree, 2= Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree. Students were asked whether they liked social studies, whether computers make learning more interesting, and whether they thought it is important to learn geography and history in school. They were also asked how often computers were used in their social studies classes and whether they are more motivated to learn social studies when it involves using computers. Finally, the students were asked about their use of Google Earth, barriers to using Google Earth, and their ability to apply Google Earth to what they were learning in history.

Prior to analyzing the data, the 22 survey items were checked for reliability. According to Pallant (2005), the survey instrument used for this study had good internal
consistency, meaning that the questions “hang together” and have transferability to future studies. In addition, according to Pallant “ideally, the Cronbach alpha coefficient of a scale should be above .7” (p. 90). The Cronbach alpha coefficient for all 22 items in the pre-study survey was .776 while for the post-study survey it was .801. Appendix I presents descriptive statistics for all items, both pre-and post-survey.

In order to report the data, the survey questions were grouped into four distinct categories. These categories were based on grouping research questions that sought to determine how Google Earth affected students’ attitude towards social studies, geography, Google Earth, and using computers. The four categories were, “Liking Social Studies” (survey items 1, 2, 4, 11, 13, 21, and 22), “Liking Geography” (survey items 15, 16, 17, 18, and 20), “Liking Google Earth” (survey items 19, 20, 21, and 22), and “Liking Computer Use” (survey items 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 19). The grouped items were first checked for reliability using the Cronbach Alpha Coefficient as described in Table 5.
Table 5

*Cronbach Alpha*

<table>
<thead>
<tr>
<th>Category</th>
<th>Cronbach Alpha Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liking Social Studies</td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>.634</td>
</tr>
<tr>
<td>Post</td>
<td>.683</td>
</tr>
<tr>
<td>Liking Geography</td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>.793</td>
</tr>
<tr>
<td>Post</td>
<td>.752</td>
</tr>
<tr>
<td>Liking Google Earth</td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>.805</td>
</tr>
<tr>
<td>Post</td>
<td>.832</td>
</tr>
<tr>
<td>Computer Use</td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>.657</td>
</tr>
<tr>
<td>Post</td>
<td>.647</td>
</tr>
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</table>

A paired sample *t*-test at the > .05 significance level was then conducted to assess Google Earth’s impact in each of the four categories. The statistical analysis indicates that Google Earth had little to no effect in any of the four categories as described in Table 6 and further described in the following sections. However, it should be noted that while Google Earth did not increase students “liking” in any of the four categories, the pre-survey study indicates that students’ responses in each category tended to be favorable. Therefore, this study was less likely to find significant change.
Table 6

*Paired t-test*

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
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<td></td>
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<td></td>
<td></td>
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<tr>
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<tr>
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<td></td>
<td></td>
</tr>
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Quantitative Summary

A paired-sample t-test was conducted to assess the impact of Google Earth on students’ attitude towards social studies. There was no statistically significant change in scores from pre-study to post-study. The eta squared statistic was 4.195. The generally accepted regression benchmark for effect size is 0.20 for small effect; 0.50 for medium effect and anything equal to or greater than 0.80 is a large effect size (Keppel & Wickens, 2004; Cohen, 1992). Therefore, because the eta squared statistic was 4.195, the student use of Google Earth did not statistically significantly change students’ attitudes towards social studies. However, student responses in the pre-study survey indicate they were favorably disposed to studying geography, therefore making an increase less likely.

The paired-sample t-test also found that Google Earth had no statistically significant impact on students liking geography. The eta squared statistic (.0095) indicated a very small effect; Google Earth had no effect on students’ attitude toward geography. However, it is of note that on both the pre- and post-study, male students reported liking geography more than female students. The pre-study found that the male students in this study liked geography ($M = 3.5791, SD = .61176$) significantly more than the female students ($M = 3.2992, SD = .77735$) ($F_{2,103} = 2.995, p = .054$, Multivariate ANOVA). The post-study scores likewise showed that the male students liked geography ($M = 3.6038, SD = .67659$) significantly more than the female students ($M = 3.2861, SD = .68034$) ($F_{2,103} = 7.302, p = .008$, Multivariate ANOVA).

A paired-sample t-test was conducted to assess whether using Google Earth increased students’ liking of using Google Earth. There was no increase from pre-study
to post-study in the scores of students’ liking Google Earth. The eta squared statistic (.010) indicated a very small effect size. However, after the students had used Google Earth, students reported higher scores on whether Google Earth is easy to use. In the pre-study survey 52% reported that Google Earth is easy to use while in the post-study survey 57% reported likewise.

It is also important to note that in both the pre- and post-survey male students reported liking Google Earth more than female students. The post-study scores found that (as in the pre-study) male students liked Google Earth ($M = 3.6038, SD = .67659$) significantly better than female students ($M = 3.2861, SD = .68034$) ($F_{2,103} = 7.302, p = .008$, Multivariate ANOVA). After using Google Earth, the male students were also significantly more positive ($M = 3.9906, SD = .71381$) than the female students ($M = 3.7065, SD = .72252$) about the value of Google Earth in increasing their understanding of history and geography ($F_{2,103} = 5.203, p = .024$, Multivariate ANOVA).

The paired sample $t$-test also found no statistically significant difference in students’ attitude towards using computers. There was no statistically significant change in scores from pre- to post-study. The eta squared statistic (.003) indicated a very small effect size.

**Qualitative Results**

In order to establish credibility when answering the research questions, the data was triangulated using both quantitative and qualitative data from multiple sources. The qualitative data was collected from post-study individual interviews with six students from each of the three schools as well as pre-and post-study interviews with their social
studies teachers. While the schools were located in different geographical settings and were influenced by local economic factors, the students’ and teachers’ responses to the use of technology in the classrooms and how Google Earth was used did not suggest any significant differences. This section focuses on answering each research question from the independent interviews with the students and their social studies teachers.

**Question 1: How does the use of the Internet-based GIS program Google Earth in a middle school social studies unit affect students’ geographic literacy and development of historical empathy?**

The qualitative research findings indicate that the Web-based GIS program Google Earth can be an effective tool to help middle school students learn geography. In fact, as the interviews reveal, students view history and geography as holistic, in that one cannot be studied without learning about the other. During my observations and the student interviews, the responses were positive about how the use of Google Earth in the classroom increased their comprehension of geography and helped them to develop a better perspective on why people in the past did what they did.” Through the use of Google Earth, students were provided “a way of thinking imaginatively” along with “other cognitive skills in order to see human values in history…a high level of expertise in the whole range of historical skills” (Portal, 1987, pp. 89-90).

Andrew, at Madison Middle School, especially valued studying history and geography through the use of Google Earth, as he gained an increased appreciation for the Persians’ tenacity during the Battle of Thermopylae:

> We learned that during the Persian War about the Battle of Thermopylae, a big part of that war was because it was a real narrow passage and if that wasn’t there,
the war might have been a lot different. When we talked about it in class and read it in our textbooks, I never really thought about the geography of that place but then I looked it up playing around on Google Earth and really you can see how narrow the passage was back then. I mean on one side you have a huge mountain and on the other side is a road but I read [not on Google Earth] that the road is where the water line used to be back then. (Andrew, Madison Middle School, Interview, 2/23/10)

According to the students, the visualization of spatial features in historical locations increased their memory retention and understanding of the culture of the period. Cole, at Madison Middle School, stated that when Mr. Brown used Google Earth in studying Rome, “you are able see buildings in 3-D, you can see all the hills, mountains, and whatever is there in that area and you can see the big connection to history” (Cole, Madison Middle School, Interview, 2/23/10). Ashleigh, felt using Google Earth “helps you remember a bunch of stuff you have to learn about geography because you are able to zoom in on whatever you are learning” (Ashleigh, Aspen Middle School, Interview, 3/19/10). In connecting Google Earth to developing historical empathy, Ashleigh said that looking at pictures posted on Google Earth “really kinda tells you more about the landmark you’re looking at, you can zoom back and look at the background and all of the stuff surrounding it, you kinda get an understanding why it’s important or there” (Ashleigh, Aspen Middle School, Interview, 3/19/10).

Mr. Marcum showed his students a video about the Silk Road in which the students witnessed women carrying heavy loads of salt water from wells on their back. The video further showed young girls and women carrying heavy loads (approximately
50 lbs) of trade goods on their backs across valleys, along steep canyons, and even zip-lining across large rivers. After the video, Mr. Marcum used Google Earth to show the students the approximate location of trade routes they had seen in the video. He was able to zoom in on the foothills of the Himalaya Mountains and show the students the terrain of one of the trade routes they saw in the video.

For Rachael, Grace, and Andrea, their extrapolation of women’s experiences—witnessing women’s role on the Silk Road—revealed their ability to connect with people in the past and their emotions. The girls expressed ‘what-it-was-like-to-actually-be-there’ sentiments, revealing how they were transported mentally into the historical living realities. Rachael stated, “I felt so sorry for those women carrying heavy loads of goods on their backs. They all looked so frail and pitiful” (Rachael, Hillsdale Springs Middle School, Interview, 3/19/10). Grace expressed, “I never really thought of girls being part of the Silk Road, their lives must have been so hard” (Grace, Hillsdale Springs Middle School, Interview, 3/12/10). Andrea stated, “I couldn’t believe women had to carry so much stuff on their backs. I felt sad for them” (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10). The emotional dimension of historical empathy “arises or develops from the active engagement in thinking about particular people, events, and situations in their context, and from wonderment about reasonable and possible meanings within, in a time that no one can really know” (Davis, 2001, p. 3).

A number of students also expressed their awareness of the emotions, experiences, and personalities of the people they studied. “It’s crazy to think Hannibal took elephants across those mountains [referring to the Alps], that must have been tough!” (Mason, Hillsdale Springs Middle School, Interview, 3/25/10). Cole believed,
“The emperor or prince or whoever he was must have really loved his wife to build the Taj Mahal” (Cole, Madison Middle School, Interview, 3/25/10). As Andrea revealed, “When looking at how harsh the terrain was of the Silk Road you got an idea of maybe how those traders felt carrying heavy goods and how scary it must have been” (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10).

Cole, Andrew, and Andrea encountered history from people, no longer remote and unfamiliar, but rather from individuals with real lives and real experiences. For example, Cole was struck by the Mughal emperor Shah Jahan who built the magnificent Taj Mahal, a mausoleum for his favorite wife, Mumtaz Mahal. Rachael appreciated the often overlooked contributions of women in history. For Mason Hannibal embodied more than just a phrase in a textbook; he was an actual person, whose true life remains partially unknown.

Summary

The students’ responses to how Google Earth helped them develop geography skills as well as relate history back to geography revealed their ability to consider the viewpoints or recreate the thoughts or actions of a historical figure or event. Students’ visualization of spatial features in context with historical locations increased their memory retention and their understanding of geography. The comprehension, articulation, and understanding of the event that took place or of the historical figure’s mindset functions as a fundamental step in the building of historical empathy. When students have the ability to judge the decisions of historical figures or events on their own terms, they are able “to view the world as it was seen by the people in the past without
imposing today’s values on the past” (Yilmaz, 2007, p. 331) and they begin to process many of history’s complexities.

The biographical focus of the students’ inquiry brought them beyond the textbook and into the past. VanSledright (2002) and Dickinson and Lee (1978), a similar proclivity for studying people among students engaged in historical inquiry. In developing historical empathy, students need to relate to individuals from foreign places and periods, and their affinity for people exposes their empathetic considerations.

**Question 2: What is the teacher's role when using the Internet-based GIS program Google Earth for instruction in the classroom?**

The qualitative research findings suggest that the teacher’s role is significant in using the Internet-based GIS program Google Earth for instruction in helping students learn about geography as well as develop historical empathy.

**Teacher Reported Technology Use**

Their interviews, my classroom observations and their written lesson plans, all three teachers indicated that all three teachers incorporated technology on a daily basis, Mrs. Meyer “three out of five days,” Mr. Marcum and Mr. Brown “every day.” They all used technology in at least one (or a mixture) of the following ways: SmartBoard, LCD projector, iTunes, video, Internet, PowerPoint Presentations, and computer projects. Furthermore, these teachers all believed technology is a way to “bring students into the lesson” (Brown, Interview, 12/18/10). Mr. Marcum stated, “Students seem much more engaged when I am using technology to teach” (Marcum, Interview, 12/16/10). Mrs. Meyer stated, “Technology today is what the chalkboard was yesterday, you can’t teach without…It’s what these students are used to” (Meyer, Interview, 12/17/10).
The teacher responses to the pre- and post-study interview questions incorporating technology into their curriculum and the learning outcomes technology instruction provides revealed the imperative role computer-supported instruction had on these teachers' curriculum. Their answers paralleled Hicks et al., (2004), Mason et al., (2000), NCSS (1994), and Van Hover et al. ’s (2004) assertion that as teachers utilize technology, the learning of social studies moves from a traditional to a more constructivist and student-centered activity. Thus, students become active in their own learning when high-order thinking, critical thinking, problem solving, and decision-making are facilitated.

**Student Reported Teacher Use**

When the students were asked in their interviews whether their social studies teacher used a computer in their classroom this year, 16 of the 18 students responded affirmatively, one negatively, while one student was not asked the question due to researcher omission. When the students were asked how often their social studies teacher used a computer in their classroom this year, 16 students responded either “every day” or “almost every day.” Jordan, the one student who responded “no,” further stated “not that much.” When asked to explain his response he got frustrated and said, “I don’t know” (Jordan, Aspen Middle School, Interview, 3/19/10).

Next, when students were asked how their social studies teacher used the computer in their classroom this year, their responses varied from; “to show movies,” to “Google Earth,” “pictures from the Internet,” “doing projects on the Internet,” “PowerPoint,” “guided notes using overhead projector [referring to the teachers LCD projector],” “projects”, and “to use their SmartBoard.”
I also asked students whether their social studies teacher last year used a computer in his/her classroom; of the 18 students, 11 responded affirmatively and seven negatively. The students were then asked how often their social studies teacher last year used a computer in their classroom and the students responded “not that much,” “every now and then,” and “only a few times.” The student interview responses were consistent with the survey. According to the survey, when students were asked about their past social studies teachers’ use of the computer, both the pre- and post-study surveys were consistent, indicating that 63% of the students felt neutral about their past social studies teachers’ computer use.

All six students at Aspen Middle School in Mrs. Meyer’s class responded the only time they remember using a computer during social studies last year was to complete a grade level project for International Fair. Jordan stated that in order for the students to complete their project for International Fair, “our teacher gave us a country and we just had to look up stuff about our country” (Jordan, Aspen Middle School, Interview, 3/19/10). Ashleigh responded “we went on [the Internet] and looked up everything about our country. I had the Philippines. I found it very straight forward, we also had to use books from the library” (Ashleigh, Aspen Middle School, Interview, 3/19/10).

Brittney, one of the students who responded “no” to her social studies teacher’s computer use last year, said that she had moved into the area at the end of last year from another state. She went on to report that, “Only my teachers had a computer, there were no student computers; well, none that I knew of, but the teachers only used their computers for taking attendance and stuff like that but never to teach us anything” (Brittney, Madison Middle School, Interview, 3/33/10).
Students were also asked if their other teachers this year used a computer in their classroom and of the 18 students, eight responded affirmatively, eight negatively, and two students were not asked the question due to researcher omission. The students were then asked how their other teachers used the computer in the classroom. The student responses were unanimous; “to use their SmartBoard,” “for us to take AR (Accelerated Reading) quizzes”, and/or “to get on Study Island.” [Study Island is a web-based program that provides schools and their students instruction, practice and assessment designed based each state’s content standards.]

The majority of the students interviewed in this study agreed that they get to spend enough time to use a computer at school as Andrea mentioned, “If you use it [a computer] too much students start to abuse it and don’t do what they’re supposed to do, so I think we get to use computers plenty here at school” (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10). Hunter stated, “We get to use them [computer] just the right amount of time at school, most teachers are pretty cool about letting you on the computer when you’re done with school work to look up stuff” (Hunter, Madison Middle School, Interview, 2/25/10). Rachael, added, “I’d say we get to use the computer about once or twice a month, which is good enough for me” (Rachael, Hillsdale Springs Middle School, Interview, 3/19/10). Mason, argued, “If you use a computer too much it just gets boring” (Mason, Hillsdale Springs Middle School, Interview, 3/25/10). Cole, however, stated, “I wish we could use a computer for every class, like we’d all have our own laptops and we’d just carry them to each class like they do at some schools. That would be awesome!” (Cole, Madison Middle School, Interview, 2/25/10).
Teaching Historical Empathy using Google Earth

In the pre- and post-study interview, I asked the teachers “What does the concept of historical empathy mean to you?” The teacher’s responses, during both pre- and post-study interviews, provided a rather vague definition of historical empathy. They all, however, recognized historical empathy as an important part of teaching social studies. Furthermore, all three teachers provided an explanation of historical empathy as a way “to understand how the past evolved into the present”.

Mr. Brown in his pre-study interview was the only teacher who came close to providing a definition similar to Barton (1997) and Stern (1998), who define historical empathy as the skill to recognize how people in the past viewed their circumstances, evaluated their opinions, made decisions, and how their perceptions were shaped by their values, beliefs, and attitudes. However, Stern (1998) suggests historical empathy does not demand our sympathy, acceptance, or forgiveness for the choices people of the past made, which is an important concept for students to understand when studying history. The following are excerpts from each of the teacher’s responses in defining their concept of historical empathy:

Pre-Study response Mr. Marcum:

Historical empathy. Like putting your place back in time. It is very hard to get your students to remove themselves from today and put themselves in the place of ancient, especially seventh graders, I mean they, I don’t know if that part of the brain doesn’t work yet or what, but sometimes I can get the students to understand what it would be like, but I have to relate it to them in real world situations. Like yesterday, we are trying to talk about the isolated oasis in the desert. They were
like,“what does isolated mean”. I explained if you have ever had in-school suspension. They were like, ‘oh, yeah, you are far away and cannot see anybody”, and I was like, yeah, you are far away and isolated and cannot talk with everyone else. They were like “That would really suck.” So I think that I could understand, but it is hard to get that across to them. If you can achieve it, it seems like they understand things much better. (Marcum, Interview, 12/16/10)

Post-Study response Mr. Marcum:

Historical empathy to me, uhm, try to get the students to understand what it would be like to live back then. Uhm, for somebody who doesn’t even understand what it’s like to live now, like a seventh grade student, that’s very hard, empathy in general with a seventh grader, you know. If I can get them to understand what it was like to live back then and understand some of the hardships compared to now, that would be great. It would be nice if we could just get a seventh grader to understand what the person next to them is going through. It’s a tough age to teach historical empathy. (Marcum, Interview, 3/29/10)

Pre-Study response Mr. Brown:

Historical empathy to me means being able to, for one, being able to look at a group of people and history and understand why they are where they are at, why they are struggling, succeeding, whatever it might be, and be able to maybe not connect, but be able to have the understanding and knowledge, and the understanding of how it affects us today. To me, this is historical empathy. (Brown, Interview, 12/18/10)
Post-Study response Mr. Brown:

Historical empathy I think is getting students to realize, having students realize the things that happened in history, why they’re important to us, but why it’s kind of led into some of the problems and situations that we have today, to help them to understand those situations and how it affects us today, I think, is going to help them hopefully in their future to kind of, for one to get rid of a lot of these racial stereotypes and stuff that you hear a lot and we get a lot of immigrants coming in now. So, you know, I hope it cuts down on a lot of the racial issues. And I think it just opens their minds to, and hopefully understand why things have happened the way they have, so they’re not so critical to analyze and stereotype and those kinds of things against people. (Brown, Interview, 3/22/10)

Pre-Study response Mrs. Meyer:

I think being aware of cultures and events that have happened before us and looking at that as not something like “ok, been there, done that” and then moved on, but what was the context of that event, what was important then, is it important now, and why should we care. In the context of today’s world, is there something similar going on today that happened years ago that happened somewhere else, or because what they did then what do we have now. I think it is an important connection with these students that they need to understand. (Meyer, Interview, 12/17/10)

Post-Study response Mrs. Meyer:

For them [the students] to just understand that, I think Google Earth made this connection for them, that we talk about the Coliseum say, and they see a picture
in the textbook of what it used to looked like. Well, we talk about what the time period was back then, what people wore, and the wars and things they went through. And then you show them a modern day picture, Oh, that car looks like my dad’s, there’s ice cream. And you can see even though modern day Rome exists there are still ancient artifacts, ruins around that modern city that show what happened long ago and I think they need to understand that just because we’re here to today doesn’t mean we should forget what happened, whether it’s here in the United States or Rome or Greece or wherever, that history does mean something, it helps them build their culture. (Meyers, Interview, 3/18/10)

Guiding Student Development of Empathy using Google Earth

While not one of the three teachers provided a clear definition of historical empathy, surprisingly they all worked to help their students develop historical empathy. During my observations, none of the teachers did a lesson based on imagination (e.g., "Imagine you are an Apache warrior"), over-identification (e.g., asking students to identify with Adolf Hitler), or sympathy (e.g., encouraging students to sympathize with victims of slavery) (Foster, 1999; Foster & Yeager, 1998). In practice, however, each teacher engaged his or her students in an “active process, embedded in the historical method” (Foster & Yeager, 1998, p. 1; Davis et al., 2001, pp. 13-14) in accordance with Foster and Yeager’s (1998) four interrelated phases in the teaching historical empathy. Each teacher (a) introduced a historical person or event, then (b) provided the students the historical context of the person or event, often comparing the person or event to previously studied persons or events in history to contemporary persons or events, they (c) provided the students discussion time using Google Earth or other primary or
secondary sources in which the student analyzed their event, and (d) described their interpretation of the person or event by constructing stories based on their own interpretation.

Hillsdale Springs Middle School

Two key observations in Mr. Marcum’s classroom illuminate his thinking about teaching geographic literacy and modeling how to conduct historical inquiry. In one of my key observations, he used Google Earth and a student handout to present information about the geography of the Middle East and Northern Africa and the spread of Islam. He used Google Earth to focus students’ attention on the geographic features of Saudi Arabia, Persia (Iran), Iraq, Syria, Turkey, Northern Africa, and on other relevant regions.

Mr. Marcum used a mixture of traditional and non-traditional teaching strategies to lead the students through the geography lesson. As he zoomed in on various locations and geographic features throughout the Middle East and Northern Africa, he told students to write down the key points from his presentation, sometimes instructing them word-for-word what to copy. On the other hand, he would become distracted from his lesson plan by asking the students questions and allowing them to raise their own questions. He was able to guide them through an inquiry process to help them grapple with some of the more complex issues and themes associated with the spread of Islam and how geography played an important role in its spread or the lack thereof.

During a second key observation, Mr. Marcum showed his students a video about the Silk Road and the various trade routes throughout Asia to expose them to the geography and trade routes of the Silk Road. He followed up the video by using the “path” application on Google Earth to demonstrate one of the Silk Roads routes and the
terrain traders would have encountered. Some of the required elements in this activity were straightforward and traditional, such as asking students to fill out a map and answer basic questions about reading selections from their textbook. However other activities, such as writing a letter as a trader on the Silk Road, were student-centered and allowed numerous opportunities for exploration and creativity.

In describing the varied approaches to this lesson in teaching geography and empathy, and his role as the teacher, Mr. Marcum claimed that “teaching empathy to a seventh grader and getting them to have some understanding of what it was like to live back then is very difficult, especially for somebody who doesn’t even understand what it is like now” (Marcum, Interview, 3/29/10). He further stated that, “You have to know how seventh graders think and work to keep them engaged in the topic by providing a lot of different opportunities for student engagement in order for them to truly empathize with people of the past” (Marcum, Interview, 3/29/10). He suggested that some of the assignments associated with this lesson were more difficult than others, but that as a whole, all of his students were excited about the activity and exceeded his performance expectations.

*Madison Middle School*

In my observations of Mr. Brown’s use of Google Earth, at first he primarily used Google Earth to show students significant geographic features and ruins of civilizations being discussed in class in order for them to make connections between civilizations. As he became more comfortable using Google Earth, Mr. Brown began using it as a way to implement group work. At first Mr. Brown organized his students into groups to conduct their own historical inquiry and geographic understanding of Greece. One such activity
required students to complete a worksheet about the geography of Greece that entailed finding a ruin and describing the surrounding geographical features. However, only a few students did the work while most spent their time socializing. Even the students who completed the assignment did so in a manner that lacked in-depth analysis (Observation, 1/25/10). When questioned why they did not stay on task Brittney responded, “Most of us had never used Google Earth before so we didn’t know what to do and we really didn’t think it was important” (Brittney, Madison Middle School, Interview, 1/28/10).

For the next unit on Rome, Mr. Brown regrouped and began showing the students how to use Google Earth and even gave them class time to “play around” on Google Earth. In an activity on the Punic wars he organized the students into groups to discuss the cause of the wars from the Carthaginian viewpoint. They were asked to find Carthage on Google Earth. When students could not find Carthage, he asked his students “Why can’t you find Carthage?” Several students guessed but one boy correctly answered, “Because the Romans burned the city down and renamed it” (Observation, 2/16/10). The students then referred to their textbook map to find where Carthage had been located and tried to find the same location on Google Earth. Finally, the students were able to pinpoint Tunis as the modern day city of Carthage.

Mr. Brown guided students through some questioning about the Punic Wars using the students’ textbook and class notes as a resource (Observation, 2/17/10). He asked the students whether they could relate some of the events or people involved in the Punic wars to other historical events or people. Students struggled to come up with an answer but finally, after Mr. Brown probed them to ‘think’, one student suggested “Alexander the Great?” Another student shouted “Ramesses the Great?” (also known as, King
Ramesses II) (Observation, 2/17/10). Mr. Brown next had the students discuss how Alexander the Great and Ramesses the Great and their expeditions could relate to people or events in the Punic Wars. After discussion, Mr. Brown asked the students to complete a worksheet that provided them with an active and detailed task of answering questions requiring the use of Google Earth.

One such activity required the students to trace, using the “path” application on Google Earth, and using their textbook as a guide, the route the Carthaginians took in order to attack the Romans. The students then discussed what the Carthaginian soldiers might have taken with them on their journey to Italy. Once the students completed a “list” of items the soldiers took with them, which included food, clothing, weapons, and elephants (Observation, 2/17/10), they analyzed their traced route on Google Earth. This time, because Mr. Brown had modeled historical inquiry and guided his students thinking, their inquiry and thinking skills improved. They were engaged and able to come to their own historical conclusions and strategies the Carthaginians (and even the Romans) might have considered. Their conclusions and strategies led students to even question each other’s interpretation of why the Carthaginians would attack the Romans. One group discussed the difference between the Romans and the Carthaginians, “People tend to think of the Romans as heroes but really the only reason they think that is because the Romans won the war.” Another group stated, “What if the war was won by Hannibal would we think differently about Rome and Carthage?” Another group remarked, “Do you think we would view Hannibal as a “bad guy” if he had won?” (Observation, 2/17/10).
The emotional aspect of the Punic Wars created an additional aspect of historical engagement inherent in historical studies. Bage (1999) supports a story’s ability to “appeal to children’s curiosity, emotions, and imagination” as “an effective way of introducing new knowledge, extending vocabulary, and addressing moral issues” by “easing the difficult relationships between history as content, information and understanding,” and thereby transforming information into “meaningful, motivational, and therefore affective educational experiences” (p. 27). Bage suggests that emotions—whether intended or not—matter in history, and a teacher’s willingness to work with the students’ ideas and emotional expressions remains fundamental to the development of historical empathy (Lee & Ashby, 2001).

Mr. Brown also had his students complete a project using Google Earth in order to gain an appreciation of how geography and history has affected each other across time. Even further, Mr. Brown wanted his students to gain an understanding of how people have influenced and been influenced by their environments in different periods of the past. For this project, students were able to select a partner and then choose an ancient city, landmark, ruin, or a natural wonder that they had studied this year in social studies.

To complete this project the students were required to write a one-page paper about a “place mark” they would like to create on Google Earth. Mr. Brown would have had his students create an actual ‘place mark’ on Google Earth but when discussing the assignment with the technology coordinator he found that the students’ ‘place mark’ would not be saved. They could not be saved because the school server resets every evening erasing information placed on the school computers leaving no way for the students to save their place mark directly on Google Earth. Their place mark was to
include a photo and description of their famous city, landmark, ruin, or natural wonder as it was seen in its historical context. The description was to include why their famous city, landmark, ruin, or natural wonder, found anywhere around the world was significant to their selected ancient civilization as well as include the surrounding geographic features. Students were to provide specific details about significant physical characteristics relevant to the region (i.e., major rivers, deserts, mountains, etc.). They were to describe changes in the physical characteristics of the regions that might have occurred over time and explain the consequences of such changes. Finally, the students were to explain why they thought their civilization was located in that particular place.

At first many students had difficulty selecting which ruin they wanted to study or look up. Many students selected the Great Wall of China but quickly became discouraged when they could not find the Great Wall of China on Google Earth. Some students did not follow directions and began looking up landmarks that were significant to American history or things they had discussed in 6th grade social studies (Observation, 3/12/10). Mr. Brown recognized his students were struggling. In response he had his students, using their textbook and class notes, create a list of possible historic landmarks or ruins. Finally, once the students chose from the list created in class, the rest of the project was completed without much difficulty. Students stayed on task but were talkative when it came to what they were searching and what they saw on Google Earth. Some typical comments throughout the class period were, “Hey, look at that!” “I didn’t know that was located there”, “This looks really cool!” and “Awesome!” (Observation, 3/12/10). The assignment took the students four days to complete. Students who needed
an extra day to complete their assignment were encouraged to use study hall or homeroom time.

In the post-study interview, Mr. Brown described his role as the teacher in incorporating Google Earth into his lessons in order to provide his students a geographical context and making connections to other parts of history:

I was really surprised by how well the students took to Google Earth. It really engaged them, I thought I was going to have to struggle keeping them on task…To me one of the best things about Google Earth, when I’m doing a lesson is that I can scroll around the globe, and say, well, we’ve talked about these civilizations, look at the geographic features how do you think that helped or inhibited a civilization? I can further say and now we’re going to talk about this civilization and see how they’re connected and what might have blocked them from having contacts and if they were to meet how were they going to meet, what areas, what directions? I really like the feature, so I can go back and do a little bit of review and say, Hey, this is how it connects, this is where these people are located. It’s not something that’s easy when you have a map on the wall, or you have to get out four or five different maps to show them. So Google Earth makes that a lot easier. (Brown, Interview, 3/22/10)

Aspen Middle School

Mr. Carlyle (a student teacher) and Mrs. Meyer’s initial use of Google Earth was very similar to that of Mr. Brown. At first Google Earth was used to show students a ‘birds-eye-view’ of Greece (i.e. the Acropolis, Olympia, ancient Olympia stadium, the Palace at Knossos, Troy, etc.). As Mrs. Meyer became familiar with using Google Earth
she started to use some of the options on Google Earth to demonstrate what “Google Earth can be used for” (Meyer, Observation, 1/19/10). One such activity included asking her students to use their textbook to figure how far Athens, Greece was from their school. After writing the students’ responses on the board, she used the path application on Google Earth to provide the exact miles from their school to Athens, Greece and to find out whether their estimates were similar. Mr. Carlyle (who at this point had taken over teaching several of Mrs. Meyer’s classes) did a similar activity when discussing the Battle of Marathon when the Athenians asked Phidippides to run to Sparta and ask for military help.

Mr. Carlyle used the path application to show the approximate route Phidippides would have run from Athens to Sparta. The students were amazed when Mr. Carlyle showed them the terrain. Mr. Carlyle even had the students discuss why certain routes to Sparta would not have been a good choice for Phidippides. Student responses included, “If he goes straight east he’ll run into water.” Another student said, “I bet he ran the shore line, that way he doesn’t have to worry about so many hills” (Observation, 1/21/10). Students even questioned how, “Did Phidippides know how to get to Sparta?” “Did he have a map?” “Did people back then have maps?” (Observation, 1/21/10). These questions led to discussion about how people during ancient civilizations traveled or learned to navigate not only by land but by water as well.

In the next unit on Rome, students were provided the opportunity to work with Google Earth in order to learn about a historical landmark or ruin. However, since many of the students had never used Google Earth, Mr. Carlyle began teaching the basics of Google Earth. Each student was provided a laptop on which they were to follow along as
he showed them some of the basics of using Google Earth. Mrs. Meyer stayed in the room to help keep students on task as well as help those who encountered difficulty (Observation, 2/11/10). Mr. Carlyle first showed the students how to zoom in/out, move the globe, and search a location. He then discussed the various layer applications in the “layer panel” window. He also showed the students how to create a “place-mark” (Observation, 2/11/10).

The following day, the students were given directions on their assignment that included selecting a historical landmark or ruin from ancient Rome, finding its location on Google Earth, and writing a one-page paper. In the paper students had to describe the landmark or ruin, describe what they thought it looked like back then and compare it to what it looks like now. Even further, they were to describe the surrounding geographical features and finally hypothesize what the landmark or ruin might look like in 100 years. They were given a laptop, a handout, and an ancient map of Rome. Students were to use either their textbook or the map of ancient Rome to select a historical landmark or ruin. Mr. Carlyle also provided a list of several locations students could look up, (e.g., Hadrian’s Wall, aqueducts, etc.). Once the students selected their ruin, Mr. Carlyle or Mrs. Meyer would sign off on their worksheet and the students were allowed to begin using Google Earth (Observation, 2/12/10).

The students stayed on task and were very talkative when it came to what they were researching and what they found on Google Earth. Many of the comments heard throughout class were, “Wow”, “Cool”, and “Hey, look at that!” (Observation, 2/12/10). The students did not get frustrated or discouraged using Google Earth. When they could not find an answer they continued to search and critically think about how they could find
more information to complete the assignment. Many students even helped fellow students who were struggling.

Other comments heard throughout the assignment were “What language is that?” (Observation, 2/12/10). One student asked, “Did all this stuff in Rome become destroyed or did it just fall apart?” (Observation, 2/12/10). Another student commented, “This isn’t very pretty!” To which Mr. Carlyle responded, “Well, it is over 2,000 years old!” (Observation, 2/12/10). The assignment took the students three days to complete. Students who needed an extra day were invited to come back to the classroom during homeroom in order to use the computers to complete the project.

In the post-study interview, Mr. Carlyle and Mrs. Meyer described their roles as teachers in incorporating Google Earth into their lessons as a way to provide their students with the geographical context of a historical figure, event, ruin, or historical landmark. Mrs. Meyer said,

Rather than standing up in front of the students and talking to them about India or China which are difficult civilizations to talk about because the kids are kind of bored with going over those units, using Google Earth enables the students to go out and find some information for themselves. (Meyer, Interview, 3/18/10)

Mr. Carlyle further added, “Through the use of Google Earth they [students] could see what it [Rome] looked like spatially. I even had students bring me things that they found from home when they went home and used Google Earth” (Carlyle and Meyer, Interview, 3/18/10).

As the teachers continued to use Google Earth in their classroom, their students’ involvement increased notably. At first, many of the seventh graders struggled in using
Google Earth to articulate their interpretations of an event or historical figure; thus each of the teachers modeled how to work through an event as a class. Researchers (Bage, 2001, Levstik & Smith, 1996; Shemilt, 1980) attest to the need for teacher modeling for students’ first embarkation into inquiry. Their findings echo social cognitivist Albert Bandura (Sternberg, 2005), whose work emphasized modeling as an essential component of learning. The observation and replication advocated by Bandura (1986) proves to be more amenable when governed by students’ own values.

For the seventh graders, the opportunity to dictate their own inquiries improved their attentiveness, motivation, and enjoyment. Through observations, and as stated in their interviews, the students overwhelmingly deemed themselves as more engaged in the project from a self-directed experience. For example, two students commented, “It’s easier to learn because you’re more interested in it, so it’s fun to learn,” (Kelly, Aspen Middle School, Observation, 1/26/10) or “If I just had to read this out of a textbook…then I wouldn’t have been as interested” (Tom, Madison Middle School, Observation, 2/10/10).

*Google Earth Limitations*

In this study using Google Earth proved to be an effective tool to better engage students in developing geography skills and history empathy. However, after many instances of using Google Earth throughout this study, especially towards the end, the realization began to set in that Google Earth also had its limitations. The teachers’ frustrations with using Google Earth focused on problems related to access, how to manage different levels of computer literacy among their students, and how to maintain classroom discipline when using computers.
Mr. Carlyle and Ms. Meyer’ indicated in their post-study interview:

I don’t know that I would use it too often. I would try to pick and choose. I don’t know that I would use it every day, because then it would kind of lose its effectiveness or, you know, the “wow” factor. I want to keep them interested, I don’t want to get them bored. (Carlyle and Meyer, Interview, 3/18/10)

Mr. Marcum responded in his post-study interview:

There’s so much in Google Earth that it’s hard to keep them focused. Even when I focus them in class, they’re still, “Zoom in on my house,” and “Let’s go see the middle school” or they just want to see the pictures. They really don’t care about all the other educational aspects of it…it is also very time consuming in coming up with effective lessons. You really have to devote a lot of time and energy into creating something like a WebQuest using Google Earth, which I know has been done but I just don’t have that time to sit down and plan something like that out, nor trying to find one out there on the Internet…I would also be afraid to turn them loose on it [Google Earth], they would need a lot of monitoring in order to keep them on task and not looking up their houses, the middle school, their grandma’s house, etc. (Marcum, Interview, 3/22/10)

Mr. Brown indicated in his post-study interview:

The students need a lot of time to learn how to use Google Earth on their own. When the students began their project I gave them a tutorial on how to use Google Earth and together we practiced using Google Earth but when it came to time to completing their project they still had a lot of difficulty in using it. I think if you had the students use it on a regular basis it would help but there is just not enough
The student interviews were paradoxical to the student survey. In the interviews they expressed their frustration with using Google Earth in that it was difficult to find some places. When trying to find the Great Wall of China, Google Earth took the students to a location in China, but nowhere near the location of the Great Wall of China. Hunter reported, “I kept trying to find the Great Wall by typing in Great Wall in the search box but it never took me there” (Hunter, Madison Middle School, Interview, 2/25/10). Hunter and other students were finally able to find the Great Wall of China by doing a Google Web search and typing in “Find the Great Wall of China on Google Earth?” The Web search suggested to type in “Badaling” in the Google Earth search box. Once the students typed in Badaling, China in the search box, Google Earth took them to the Great Wall of China (Observation, 2/14/10).

Students also struggled with correctly spelling locations and easily became frustrated when Google Earth could not find a match. One student suggested Google Earth should provide a feature much like its Google Web search that provides a list of topics under “Do you mean?” (Observation, 2/14/10).

Students’ perception of their social studies teachers

The student interviews paralleled the survey in “liking their current social studies teacher.” All the students’ responses to the question of whether they liked their social studies teacher were very similar indicating they were “funny,” “interesting”, and “cool.” Savannah stated she liked Mrs. Meyer because “she is funny and we have a lot of fun, she moves around the room and dances and stuff” (Savannah, Aspen Middle School,
Interview, 4/3/10). Ashleigh remarked that Mrs. Meyer is not like the other social studies teachers that she has had before because,

She [Mrs. Meyer] doesn’t make you take a bunch of notes or worksheets and she doesn’t stand up in front of the class and just talk and talk or make us read from our textbook everyday, which sometimes is okay. What I’m trying to say is that she mixes things up so we are not doing the same things day after day after day. She also likes us to use the computers and is always trying to get us to do some activity about history which is cool because our other teachers never have us use the computer for learning; well, other than for Accelerated Reading (AR) quizzes or to get onto Study Island. (Ashleigh, Aspen Middle School, Interview, 3/19/10)

Cole reported that he liked Mr. Brown because, “He makes everything in class more fun and entertaining” (Cole, Madison Middle School, Interview, 2/25/10). When further questioned how Mr. Brown makes things fun,” Cole answered that Mr. Brown, “is always using his computer to show us things and uses the Internet to relate about what we are learning in class to the real world, like what is going on in the news and connects it to history” (Cole, Madison Middle School, Interview, 2/25/10). Brittney stated that even though she really did not like social studies, she liked Mr. Brown, “He is funny and throws out a bunch of fun interesting facts and does not make you memorize a bunch of dates and people” (Brittney, Madison Middle School, Interview, 4/3/10).

Mr. Marcum’s students reported that they liked him because he is “really nice” (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10). Austin said that Mr. Marcum is “funny, outgoing and makes history a lot more fun” (Austin, Hillsdale Springs
Middle School, Interview, 3/12/10; Grace, Hillsdale Springs Middle School, Interview, 3/12/10). Austin noted,

Mr. Marcum is always trying to get us to learn geography, just about every day when we get into the classroom he has up on the board [via LCD projector] the daily geography that we are supposed to answer questions about some place in the world or describe the land or something like that. At first I really didn’t like it but I have become good at it [understanding geography], I actually look forward to it [daily geography]. (Austin, Hillsdale Springs Middle School, Interview, 3/19/10)

Austin further noted that because Mr. Marcum used Google Earth so frequently in his classroom that he personally started to use Google Earth too,

Look up stuff. At first I just looked up my house, school, my grandma’s house and my friends’ houses but that got old so I started looking up history stuff. At first I started looking up stuff about the Civil War, you know like battle fields and forts, that’s my favorite topic, the Civil War. I then looked up places Mr. Marcum would put up on the board. I would zoom in more, closer, so I could really see things. I also like playing with the different layers but if you put too many layers on it’s too much. But I like the 3-D layer and the terrain layer the most, you really get a good look at stuff that way. (Austin, Hillsdale Springs Middle School, Interview, 3/19/10)

Mrs. Meyer’s students noted that she made history fun by incorporating various teaching strategies to help them learn history as well as having her students “want to learn about other civilizations” (Jordan, Aspen Middle School, Interview, 3/19/10). One of Mr. Marcum’s students, Ryan, liked that he could make history relate to them on a
personal level by “using examples from our everyday lives to things going on back then” 
(Ryan, Aspen Middle School Interview, 3/19/10). His students also liked that he was 
strict, but not too strict, and that he joked around with them. They even appreciated his 
ongoing geography lessons which helped them make connections with the history being 
studied. Mr. Brown’s students also appreciated that he was not too strict and as Cole put 
it, that he tried to “find new ways to teach us something” (Cole, Madison Middle School 
Interview, 2/25/10).

Summary

The teachers in this study used computers nearly on a daily basis to teach and the 
technology they used in their classroom played an essential role in their instruction. All 
three teachers unanimously believed that it was important to integrate technology into 
their curriculum. The most common way they used a computer in their classrooms was 
to use their SmartBoard or LCD projector to make PowerPoint Presentations (notes) on 
the topic being studied.

These social studies teachers’ understanding of geography and its importance to 
history had a significant impact on how effective they were in helping their students 
develop not only geography skills, but historical empathy as well. Students reported they 
like studying geography and history because their teachers made the subjects fun. Each 
teacher believed geography to be an important aspect of studying history and worked to 
create lessons that built upon the study of geography. While each teacher will continue to 
incorporate geography into their lessons, this study confirmed to the teachers their 
students’ lack of geography skills. Google Earth proved to be one technological tool that 
these social studies teachers used to present multiple perspectives to their students.
However, in order for students to effectively navigate and use Google Earth to develop geography and empathy skills, the role of the teacher proved to be significant in guiding and modeling appropriate skills. Empathic inquiry requires considerable classroom time, energy, and resources, and teachers must balance between providing students with structure and resources, while at the same time allowing time for independent thought and group deliberation.

The students’ responses in the interviews suggested that the role of the teacher is notably important, especially in motivating students to learn history and geography while using Google Earth. When using Google Earth, each teacher encouraged his or her students to become intimately connected with the historical figures or events in question and to direct their learning about history and geography. While each teacher used a variety of instructional approaches in using Google Earth, each had the ability to engage students to think about complex geography connections and develop a historical perspective. In the observed lessons using Google Earth, students were actively involved in the learning process. Students had an active role, and through careful examination, were able to relate to the subject matter on a personal level.

*Question 3: What background factors are related to student learning outcomes as defined in this study?*

Both the survey and interview questions reveal that students enjoy using computers and believe that computers help to make learning more interesting. In their interviews, the students in this study unanimously stated their sole purpose for personal use of a computer is to get onto FaceBook or MySpace “but only at home because those sites are blocked at school” (Andrea, Hillsdale Springs Middle School, Interview,
3/12/10). One student further stated that in addition to using MySpace she also downloads music. Another student said he also likes to look up random stuff on Google or YouTube. The majority of the student interview participants have a computer at home and the Internet which paralleled the survey results which revealed that 88% (based on pre-study statistics) of the students have a computer at home and 73% have Internet at home (See Figure 1). Despite the fact that nearly all students had availability of a computer and Internet available at home or the local public library, the teachers in this study felt they could not assign homework that required their students to use a computer or the Internet to complete an assignment.
Figure 1. Student computer and Internet available at home
Several students in the post-study survey indicated they only have dial-up at home, as other Internet providers are not available in their area or are too expensive. The survey revealed that only 49% of students have access to “fast” Internet service (something other than dial-up). Those students who have dial-up said they rarely get onto the computer at home because it takes too long to get onto websites.

Of the 18 students interviewed, only two revealed they use their computer at home for school-related assignments. Andrew stated, “sometimes I go home and get onto the Internet and look up stuff we talked about in school” (Andrew, Madison Middle School, Interview, 2/23/10). When further questioned about whether he looked up information about social studies he said, “Yea, but I really like history” (Andrew, Madison Middle School, Interview, 2/23/10). Andrea mentioned that,

A lot of my teachers don’t assign homework that requires us to use a computer at home because a lot of students don’t have a computer at home so it wouldn’t be fair to them. I use my computer to type up stories for Language Arts, sometimes I retype my social studies notes, but only to practice typing, I loving typing and I think it makes everything look neat. (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10)

The students in this study agreed without hesitation that they could use a computer (computer became synonymous with Internet) to learn about history. However, the majority of the students interviewed questioned the validity of the information retrieved from the Internet. Grace remarked, “You get more true information from a book, because you can’t believe everything on the Internet” (Grace, Hillsdale
Springs Middle School, Interview, 3/12/10). Ryan mentioned, “My teacher last year told us never to use Wikipedia to find information” (Ryan, Aspen Middle School, Interview, 3/19/10). When I asked him why, he responded, “Because people can change the information on there” (Ryan, Aspen Middle School, Interview, 3/19/10). I further asked him if his teacher taught him how to determine whether a Website was reliable, he stated, “She said never to use .com or maybe it was .org; I can’t remember, anyway those websites are ones where anyone can type or post whatever they want so the information could be wrong” (Ryan, Aspen Middle School, Interview, 3/19/10). Andrea noted “I just get nervous getting stuff off the Internet, I just don’t trust it” (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10).

Surprisingly many of the students interviewed stated they would rather use a book to retrieve information about history than the Internet. Kaylee proclaimed, “If I wanted to know something about what people in the past did I would look it up in a book” (Kaylee, Hillsdale Springs Middle School, Interview, 3/9/10). Upon further questioning she determined, “I wouldn’t do the Internet, because I think it’s easier to just get a book out and look up the information. However, I think the Internet has more pictures but the book is more interesting, I think” (Kaylee, Hillsdale Springs Middle School, Interview, 3/9/10). Destiny posited that, “It’s just so easy to look up information in a book. If that book doesn’t tell you want you want to know you can just look at another book (Destiny, Aspen Middle School, Interview, 3/29/10). Ashleigh stated that if she wanted to learn about someone or something in history she “would go to the library and look up books. If it is a famous person, it will be a lot easier, and if it is a person that has just died, well then, that much easier” (Ashleigh, Aspen Middle School, Interview, 3/19/10). Ashleigh
further argued that, “Books are easier to use, the information on websites, like Wikipedia, are fake. Anyone can put anything on the Internet but books are different” (Ashleigh, Aspen Middle School, Interview, 3/19/10). Upon further questioning the validity of books versus the Internet, Ashleigh concluded that books are more reliable because, “they [books] are already printed and people cannot change what is already printed so they have to be true.” (Ashleigh, Aspen Middle School, Interview, 3/19/10). Austin remarked that “if I want to find out information I would probably go to the library and try to find a book, but if that didn’t work, I would look it up on the Internet” (Austin, Hillsdale Springs Middle School, Interview, 3/12/10). Students’ beliefs about book reliability is a major misconception. While the Internet is often known for its unreliable or inaccurate information, books can also publish inaccurate information.

When the students were questioned about how they can check the reliability of the information on the Internet, all struggled to answer. Jordan said he would “look at more than one website to see if the information is right” (Jordan, Aspen Middle School, Interview, 3/19/10). Landon said he would “ask my mom or dad and if they don’t know I would ask my teacher” (Landon, Aspen Middle School, Interview, 4/3/10).

The majority of the students interviewed stated they liked studying geography but did not feel they were geographically literate. When they were asked to define geography many of the students had difficulty coming up with a definition, with the most common response being “mountains,” “maps,” “continents,” and “rivers.” However, Andrew stated that geography is “physical features and knowing where things are located on the Earth’s surface” (Andrew, Madison Middle School Interview, 2/23/10).
Interestingly, all 18 students thought it was important to have basic geography skills as Cole stated,

   It is important to know where things are located because it can help you understand what life might be like there. Like, if you are talking about the Sahara Desert you know it is going to be hot and sandy so you know pretty much all of North Africa is hot and sandy most of the time and you know the people don’t ever have to worry about snow or having snow days or having to buy sweaters or coats or boats. (Cole, Madison Middle School, Interview, 3/29/10)

Cole’s response about why geography is important is comparable to the National Geography Standards (1994) which outline three goals of geography education that help to create a geographically informed person: (a) sees meaning in the arrangement of thinking in space, (b) sees relations between people, places, and environments, and (d) applies spatial and ecological perspectives to life situations.

When the teachers were asked whether they thought their students were geographically literate their responses were mixed in both the pre- and post-study interviews. In the pre-study interview, Mr. Brown stated he did not think his students were geographically literate because,

   I don’t think our students have a concern or care of what is going on in the world, especially what is going on outside of the United States. They think that it doesn’t affect them and it really blocks their interest and trying to understand other cultures, let alone geography of the cultures and why the geography affects them. (Brown, Interview, 12/18/10)
In his post-study interview when asked whether he thought his students were geographically literate he further explained,

Some days I say “yes” and some days I say “no”. And I don’t know what it is. There are days when a lot of them will say, “Oh, yeah, I know that place, or I remember that, and don’t they live there?” And I’m like, “Yeah”. And then other days I really feel like stuff happens. They talk about, or I talk about things and they have no connection, no idea. So I don’t understand really where that stems from. I think overall, no, they are not. (Brown, Interview, 3/22/10)

Mr. Marcum in his pre-study interview asserted that his students were geographically literate.

I like to think that when they leave my room they are [geographically literate], but at the beginning of the year, I have some students, general education students who still cannot name the seven continents. I don’t know if it is playing dumb to be cool, or we went over this and I thought it was boring and I have been off for three months so now I don’t remember. I don’t understand what the gap is there, but I don’t ever remember not knowing the seven continents. If you ask me when did I learn the seven continents, I would say kindergarten or 1st grade…I just don’t think social studies is seen as an important subject by other teachers.

Several years ago during an open house, we had parents approach us [the two seventh grade social studies teachers] and asked if history was a full-year class this year because last year a couple of teachers after Christmas break, during their normal social studies block, covered math and reading instead because those were the only two subjects tested in the 6th grade. So the teachers would switch every
other day. One day they would do a math lesson, the other day an extra reading lesson. The two teachers that did that actually had perfect scores on their math test. Every student in their class passed the math OAT in 6th grade. But they had students that could not name seven continents or know what a tributary was, they were clueless when it came to history and geography. (Marcum, Interview, 12/16/10)

Asked in the post-study interview whether he thought his students were geographically literate Mr. Marcum remarked, “Some days I do, some days I don’t. Sometimes I’m surprised at things that students say, and other days as much as we use geography and maps in class, I think “Oh my gosh, you don’t know that?” (Marcum, Interview, 3/29/10).

When asked if she thought her students were geographically literate in the pre-study interview Mrs. Meyer stated, “Sort of,” and further explained that when, “I do ask them geographical questions, I am getting the answers, they are not struggling. I don’t have to re-teach stuff. I would say they have a pretty good foundation base” (Meyer, Interview, 12/17/10). However, in her post-study interview Mrs. Meyer’s laughed and asserted,

After using Google Earth, NO! I think Google Earth brought out their gaps… I think it’s up to us, seventh and eighth grade teachers to try and make more connections, and I think using Google Earth will help in a different way to help students understand geography. (Meyer, Interview, 3/18/10)

Interestingly many of the students were able to make a connection between studying geography and the importance of geography in the history of a location.
According to Austin, “Geography is important so you can like learn about the past and like all the history and stuff that happened and I think it can help you learn about things that will happen, like in the future” (Austin, Hillsdale Springs Middle School, Interview, 3/12/10). Savannah remarked, “Geography is important so you can learn how natural boundaries helped keep civilizations from attacking each other” (Savannah, Aspen Middle School, Interview, 4/3/10). Jordan responded, “When you understand the geography of a place you can understand why some civilizations were settled there.” When further questioned about his answer he added, “Like if the land is flat it is easy to cross but some places have mountains which means people probably are not going to cross the mountains to get somewhere else or move” (Jordan, Aspen Middle School, Interview, 3/19/10). Emma asserted,

Geography and history go hand and hand because like back then they didn’t have all this technology so they had to go and figure stuff out for themselves. They had to travel everywhere by foot, and, well, I guess by boat too, so it would take them a really long time to get to places so you can understand why people stayed where they are. Like the Chinese they were isolated from everyone else for a long time because of mountains, just like the Greeks; well, I mean the Greeks were separated from other Greeks by mountains, that is how they all developed I think they were called city [states] and government and stuff like that. So like when you know that kinda stuff you can understand how those things happened in those areas. (Emma, Madison Middle School, Interview, 3/23/10)
Summary

Student background factors played a significant role in this study. Almost all of the students interviewed and surveyed expressed their enjoyment in using computers and that computers should be an important part of learning. Most students have a computer and Internet at home, however, rarely use them for school-related assignments. Surprisingly many students did not find the computer or the Internet a reliable source to find information and would rather use a book to find information about history.

Overwhelmingly students the survey and interviews, found geography to be a fun and enjoyable topic to study but did not think they were geographically literate. In contrast to the 2006 National Geographic-National Geographic Roper Survey (2006) that found more than half of all young adults…think that geography skills are not important; the students is this study thought geography skills are important and should be learned in school. Many students believed that an understanding of the geography of a particular place helps them to make connections with the history of that place.

All three teachers struggled in determining whether their students were geographically literate even though they all regularly incorporated geography into their curriculum. One teacher blamed previous social studies teachers for their students’ lack of geography skills and another teacher asserted their lack of skills was due to their developmental level.

Question 4: What benefits do students report when using the Internet-based GIS program Google Earth?

The research findings indicate that the Web-based GIS program Google Earth had three distinct benefits as reported by students: it increased their motivation to learn
geography, they learned a new technology, and it improved their historical and global understanding.

One of the most reported benefits of Google Earth was its interactive capabilities as it prompted students’ curiosity and motivated them to explore the Earth’s features. Grace remarked, “I think it’s cool how you can zoom in on the mountains and rivers and stuff” (Grace, Hillsdale Springs Middle School, Interview, 3/12/10). Brandon enjoyed how Google Earth was able to give him a 360 degree view of a location, “I loved zooming into the [Roman] Colosseum and be in one place and turn around so I could see what it was like inside” (Brandon, Madison Middle School, Interview, 3/19/10). Kaylee believed, “It [Google Earth] made me feel like I was really there” (Kaylee, Hillsdale Springs Middle School, Interview, 3/9/10). Jordan stated, “I can’t stop looking up stuff, I like to go home and look up stuff and then tell Mr. Carlyle about stuff he should have us see in class” (Jordan, Aspen Middle School, Interview, 3/19/10).

Destiny, however, did not like using Google Earth, nor did she feel Google Earth motivated her to learn geography because she felt, “It was confusing, there were too many options [layers], so I just gave up on it” (Destiny, Aspen Middle School, Interview, 3/29/10). Landon argued, “Google Earth just doesn’t take you where you want to go and sometimes the areas of places were blurry” (Landon, Aspen Middle School, Interview, 3/19/10). When asked what would help make Google Earth better Landon suggested, “The technology needs to be updated” (Landon, Aspen Middle School, Interview, 3/19/10). Even though Cole enjoyed using Google Earth he found difficulty finding locations, “I just couldn’t find places I wanted, it was hard to navigate, I felt confused sometimes” (Cole, Madison Middle School, Interview, 3/29/10).
However, a few students were motivated to learn geography in order to better navigate Google Earth. Upon further questioning of Hunter’s dislike in using Google Earth and his “perceived” lack of geography skills, he stated “I guess if I knew the geography better of China like I might have been able to find the Great Wall…like if I knew it was near a river or something I might have searched for it near rivers” (Hunter, Madison Middle School, Interview, 2/25/10). Ashleigh reported,

While it is easy to put in a place on Google Earth and hit search and you’re taken to that place it helps to know a little about the geography of the place you’re looking for. Like if you are looking up, say, the pyramids in Egypt and put whatever in for the search of the pyramids of Egypt and Google Earth takes you to where you see mountains with a lot of green you know you’re in the wrong place because obviously the pyramids in Egypt are nowhere near mountains because it’s all desert! (Ashleigh, Aspen Middle School, Interview, 3/19/10)

The majority of students reported they were much more likely to use Google Earth rather than a paper map in order to find a location, develop spatial understanding, study environmental and climate changes, and understand real-world people and places. “Google Earth is much easier to use than the maps in our books because all you have to do is put in what you’re looking for and like in two seconds you’re there” (Emma, Madison Middle School, Interview, 3/23/10). Andrew felt that by using Google Earth he was able to understand the climate and environment where a ruin or landmark was located,

I felt I got a sense of the geography around Greece when looking at the Acropolis in Greece. When zooming around you could really see how much water is around
Greece and how close it is to Africa so you know it’s got to be by the equator so with all that water you know the place must be humid, and hot. Which I think would help save a lot of historical stuff and ruins and stuff like that in that area, though I’m not sure but I think it would, I think I read somewhere that sand can cause damage to stuff. Anyways, I also saw a picture from one of those little picture tab thingies on Google Earth that showed the Acropolis with fog around it but then I read the caption, it said the Acropolis was surrounded by smog from all the people and business around it. I wonder if that would hurt the Acropolis.

(Andrew, Madison Middle School, Interview, 2/23/10)

Hunter also discussed his understanding of Greece’s environment, “We learned it was hard for the Greeks to grow crops because of the mountains, you could see all the mountains using Google Earth, you could also see how sandy it was which would make it hard to grow crops” (Hunter, Madison Middle School, Interview, 2/25/10).

Cole cited that when he used Google Earth to study the Taj Mahal he was able to gain a sense of how to organize information about the past and analyze the spatial organization of people and places on the Earth’s surface.

It [Google Earth] showed me what the Taj Mahal looked like and told me what the emperor did to have a palace built for his wife. I actually thought it [Taj Mahal] was built in the middle of a desert but when you look at all the green with the trees and stuff around it and a river close by you realize it’s not in a desert. The land actually looks like what we have here. (Cole, Madison Middle School, Interview, 3/29/10)
Students who used Google Earth saw value in the technology and reported that it would help them in the future. Even further, students learned geography while at the same time they were introduced to a powerful technology for problem-solving and analysis. “You’re learning something new and you never know how it [learning how to use Google Earth or other GIS programs] can help you in the future” (Rachael, Hillsdale Springs Middle School, Interview, 3/19/10). Andrea further noted, “I think you might use this in college or something so it’s important to learn it now” (Andrea, Hillsdale Springs Middle School, Interview 3/12/10). Grace posited:

My mom is a real estate agent. She’s used it [Google Earth] for work, I’m not really sure why or how, I know she has it on her iPhone, I think she used it to look up someone’s house. Maybe someday I’ll be like my mom and will need to know how to use Google Earth to look up houses. (Grace, Hillsdale Springs Middle School, Interview, 3/19/10)

In their post-study interviews, students overwhelming attributed the visual images Google Earth provided with improving their historical and geographical understanding. As Brandon stated, “I learned it better visually with actually seeing places, the pictures you can click on and stuff” (Brandon, Aspen Middle School, Interview, 4/3/10). In addition, many students commented on how Google Earth helped them see the movement of armies, the clothing contemporary people were wearing, the physical description of people, and the transformation of the land. For example, Savannah indicated that seeing Constantine’s empire spatially through Google Earth helped her because, “I had a visual in my mind reading about Constantine’s empire but then looking at his actual empire and the pictures provided on Google Earth helped a lot” (Savannah, Aspen Middle School,
Interview, 4/3/10). Emma asserted, “We actually saw women in Saudi Arabia wearing the headdress [hijab], I felt so sorry for them” (Emma, Madison Middle School, Interview, 3/19/10). Andrea remarked, “In seeing the people you could tell what part of the world you were in, like in Egypt the people were dark but not Black and China they were small [in stature] and White” (Andrea, Hillsdale Springs Middle School, Interview, 3/12/10). Mason stated, “We see how things have changed from then to now, back then they didn’t have huge buildings but now you can see a bunch of buildings” (Mason, Hillsdale Springs Middle School, Interview, 3/25/10).

Summary

Students benefited from the use of Google Earth in three ways: it increased their motivation to learn geography, they learned a new technology, and it improved their historical and geographical understanding. Students enjoyed getting a birds-eye-view of the world. They reported enjoyment with being able to visit anywhere in the world without having to leave the classroom. The teachers believed Google Earth provided their students with a realistic view of the world and its geographic features.

Students were able to visualize and understand history by visiting historical locations around the world and draw their own conclusions. They were able to analyze events from multiple perspectives, providing them with a deeper understanding of why historical events occurred. Students began to develop historical empathy after researching ruins and landmarks. Students felt they were learning a technology that could help them in high school, college, and beyond.
Conclusion

In addressing the confusion over the term historical empathy, Barton and Levstik (2004) distinguished between historical empathy as cognitive and an affective endeavor. Cognitively, students seek to know and understand the perspectives and realities of remote peoples; affectively, students learn “to care with and about people in the past, to be concerned with what happened to them and how they experienced their lives” (Barton & Levstik, 2004, pp. 207-208). By placing historical empathy in the affective domain, historical empathy affirms Bage’s (1999) claim that emotions do matter in history. The students in this study sought to discover real people, events, and appreciate decisions through a geographical lens.

Historical empathy is best achieved through the lens of human experience. The students in this study came to recognize historical figures and events as real rather than isolated names or events in a textbook. Historical empathy, therefore, created a channel between the present and the past for the students. By studying history and geography through people’s lives, young adolescents can relate better to individuals whose experiences might otherwise remain foreign and puzzling to them. Wineburg (2001) confirms:

The familiar past entices us with the promise that we can locate our own place in the stream of time and solidify our identity in the present. By tying our own stories to those who have come before us, the past becomes a useful resource in our everyday life, an endless storehouse of raw materials to be shaped or bent to meet our present needs. Situating ourselves in time is a basic human need. (pp. 5-6)
The basic need to situate ourselves in time is essential for achieving empathy. Questions of who we are versus people of the past naturally arise, thus suggesting that the human element is vital to students’ success in developing historical empathy. During the identity seeking years of adolescence, these sorts of questions are intertwined with how they make sense of history which in turn helps students to become lifelong learners who can connect relevant learning to their real lives.
CHAPTER 5: DISCUSSION AND FUTURE RESEARCH

Introduction

This chapter reviews the study’s purpose, design, research questions, and provides recommendations and suggestions for further study. This study sought to answer four questions specific to how the Internet-based GIS program Google Earth can be used as an effective tool to develop middle school students’ geographic literacy and historical empathy. The research questions guiding this study were:

1. How does the use of the Internet-based GIS program Google Earth in a middle school social studies classroom affect students’ geographic literacy and development of historical empathy?

2. What is the teacher’s role when using the Internet-based GIS program Google Earth for instruction in the classroom?

3. What background factors are related to student learning outcomes as defined in this study?

4. What benefits do students report when using the Internet-based GIS program Google Earth?

Data was collected using a mixed-method approach that included a pre- and post-study survey, pre- and post-study individual teacher interviews, and a post-study interview with 18 students. Additionally, 15-20 observations were conducted in each classroom over a three-month period. Primary sources, handouts, and other supplementary instructional materials were also collected and analyzed to triangulate the findings and validate the study’s conceptual framework.
Google Earth was implemented in three seventh grade social studies classes for the duration of three months. While the quantitative results do not indicate Google Earth’s effectiveness, the qualitative results suggest the positive influences Google Earth had on students’ perceptions of geography and their development of historical empathy. As a result of using Google Earth, the students in this study developed a deeper understanding of connections between geography and history by developing significant insights into how geographic factors play a significant role in interpreting historical occurrences. Furthermore, Google Earth helped to enhance students’ computer skills while they were engaged in the process of doing social studies, including building historical knowledge through the use of primary sources, conducting historical inquiry, developing empathy, and thinking historically. It is clear, however, that the Internet-based GIS program Google Earth is a supplemental technology and not a replacement for the traditional teaching of history and geography. The findings suggest a need for more empirical research to clarify and define the role of Google Earth in helping students develop geographic literacy and historical empathy.

*Geographic Literacy*

The primary focus of this study was to explore how Google Earth can help middle school students develop geographic literacy and historical empathy. Although the paired t-tests did not show a statistically significant difference in student pre- and post-study of survey items related to whether or not they liked geography, the student interviews suggest a relationship between the use of Google Earth and developing geographic literacy.
Students were able to use Google Earth in order to understand and visualize the locations of civilizations, ruins, and geographic features such as deserts, rivers, and mountains. They became motivated to learn geography in order to better navigate Google Earth and find specific locations using geographic features. Even further, students reported that through the visualization of spatial features on Google Earth they were able to increase their memory retention and their understanding of geography. Students were able to develop geospatial thinking skills in order to understand space that was applied in a variety of teacher and student-centered lessons.

Students were able to focus on real-world people, places, and environments with which they made a personal connection. They were able to gain a perspective on the big and small picture of where people in the past lived, and how, as students, their personal surroundings fit together with the people of the past. Finally, the students became geographically informed as they were able to see meaning in the arrangement of thinking in space.

*Historical Empathy*

The student interviews suggest a significant relationship between the use of Google Earth and the development of historical empathy. Student responses reveal Google Earth helped them develop a perspective of why people in the past did what they did.

This study found that students increased their understanding of geography and history by making connections to people of the past, comparing and contrasting, applying, analyzing, evaluating, generalizing, and using geography skills, as well as seeing the big picture of places. Students began to understand people from a temporal
and cultural period different from their own. When young adolescents are provided the opportunity to personally relate to history through the lives of historical figures and events, they become interested in the personal side of history which aids in historical learning. When students are stimulated to learn history through the lives of historical figures and events, history is no longer experienced as foreign or perplexing.

Students’ curiosity in this study drove them to discover and understand who people of the past really were and to try and understand challenges they faced, the decisions they had to make, and why they made those decisions. Students began to understand historical figures, events, and places as real rather than isolated names, events, and places in their textbook. The human element proved to be essential to their success in developing historical empathy.

The ability to construct probable historical accounts through research and primary sources allows students to engage in historical thinking and develop empathy. Yeager and Foster (2001) clarify that these exercises should not be merely creative imagination, but rather a method in which students are encouraged to use higher order thinking skills of interpreting, analyzing, comparing, and explaining. Many students, at first, struggled through the process of historical empathy but through repeated exposure and practice, they began to demonstrate varying degrees of empathy. However, in order for students to achieve historical empathy they needed more scaffolding, more direction, and more teacher intervention.

**Visuals**

The students’ exposure to authentic visual images in Google Earth helped to improve their understanding of geographic literacy and history. Students built their
understanding of geography and history by making connections between the places they saw on Google Earth and what they knew, what they were learning, what they learned from whole-class discussion, and their group work while using Google Earth. The visuals used in Google Earth brought a human interest application to the students that transported them back in time or into another culture. Students’ visualization of spatial features in the context of historical locations increased their memory retention and their understanding of geography. Students were provided the opportunity to explore spatial relationships, human and environmental interactions, and were encouraged to think critically in order to problem-solve. The visualization of spatial features in the context of historical locations enhanced their memory skills and their understanding of a culture and/or a civilization.

**Teacher Role**

The teacher’s role is significant in using the Internet-based GIS program Google Earth for instruction in helping middle school students learn about geography and develop historical empathy. The teachers in this study were optimistic about the effective role of Google Earth in supplementing their social studies instruction. It became evident that Google Earth provided added value to the development of the teachers’ social studies curriculum. Even so, Doolittle and Hicks (2003) remind social studies teachers that:

> If integrated technology means nothing more than enhancing the traditional delivery system of social studies content, where laptops replace notebooks, where PowerPoint slides replace handwritten overheads, where e-textbooks replace hard copy textbooks, then we will be no closer to the NCSS vision of the transformative power social studies instruction. (p. 75)
If the chief value of technology lies in “providing the leverage so urgently needed for moving social studies away from passive, teacher-dominated approaches emphasizing recall and regurgitation and toward active student-centered forms of learning” (Crocco, 2001, p. 387), then a glimpse into this study’s social studies classrooms offer insight into how to get there. The three teachers who participated in this study believe geography to be an important part of teaching history and therefore consistently used Google Earth to further the critical and historical thinking of their students as well develop their geography skills. Throughout the instructional process, the teachers guided and helped their students’ learning and development of empathy. The teachers posed questions, answered student questions, carefully observed and/or listened to the students’ responses in order to redirect or encourage their work. During whole group instruction, the teachers often generalized the students’ responses to help them improve their thinking skills. The teacher’s role was that of a facilitator of student learning. The students were engaged in activities that helped them construct their own knowledge while the teacher facilitated that process.

*Middle Schools*

As discussed in Chapter Two, middle school students “spend more time reading, writing, and problem solving when technology is involved” (Powell, 2005, p. 200). Thus, middle school teachers have a unique opportunity to help their students develop effective learning strategies through the use of technology that will take them onto high school, college and help them become informed citizens. The lessons used in this study were developmentally appropriate for middle school students. The lessons were targeted to meet the students’ educational needs in order to provide an education best suited to
their developmental growth. Through the use of Google Earth, students and teachers were engaged in active learning; the curriculum was relevant, challenging, integrative, and exploratory; and most importantly the teachers were flexible in order to best meet the needs of their students in order for them to achieve academic and social success.

**Background Factors**

Regardless of gender, socio-economic status or ethnicity, 88% of the students who participated in this study had access to computers outside of school. Students reported that their primary use of computers outside of school was to access social networking websites, (i.e. Facebook or MySpace). Next to social networking websites, searching the Internet was one of the most frequently reported activities for out of school computer use. Students’ attitudes toward computer use were positive.

The schools that participated in this study are unlike most schools located in the United States. The three schools are located in rural Southeast Ohio in an area often referred to as “the foothills of the Appalachian Mountains.” The students and the teachers who teach at and attend these schools live in area isolated from major towns and cities. The economy of Southeast Ohio was once fully supported by coal and salt mines, timber, railroads, and a major university. The major university is all that still fully exists, as many of the coal and salt mines have closed and the railroads have been abandoned. There is little in the way of employment. Therefore, a significant number of the people who live in this part of Ohio live in poverty and often depended on public assistance. According the 2000 Census, the median household income in Southeast Ohio was $27,000 per year; $14,000 lower than the national average. However, the university adds
to the uniqueness of this area as there are a number of middle to upper class, well-traveled, and well-educated people.

Two of the three teachers who participated in this study were born and raised in Southeast Ohio close to the schools in which they teach. They know what life is like for many of their students and families. They know their students come from families who have little to no education, no or low-paid employment, and struggle to make ends meet.

Two teachers who participated in this study stated in their interviews that they became teachers and chose to teach in this area so they could provide students a good education in hopes they could break the cycle of poverty. Their hope is to instill in students the value of an education so their students continue their education, in order to obtain good, well-paid employment.

Unfortunately, the teachers who participated in this study reported that they believed many of their students (and families) do not value or understand the importance of an education. The teachers felt this lack of support often hindered their teaching as homework/projects often returned incomplete due to lack of parental support or parents not being able to help their child, and/or a lack of student interest. As the research literature indicates, in order for American students to succeed as effective citizens, workers, and leaders in the 21st century they must be provided the opportunity to use information and communication technologies within their original context (Partnership for 21st Century Skills, 2005). When students are not provided this opportunity, they will be at a disadvantage in comparison to their peers which may well significantly affect their success in life. Even though 88% of the students reported having a computer at home, teachers did not assign homework that required the use of a computer or Internet due to
the fact that 12% of the students did not have access to a computer to complete the assignment.

This study further supports recent research findings that the gap between the use of technology in and out of school is widening (De et al., 2004; Pew Internet & American Life Project, 2005; Wilhelm et al., 2002). Even further, this study’s findings confirm Levstik and Barton’s, (2001) and Spires et al. (2008) research that found students view the integration of technology at school is limited. The students in this study want to use the computer more in school for school assignments, word processing, and to learn how to use other standard software applications. Unfortunately, these students reported they rarely use the computer in school for applications other than for drill and practice. Students also reported when they do use computers in school, they are often used as a bonus for when they are finished with school work and are given time to get onto a computer. The students’ current social studies classroom was the most frequently reported class in which technology was regularly used by the teacher and the students.

Quantitative data revealed boys’ attitudes towards computers were more positive than the girls, but no gender differences were found in the qualitative data. The gender-based differences found in the quantitative data are comparable to the results of Upitis (2001) and Butler (2000) who indicated gender is a consistent factor affecting computer attitudes; boys generally have a more positive attitude toward computers than girls. A study conducted by Sheingold (1981) found that seventh grade was the point at which boys increased their computer use compared to girls. Collis (1985) further found that gender differences in attitudes toward computers were strongly established by the eighth
grade. The student interview responses were one of a kind. Therefore, to more fully understand the gender differences, further research is necessary.

Google Earth

One of the most widely reported advantages of using Google Earth in this study was that it was user-friendly and provided excellent visuals. The students were genuinely intrigued by and excited about having information and seeing places they were studying in real-time which expanded their interest in the learning process. In general, students found Google Earth fun, engaging, and easy to use. Google Earth helped them learn geography and history that in effect, shifted instruction from being teacher-centered to student-centered. The teachers also reported the ease of using Google Earth. They found it fun, but most importantly it helped them to teach geography skills and historical empathy.

Lastly, using Google Earth provided teachers and students the opportunity to use information and communication technologies in an authentic context. Given the positive responses from the students and teachers regarding the use and benefits of Google Earth, additional GIS applications should be developed to promote the use of this technology in other social studies classrooms.

Recommendations

The purpose of this study was to determine whether the Internet-based GIS program Google Earth can be used as an effective tool to increase middle school students’ geographic literacy and historical empathy by developing a deeper understanding of the relationship between geography and history. What emerged from the study was the significant role the teacher plays in successfully incorporating a new
technology in the classroom in order to enhance the social studies curriculum. Efforts in teaching geographic literacy and historical empathy demand a significant amount of time and effort from both the teacher and the students. Some of the possible implications are:

*Teachers*

- Professional development programs are needed to engage social studies teachers in more pedagogical issues related to planning, evaluating, and incorporating GIS programs like Google Earth into their social studies curriculum.
- Social studies teachers need to take more time to help their students develop historical empathy.
- If a middle school is to be successful, professional development programs need to provide social studies educators with ways in which 21st century skills can be incorporated into the classroom in order to create a curriculum that is student-centered, relevant, challenging, integrative, exploratory, and capable of reaching multiple learning styles.
- Social studies teachers need to learn how to utilize GIS technology to teach local, regional, state/national, and global geography concepts and content in order to encourage local and global interaction as well as for students to attain multiple perspectives on people, issues, and events.
- Social studies lessons utilizing Google Earth need to be developed in order to create more opportunities for social studies teachers to utilize this technology.
• Geographic information systems such as Google Earth need to be introduced in the early grades for students to study their home, neighborhood, community and the world beyond in order to enhance their geographic literacy.

• Social studies teachers need to spend more time teaching their students how to critically evaluate information they encounter in books or on the Internet in order to determine its trustworthiness and/or reliability.

Teacher Educators

• Teacher education programs need to place significant emphasis on utilizing technology in the social studies classroom in order for pre-service educators to learn to thread technology throughout their curriculum in order to provide their students with lessons and activities in which technology is used in an authentic context to help develop students 21st century skills.

• More attention needs to be given to teaching social studies educators and pre-service teachers on how to teach historical thinking, perspective taking, and historical empathy. Only when social studies teachers have a clear understanding of historical thinking, perspective taking, and historical empathy, will they be able to develop lessons that actively engage their students in historical inquiry.

School Administrators

• More class time needs to be provided for social studies instruction in order to use technology with students. The traditional 45 minute class periods do not
provide sufficient time for teachers and students to effectively utilize computer technology.

- The Ohio Department of Education needs to reduce the number of social studies standards taught in the seventh grade. In order for students to truly appreciate and understand the social studies need to emphasize depth over breadth and to focus on 21st century skills.

Suggestions for Further Study

- As this study findings suggest that students’ sole use computers at home was for social networking. Further research on home computer use might well provide further insight into how social networking can help students further develop geographic literacy and historical empathy.

- Based on the findings in this suggest, future research should examine student perceptions of the validity and reliability of information they encounter in books versus that on the Internet.

- Further studies should address gender differences to determine whether the use and effectiveness of GIS computer technology differs between male and female students.

- Further studies should examine Google Earth’s use in a seventh grade social studies classroom for an entire school year to understand its effect on developing students’ geographic literacy and historical empathy.

- Replication of this study in these classrooms and other middle school classrooms could provide additional insight and examine whether Google
Earth helps other middle school students develop historical empathy and geographic literacy.

- Further studies should be directed at urban or suburban schools in order to compare and contrast their findings with the middle schools that participated in this study.

- Research should include studying the impact of GIS programs in social studies classrooms at other educational levels, such as in elementary and secondary schools.

- Research should include early introduction of computer use in social studies in the primary grades to determine its effectiveness on increasing girl’s attitudes towards technology and computer use.

- In the world of high-stakes testing social studies educators often teach breadth rather than depth to raise test scores. Research therefore, should be conducted to determine the relationship between levels of geographic literacy and historical empathy and student test scores.

Conclusion

In conclusion, this study found that the integration of GIS technology in the social studies classroom is an emerging phenomenon. The Web-based GIS program Google Earth improved students’ geographic literacy, historical thinking and problem solving skills as well as provided them with the opportunity to analyze geographic information. Students were provided an opportunity to explore how the past affects the present and the present might affect the future, and to interpret history for themselves. They were able to
learn about the real world through a new experience in order for them to become more engaged in the disciplines of geography and history and to be exposed to diverse people and perspectives.

Google Earth provided students with an opportunity to explore the world and its many surfaces, places, and regions, and allowed them to make connections between classroom discussions, their textbook, and the real world. When students know the geography of an area or place, they can begin to interpret the complexity of the characteristics, distribution, and migration of past and present populations on the Earth's surface and how history has been created (Songer, 2007).

While the qualitative data in this study suggest, that Google Earth was an effective tool in teaching geographic literacy and historical empathy, this study does not claim that using Google Earth is the only solution. Rather, this study suggests that GIS programs such as Google Earth can help social studies teachers enhance their students’ geographic literacy and historical understanding in a new and exciting way.
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APPENDIX A: TEACHER CONSENT

TEACHER CONSENT TO PARTICIPATE IN AN OHIO UNIVERSITY EDUCATIONAL RESEARCH PROJECT

TITLE OF PROJECT: How Google Earth can be used as an effective Internet Geographic Information System (GIS) tool to help middle school social studies students’ develop historical empathy.

PURPOSE OF THE RESEARCH STUDY: The purpose of this study is to examine how middle school social studies teachers can use Google Earth to help their students’ develop historical empathy.

WHAT YOU WILL DO IN THE STUDY: During the study, you will be interviewed twice and each interview will last approximately 1 hour each. The researcher will conduct classroom observations approximately 8-10 times over a three month period.

TIME REQUIRED: Each interview will take approximately 1 hour each and classroom observations will be scheduled with you and will total 15-20 hours.

RISKS: There are no known risks.

BENEFITS: There are no direct benefits to you beyond the learning experience that you will receive provided by the study.

CONFIDENTIALITY: The information that you give in the study will be handled confidentially and your information will be assigned a pseudonym. Your name will not be used in any report; information you provide will not be shared with any administrators and will have NO professional effect on you.

VOLUNTARY PARTICIPATION: Your participation in the study is completely voluntary.

HOW TO WITHDRAW FROM THE STUDY: You may withdraw from this study at anytime by telling the researcher or your administrator or researchers advisor.

PAYMENT: You will receive no payment for participating in this study.
WHO TO CONTACT IF YOU HAVE QUESTIONS ABOUT THE STUDY:

- Jennifer Tesar, Graduate Student, College of Education, Ohio University, Athens, Ohio 45701. Telephone: (740) 707-3993. email: tesarj@ohio.edu
- Dr. Frans Doppen, Faculty Advisor, College of Education, Ohio University, Athens, Ohio 45701. Telephone: (740) 593-0254, email: doppen@ohio.edu
- If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740) 593-0664.

AGREEMENT: I _________________________________________agree to participate in the research study described above.

Signature: ___________________________ Date: ________________
APPENDIX B: PARENT/GUARDIAN CONSENT

PARENT/GUARDIAN CONSENT FOR STUDENT TO PARTICIPATE IN AN OHIO UNIVERSITY EDUCATIONAL RESEARCH PROJECT

TITLE OF PROJECT: How Google Earth can be used as an effective Internet Geographic Information System (GIS) tool to help middle school social studies students’ develop historical empathy.

I invite your student to participate in the research study named above. Before you can decide whether or not to allow your student to volunteer for this study, you must understand the purpose, how it may affect your student, any risks to your student, and what is expected of your student.

- Your student’s participation is entirely voluntary;
- You may decide not to allow your student to participate or to withdraw your student from the study at any time without penalty;
- If you decide to withdraw your student from the study please notify me or your student’s social studies teacher;
- If the study is changed in any way, which could affect your student’s participation, you will be told about the changes and may be asked to sign a new informed consent.
- Your student’s grade will in no way be affected by participating or lack of participation in this research study.

WHAT YOUR STUDENT WILL DO IN THE STUDY: During the study, your student may be interviewed which will last approximately 30 minutes. Your student will also be asked to complete two surveys.

TIME REQUIRED: Each interview will take about 30 minutes. The surveys will take approximately 10-15 minutes.

RISKS: There are no known risks.

BENEFITS: There are no direct benefits to your student beyond the learning experience that he/she will receive provided by the study.

CONFIDENTIALITY: The information that your student gives during the study will be handled confidentially and your student’s name will not be used in any report.
WHO TO CONTACT IF YOU HAVE QUESTIONS ABOUT THE STUDY:

- Jennifer Tesar, Graduate Student, College of Education, Ohio University, Athens, Ohio 45701. Telephone: (740) 707-3993. email: tesarj@ohio.edu
- Dr. Frans Doppen, Faculty Advisor, College of Education, Ohio University, Athens, Ohio 45701. Telephone: (740) 593-0254, email: doppen@ohio.edu
- If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740) 593-0664.

AGREEMENT: I agree to allow ____________________________ to participate in the research study described above.

Signature: ____________________________ Date: _________________

Print your name: ____________________________
APPENDIX C: STUDENT CONSENT

STUDENT PARTICIPANT CONSENT TO PARTICIPATE IN AN OHIO UNIVERSITY EDUCATIONAL RESEARCH PROJECT

TITLE OF PROJECT: How Google Earth can be used as an effective Internet Geographic Information System (GIS) tool to help middle school social studies students’ develop historical empathy.

PURPOSE OF THE RESEARCH STUDY: The purpose of this study is to examine how Google Earth can be used as an effective tool to help you develop historical empathy.

WHAT YOU WILL DO IN THE STUDY: During the study, you may be interviewed twice and each interview will last approximately 1 hour each. You will complete two student surveys. The researcher will conduct classroom observations approximately 8-10 times over a three month period.

TIME REQUIRED: Each interview will take 30 minutes and classroom observations will total 15-20 hours. The total experiment will require about 16-21 hours over the course of the year.

RISKS: There are no known risks.

BENEFITS: There are no direct benefits to you beyond the learning experience that you will receive provided by the study.

CONFIDENTIALITY: The information that you give in the study will be handled confidentially and your name will not be used in any report.

VOLUNTARY PARTICIPATION: Your participation in the study is completely voluntary.

HOW TO WITHDRAW FROM THE STUDY: If you want to withdraw from the study, tell me or your social studies teacher. There is no penalty for withdrawing.

PAYMENT: You will receive no payment for participating in the study.
WHO TO CONTACT IF YOU HAVE QUESTIONS ABOUT THE STUDY:

- Jennifer Tesar, Graduate Student, College of Education, Ohio University, Athens, Ohio 45701. Telephone: (740) 707-3993. email: tesarj@ohio.edu
- Dr. Frans Doppen, Faculty Advisor, College of Education, Ohio University, Athens, Ohio 45701. Telephone: (740) 593-0254, email: doppen@ohio.edu
- If you have any questions regarding your rights as a research participant, please contact Jo Ellen Sherow, Director of Research Compliance, Ohio University, (740) 593-0664.

AGREEMENT: I ________________________________ agree to participate in the research study described above.

Signature: ________________________________ Date: ________________
APPENDIX D: TEACHER PRE-STUDY INTERVIEW QUESTIONS

1. Why did you decide to become a teacher? What is your philosophy of teaching?
2. What are your thoughts on the pros and cons of instructional technology (i.e., the use of computers in the social studies classroom)?
3. How often do you incorporate technology into your curriculum? If you use technology, what type of technology do you use and how often?
4. Do you think your school has an adequate infrastructure for you to be able to integrate technology into your curriculum? Explain.
5. How often do you receive training on technology integration? What kind of training do you receive?
6. Do you think your school’s administrators, colleagues, students, and parents value the integration of technology into your curriculum? Why or why not?
7. Do you think your students are more motivated in learning about social studies when technology is used? Why? Give an example?
8. Do you think that when students use computers for social studies they become more engaged in the topic? Why? Give an example?
9. Do you think computers help build students critical thinking, problem-solving, and decision-making skills? Why? Give an example?
10. When computers are used to supplement social studies instruction do you think they help broaden a student’s exposure to diverse people and perspectives? How? Why?
11. What does the concept of “historical empathy” mean to you?
12. What does geography education mean to you?
13. Do you think your students are geographically literate? Why?
14. How does geography education fit into your curriculum?
15. What are your thoughts about teaching your students historical empathy?
16. What are your thoughts about teaching your students geography?
17. Do you think when students have a good understanding of the geography of a particular place they are better able to grasp the history of that place? Please explain.
18. Have you ever used a GIS (Geographic Information System) program in your social studies curriculum? If so which program and in what manner and setting did you use it?
19. Have you ever used the free Internet based GIS program, Google Earth? If so in what manner and setting did you use it?
20. Do you think your students will be motivated to learn geography when they use Google Earth?
21. Do you have any additional questions/comments?
APPENDIX E: TEACHER POST-STUDY INTERVIEW QUESTIONS

1. What are your thoughts on the pros and cons of instructions technology, i.e., the use of computers in the social studies classroom?
2. Do you think your school has an adequate infrastructure for you to be able to integrate technology into your curriculum? Explain.
3. Do you think your school’s administrators, colleagues, students, and parents value the integration of technology into your curriculum? Why or why not?
4. Do you think your students are more motivated in learning about social studies when technology is used? Why? Give an example?
5. Do you think that when students use computers for social studies they become more engaged in the topic? Why? Give an example?
6. Do you think computers help build students critical thinking, problem-solving, and decision-making skills? Why? Give an example?
7. When computers are used to supplement social studies instruction do you think they help broaden a students’ exposure to diverse people and perspectives? How? Why?
8. What does the concept of “historical empathy” mean to you?
9. What does geography education mean to you?
10. Do you think your students are geographically literate? Why?
11. How does geography education fit into your curriculum?
12. What are your thoughts about the importance of teaching your students about historical empathy?
13. What are your thoughts about teaching your students geography?
14. Do you think when students have a good understanding of the geography of a particular place they are better able to grasp the history of that place?
15. What were the pros and cons of implementing Google Earth into your social studies curriculum?
16. How do you feel your students responded to using Google Earth?
17. Describe your students’ motivation to learn about a social studies topic when using Google Earth?
18. Do you think the students were able to develop historical empathy through the use of Google Earth? How?
19. Would you use Google Earth for future lessons? Why or why not?
20. Are you interested in using more advanced GIS programs? Why or why not?
21. Do you have any additional questions/comments?
APPENDIX F: STUDENT POST-STUDY INTERVIEW QUESTIONS

1. What is your favorite subject in school and why?
2. Do you like social studies? Why or why?
3. Do you like your social studies teacher? Why or why not?
4. Do you like using computers? Why or why not?
5. What stops you from using computers in school? Explain
6. In the past, how much have your social studies teachers used computers in their classrooms? What did they use them for, give an example? How often?
7. In the past, how much have your other teachers used computers in their classroom? What did they use them for? How often?
8. How often do you use computers at home? And what for?
9. What can you do to better understand why people in the past did what they did?
10. How do you use computers to learn about history?
11. Do you think your school has enough computers? Why or why not?
12. Do you get to spend enough time using computers at your school? Why or why not?
13. Do you think using computers in social studies helps to make the subject more interesting? Why or why not?
14. Do you get to spend enough time on computers in your social studies classes? Why or why not?
15. Do you think computers should be an important part of your education? Why do you think that?
16. What is geography?
17. Do you think geography is an important subject to learn?
18. In the past, did your social studies teachers use maps to help you learn geography?
19. Do you think you have a good understanding of geography?
20. Do you think when you have a good understanding of the geography of a particular place it helps you to understand the history of that place? Why?
21. Did you ever used a GIS (Geographic Information System) program before this unit? If so where, which program, and how?
22. Have you ever used the free Internet based GIS program, Google Earth? If so, where, why, and how?
23. Were you more motivated to learn geography when you used Google Earth? Why or why not?
24. What did you like about Google Earth?
25. What did you not like about Google Earth?
26. Do you have any additional questions/comments?
APPENDIX G: STUDENT PRE-AND POST-STUDY

Please answer the following questions by circling what applies to you.

**My age is:** 12  13  14  15  16

**My gender is:** Female  Male

**My ethnic group is:**
White  Black  Hispanic  Asian or American  Multi-
non-  non-  Pacific  Indian or Racial
Hispanic  Hispanic  Islander  Alaska
Native

Please circle the statement that best corresponds to your thinking.

1. **I like social studies.**
   - strongly disagree  disagree  neutral  agree  strongly agree

2. **I like my social studies teacher.**
   - strongly disagree  disagree  neutral  agree  strongly agree

3. **I like using computers.**
   - strongly disagree  disagree  neutral  agree  strongly agree

4. **My social studies teachers in the past have used computers a lot.**
   - strongly disagree  disagree  neutral  agree  strongly agree

5. **Computers make learning more interesting.**
   - strongly disagree  disagree  neutral  agree  strongly agree

6. **Nothing blocks me from using computers at school.**
   - strongly disagree  disagree  neutral  agree  strongly agree

7. **I have a computer at home.**
   - Yes  No

*If you answered No to this question skip to question 11.*
8. I have Internet service at home.
   Yes          No

9. I have fast Internet at home.
   Yes          No

10. I often use my computer at home for school related things.
    strongly disagree  disagree  neutral  agree  strongly agree

11. I use computers a lot outside of the social studies classroom to complete social studies assignments.
    strongly disagree  disagree  neutral  agree  strongly agree

12. At my school I get to spend enough time on computers.
    strongly disagree  disagree  neutral  agree  strongly agree

13. Computers make learning social studies more interesting.
    strongly disagree  disagree  neutral  agree  strongly agree

14. I think computers should be an important part of learning.
    strongly disagree  disagree  neutral  agree  strongly agree

15. I enjoy studying geography.
    strongly disagree  disagree  neutral  agree  strongly agree

16. I think learning geography is a very important subject to learn in school.
    strongly disagree  disagree  neutral  agree  strongly agree

17. When you have a good understanding of the geography of a particular place you are better able to understand the history of that place.
    strongly disagree  disagree  neutral  agree  strongly agree

18. I like studying maps.
    strongly disagree  disagree  neutral  agree  strongly agree

19. Google Earth is easy to use.
    strongly disagree  disagree  neutral  agree  strongly agree

20. Using Google Earth helps me to better understand geography.
    strongly disagree  disagree  neutral  agree  strongly agree

21. Using Google Earth helps me to better understand history.
    strongly disagree  disagree  neutral  agree  strongly agree
22. I will use Google Earth in the future to help understand history better.

strongly disagree disagree neutral agree strongly agree
APPENDIX H: GOOGLE EARTH LESSON

Grade: 7  
Subject: Social Studies World History 1000 B.C. to A.D. 1700  
Duration: 3-4 days

Goals: Students will gain an appreciation of how geography and history together have affected each other across time, how people have influenced and been influenced by their environments in different periods of the past.

Learning Objectives: The student will be able to,
- Identify a famous city, landmark, ruin, or natural wonder found around the world that they have studied in their seventh grade social studies class.
- Demonstrate an understanding of why a famous city, landmark, ruin, or natural wonder found around the world was significant to an ancient civilization.
- Demonstrate an understanding of the past by creating a “place mark” in Google Earth that depicts a famous city, landmark, ruin, or natural wonder as it was seen in its historical context.
- Describe the similarities between their famous city, landmark, ruin, or natural wonder found around the world in past and present terms.
- Describe the differences between their famous city, landmark, ruin, or natural wonder found around the world in past and present terms.
- Describe how their famous city, landmark, ruin, or natural wonder found around the world will change in 100 years from now.

Ohio Seventh Grade Social Studies Standards:
- History:
  - Describe the enduring impact of early civilizations in India, China, Egypt, Greece and Rome after 1000 B.C. including:
    - The development of concepts of government and citizenship;
    - Scientific and cultural advancements;
    - The spread of religions;
    - Slavery and systems of labor.
- Geography:
  - On a map, identify places related to the historical events being studied and explain their significance.
  - For each of the societies studied, identify the location of significant physical and human characteristics on a map of the relevant region.
  - Use physical and historical maps to analyze the reasons that human features are located in particular places.
- Social Studies Skills and Methods:
  - Describe historical events and issues from the perspectives of people
living at the time in order to avoid evaluating the past in terms of today's norms and values.
  o Compare multiple viewpoints and frames of reference related to important events in world history.

- **Technology components:**
  - Google Earth 101 PowerPoint presentation
  - Google Earth software
  - Computer with LDC projector and Internet connection
  - Access to the Internet for teacher and student-based research
  - Computer lab

**Introduction:**
- Discuss with students a famous city, landmark, ruin, or a natural wonder they have visited such as a civil war battlefield, an Indian Mound, Old Man’s Cave, Washington, DC etc. How did they feel when they explored the famous city, landmark, ruin, or natural wonder? What did they learn by “visiting” this famous city, landmark, ruin, or a natural wonder?
- Ask the students if they could visit any civilization in history which civilization it would be and why. What do they hope to learn by visiting this particular site?
- Tell the students they are going to have the opportunity to visit (via Google Earth) a famous ancient city, landmark, ruin, or a natural wonder and create a “place mark” on Google Earth.

**Prior Knowledge:**
- Show the students a map of the world. Ask them to identify specific countries, cities, or regions that they have studied in their seventh grade social studies class.
- Have the students expand on what they know about that particular country, city or region and why they are important to history.

**Present New Content:**
- Ask students whether they have ever used Google Earth, why or why not? Ask students why people use Google Earth?
- Using PowerPoint and Google Earth present an introduction to using Google Earth (Google Earth 101.PPT). Students will learn Google Earth skills such as;
  - Searching for locations by name, street address, or latitude and longitude
  - Using the ruler to measure distances
  - Overlaying lines of latitude and longitude.
  - Changing sunlight based on time of day.
  - Viewing the Earth, sky, or Mars.
  - Turning on or off various layers, including 3D structures.
  - “Place marking”
  - Adding pictures
As the students watch the PowerPoint presentation they will each practice the Google Earth skill on their PC in the computer lab.

Independent Learning Experience:

- Divide the students into pairs or small work groups. Each group will select a famous ancient city, landmark, ruin, or a natural wonder that they have studied in seventh grade social studies.
- Students will review their class notes and textbook for information on their ancient civilization. They may also research new information found on the Internet in the form of primary sources, articles, etc. as it relates to their famous city, landmark, ruin, or a natural wonder.
- Students will create a “place mark” on Google Earth that includes a photo and description of their famous city, landmark, ruin, or natural wonder as was seen in its historical context.
- The “place mark” photo may be hand-drawn and then scanned into an electronic file. Or students may use photos found on the Internet but they must depict the city, landmark, ruin, or natural wonder as it was seen in history.
- The description will describe why their famous city, landmark, ruin, or natural wonder found around the world was significant to an ancient civilization. The description will,
  - Include the geography surrounding the city, landmark, ruin, or natural wonder.
  - Provide specific details about significant physical characteristics relevant to the region i.e., major rivers, deserts, mountains, etc.
  - Describe changes in the physical characteristics of the region that have occurred over time and explain the consequences of such changes?
  - Explain why the civilization was located in that particular place.
- Using Microsoft Word students will write a short essay comparing the similarities and differences between their famous city, landmark, ruin, or natural wonder found around the world, in the past and present. Students will further describe how their famous city, landmark, ruin, or natural wonder might change in 100 years from now. Guidelines for the essay are as follows:
  - Handout must be double-spaced with 1 inch margins
  - Do not exceed 2 pages
  - Use a professionally looking twelve-point font such as Times New Roman or Arial
- Is free of spelling or grammatical errors
- Students will share their “place mark” and essay with the class.

Feedback:

- Teacher circulates around the room providing ongoing feedback to small groups.

Assessment:

- Using a scoring rubric, provided to the students in advance, to evaluate each place mark and description.
<table>
<thead>
<tr>
<th>Name(s):</th>
<th>Not Evident (0 points)</th>
<th>Somewhat Evident (1 point)</th>
<th>Evident (2 points)</th>
<th>Clearly Evident (3 points)</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Place mark” includes a <strong>photo</strong> of famous city, landmark, ancient ruin, or natural wonder as was seen in its <strong>historical context</strong>.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Place mark” includes a <strong>description</strong> of famous city, landmark, ancient ruin, or natural wonder as was seen in its <strong>historical context</strong>.</td>
<td></td>
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<tr>
<td>Photo depicts the city, landmark, ancient ruin, or natural wonder as was seen in history.</td>
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</tr>
<tr>
<td>Description describes why the famous city, landmark, ancient ruin, or natural wonder was significant to an ancient civilization.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Description includes the geography surrounding the city, landmark, ancient ruin, or natural wonder; Description provides specific details about significant physical characteristics relevant to the region.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Description includes a summary of changes in the physical characteristics of the regions that have occurred over time and explains the consequences of these changes.</td>
<td></td>
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<tr>
<td>Description demonstrates knowledge of why students think their civilization was located in that particular place.</td>
<td></td>
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<tr>
<td>Essay compares the similarities and differences of their famous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>city, landmark, ancient ruin, or natural wonder found around the world in past and present terms.</td>
<td></td>
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</tr>
<tr>
<td>Essay describes how famous city, landmark, ancient ruin, or natural wonder might change in 100 years from now.</td>
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<tr>
<td>Uses correct language mechanics to clearly and succinctly express ideas.</td>
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<tr>
<td>Total</td>
<td>/ 30</td>
<td></td>
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</tr>
</tbody>
</table>
### APPENDIX I: SURVEY

**Percentages of Student Responses by Question**

<table>
<thead>
<tr>
<th>Question #</th>
<th>Pre-Survey Mean</th>
<th>Post-Survey Mean</th>
<th>Pre-Survey Percent “Agree”</th>
<th>Pre-Survey Percent “Disagree”</th>
<th>Post Survey Percent of “Agree”</th>
<th>Post-Survey Percent of “Disagree”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Like SS</td>
<td>3.44</td>
<td>3.50</td>
<td>37.1%</td>
<td>8.4%</td>
<td>37.1%</td>
<td>8.4%</td>
</tr>
<tr>
<td>2. Like SS Teacher</td>
<td>4.38</td>
<td>4.13</td>
<td>32.3%</td>
<td>2.8%</td>
<td>39.2%</td>
<td>.7%</td>
</tr>
<tr>
<td>3. Like Computers</td>
<td>4.36</td>
<td>4.31</td>
<td>30.1%</td>
<td>1.4%</td>
<td>39.9%</td>
<td>2.1%</td>
</tr>
<tr>
<td>4. Past SS Teachers</td>
<td>2.94</td>
<td>2.98</td>
<td>23.8%</td>
<td>23.8%</td>
<td>21.0%</td>
<td>21.7%</td>
</tr>
<tr>
<td>5. Computer Interesting</td>
<td>4.05</td>
<td>4.01</td>
<td>36.4%</td>
<td>4.2%</td>
<td>45.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>6. Nothing Blocks</td>
<td>3.30</td>
<td>3.00</td>
<td>20.3%</td>
<td>1.5%</td>
<td>19.6%</td>
<td>29.4%</td>
</tr>
<tr>
<td>7. Computer at home</td>
<td>4.52</td>
<td>4.50</td>
<td>(yes) 88.1%</td>
<td>(no) 11.9%</td>
<td>(yes) 83.2%</td>
<td>(no) 11.9%</td>
</tr>
<tr>
<td>8. Internet home</td>
<td>4.20</td>
<td>4.26</td>
<td>(yes) 73.4%</td>
<td>(no) 18.2%</td>
<td>(yes) 67.8%</td>
<td>(no) 15.4%</td>
</tr>
<tr>
<td>9. Fast Internet</td>
<td>3.18</td>
<td>3.31</td>
<td>(yes) 49%</td>
<td>(no) 41.3%</td>
<td>(yes) 46.9%</td>
<td>(no) 34.3%</td>
</tr>
<tr>
<td>10. Computer home use</td>
<td>2.93</td>
<td>2.90</td>
<td>14.7%</td>
<td>19.6%</td>
<td>13.3%</td>
<td>18.9%</td>
</tr>
<tr>
<td>11. Computers for SS</td>
<td>2.71</td>
<td>2.94</td>
<td>17.5%</td>
<td>35.7%</td>
<td>18.2%</td>
<td>26.6%</td>
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</tr>
<tr>
<td>12. Enough time</td>
<td>2.74</td>
<td>2.68</td>
<td>21.0%</td>
<td>30.1%</td>
<td>21.7%</td>
<td>35.7%</td>
</tr>
<tr>
<td>13. Computer SS interesting</td>
<td>3.85</td>
<td>3.89</td>
<td>35.0%</td>
<td>4.9%</td>
<td>44.1%</td>
<td>6.3%</td>
</tr>
<tr>
<td>14. Computers important</td>
<td>3.80</td>
<td>3.80</td>
<td>34.3%</td>
<td>5.6%</td>
<td>39.2%</td>
<td>6.3%</td>
</tr>
<tr>
<td>15. Enjoy Geography</td>
<td>3.28</td>
<td>3.25</td>
<td>32.2%</td>
<td>11.2%</td>
<td>30.1%</td>
<td>11.9%</td>
</tr>
<tr>
<td>16. Geography Important</td>
<td>3.53</td>
<td>3.48</td>
<td>43.4%</td>
<td>4.9%</td>
<td>40.6%</td>
<td>7.0%</td>
</tr>
<tr>
<td>17. Good Understanding</td>
<td>3.73</td>
<td>3.71</td>
<td>42.7%</td>
<td>3.5%</td>
<td>49.0%</td>
<td>3.5%</td>
</tr>
<tr>
<td>18. Like Maps</td>
<td>3.13</td>
<td>3.13</td>
<td>33.6%</td>
<td>20.3%</td>
<td>28.7%</td>
<td>21.7%</td>
</tr>
<tr>
<td>19. GE Easy</td>
<td>3.99</td>
<td>4.09</td>
<td>36.4%</td>
<td>2.1%</td>
<td>39.9%</td>
<td>4.2%</td>
</tr>
<tr>
<td>20. GE Geography</td>
<td>3.93</td>
<td>3.88</td>
<td>43.3%</td>
<td>4.2%</td>
<td>42.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td>21. GE History</td>
<td>3.50</td>
<td>3.62</td>
<td>38.5%</td>
<td>9.8%</td>
<td>35.7%</td>
<td>11.2%</td>
</tr>
<tr>
<td>22. GE future</td>
<td>3.67</td>
<td>3.64</td>
<td>34.3%</td>
<td>7.0%</td>
<td>35.0%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>