USING THE INTERNET TO DEVELOP STUDENTS’ CRITICAL THINKING SKILLS AND BUILD ONLINE COMMUNITIES OF TEACHERS: A REVIEW OF RESEARCH WITH IMPLICATIONS FOR MUSEUM EDUCATION

DISSERTATION

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By

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ABSTRACT

This dissertation presents a Critical Content Meta Analysis of published literature related to using the Internet to develop critical thinking skills in students and to build online communities of teachers. An underlying goal of the research was to work toward the development of stronger connections between museums and public schools. Through analyzing the literature, I developed suggestions for museum personnel to implement when creating educational museum web sites.

The analysis of the literature on critical thinking shows that there is no agreement among the authors as to the meaning of the term “critical thinking.” The majority of the literature presents the concept of critical thinking with little effort to explain its nuances. The literature largely endorses the view that thinking critically about the Internet involves accepting information because it is represented in multiple sites on the Internet and rejecting information that is not congruent with dominant cultural beliefs.

Utilizing the concept of hyper-connective thinking, museum educators can build educational web sites that highlight objects that are the subject of controversy. The use of these web sites will enable students to access multiple perspectives relating to the objects, thus allowing them to learn about divergent interpretations and understandings.

The literature on building online communities of teachers also has little agreement with regard to the use of the term “community.” The concept of online communities, especially in educational settings, is gaining in popularity at a rapid rate. Through online
interactions, teachers may be able to overcome the often-cited feelings of separation from peers and find ways to improve their teaching practice. There are many power issues that must be considered when building an online community ranging from the ability of the community members to change the social interactions to the relative parity of the members of the community. To build a community, it is not enough to pronounce a group of students in a class as a community, but the members must perceive a common interest and benefits from their interaction. Additionally, through online communities, museums have the opportunity to develop interactions among interested visitors relating to the objects in the collections. These interactions range from casual information sharing to building ongoing dialogue between and among museum educators, teachers, museum visitors, and others.

I argue that insufficient research has been conducted on using the Internet in K-12 classrooms with students. As schools and museums are increasingly turning to the Internet to promote educational experiences, doing so in a void of research is not advisable. Thus, this research is an important first step in filling the void by creating numerous suggestions for museum educators to utilize when developing educational web sites. Museum web sites could become exemplars for helping students develop critical thinking skills.
Dedicated to my family
(Especially dedicated to my grandmother who did not have all the educational opportunities that were available to me.)
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FIELDS OF STUDY

Major Field: Art Education

Studies in:
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History of Art
Technology
Multicultural Art Education
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CHAPTER 1

INTRODUCTION

This study investigates the literature regarding uses of the Internet in public school classrooms. The literature is vast. Therefore, this research focuses on two particular topics that are frequently cited as benefits of the Internet and are relevant to the ways museums and schools may use the Internet to further their educational goals. The topics are: developing students’ critical thinking skills\(^1\) and building online communities of teachers. Because the underlying interest of this dissertation is the potential uses of the Internet to foster museum-school partnerships, underlying these two topics is the idea of allowing students to experience museum objects and collections through the Internet.

I believe that using the Internet as an educational tool has the potential to improve public schooling. Additionally, schools and museums may be able to develop and foster ongoing relationships through the Internet that can further the educational goals of both institutions. However, use of the Internet should not be an end in itself, but should further other educational goals and augment student learning. Throughout the literature on these topics, the majority of the authors are extremely positive about the results of

\(^1\) I recognize that the terms “critical thinking” and “higher-order thinking” may be viewed by some as out-of-date and less relevant than contemporary theories of “teaching for understanding.” Throughout the literature, these terms, and others, are used almost interchangeably by some authors whereas other authors create strict delineations between the terms.
using the Internet. A great deal of literature looks at these issues from a quantitative perspective and focuses on the increasing access of students and teachers to the Internet. I believe that studying access to the Internet is important but is fundamentally different than studying the effects of using the Internet. Also, qualitative research may provide unique perspectives about this issue that are not available through quantitative research. This dissertation is a critical analysis of the literature on Internet usage in public schools focusing on critical thinking skills and building online communities of teachers.

This chapter provides an overview of the entire dissertation and introduces the main concepts that I later explore in-depth. I begin with the background to the problem and explore the potential of the Internet to change public schooling. Then, I present the justification for the study, explain my goals for education, and discuss how using the Internet to achieve educational goals is possible. I address the two focus areas of this study: developing critical thinking skills by using the Internet and building online communities of teachers. Next, I describe the main dissertation problem and list the research questions. This is followed by a brief literature review that touches on the Internet in K-12 school classrooms, the Internet and critical thinking, teacher community, and the relationship to museum web sites. I explore the purpose of this research and the methodology, including the design and methods of data collection as well as the methods of data analysis. Then, I explain the significance of and the limitations of the study. The chapter concludes with an overview of the remaining chapters in the dissertation.

Background to the Problem

When Melissa was a public school art teacher, her principal encouraged her to use the school computer lab with her students, which she gladly did. She had no formal training in using computers with students, and felt limited in her ability to
seamlessly integrate the use of computers into lessons. She found herself replicating assignments she received in college graphic design coursework. Her students utilized the school computer lab several times per year to make art using a paint and draw program and to look at CD-ROMs distributed by museums. She hoped to find a way to integrate the Internet and museum web sites into her curriculum. However, the district maintained a strict policy that middle school students could use the Internet only when the teacher student ratio was 1:1. Because this was never the situation during class time, she allowed students to come after school and use the Internet. Their uses were limited to locating information about certain artworks and artists. The administrators at her school were pleased that her students were in the computer lab, and frequently mentioned this on her teaching evaluations. Yet, they never investigated how students used computers and the Internet, what students learned from the process, and if they thought about their uses of computers and the Internet. The administrators were simply glad to see the lab used by students who were doing something.

Throughout the history of public education in the United States, innovations and advancements in technology affected classroom teaching practices. The current emphasis on teachers using the Internet during class time is the most recent manifestation of the promise of technology to benefit the field of education. Often these technological innovations are accompanied by the hope or the assurance from manufacturers or policy makers, that using these innovations will improve education. Larry Cuban (1986) traced the history of technological advancements in schools from 1920-1986, focusing on film, radio, television, and personal computers. He found that, despite the enormous claims about their educational potentials, these technologies did not significantly impact the day-to-day practices of most classroom teachers. Additionally, when these technologies were integrated into public school classrooms, the results were not of the level that educational reformers had predicted.

The Potential of the Internet to Change Public Schooling

During an interview for a public school art teaching position in 1995, the principal asked Michael how he would use laser discs in his classroom with students. Michael had no experience with this technology and told the principal that he
would learn to use them and find a place in the curriculum to utilize them. He got the job and when he started, he made inquiries about the discs available and how to could use them with students. To Michael’s surprise, there were no discs on art topics, there was no money to purchase relevant ones, there was no training available, and there was no facility from which to borrow the discs. He began to wonder how this technology could revolutionize education if he could not even access the materials or participate in any training.

Certainly, the situation has changed considerably since 1995 with regard to accessing technology and professional development for teachers. The laser disc fad passed, and now it is virtually impossible to be engaged in public school education in the United States without being aware of the claims being made about the Internet. In the last several years, at all levels of education, sweeping statements about the potential uses of the Internet in public schools have been an integral part of the discourse on technology and education. In fact, the endorsements of the Internet came from the highest levels of the government with the United States Congress creating a bi-partisan commission to study the possibilities of using the Internet in public schools. This commission issued a report of its findings entitled *The Power of the Internet for Learning* (2000). This report, submitted to President Clinton and Congress, states

For education, the Internet is making it possible for more individuals than ever to access knowledge and to learn in new and different ways. At the dawn of the 21st Century, the education landscape is changing. Elementary and secondary schools are experiencing growing enrollments, coping with critical shortages of teachers, facing overcrowded and decaying buildings, and responding to demands for higher standards.

The Internet is enabling us to address these educational challenges, bringing learning to students instead of bringing students to learning. It is allowing for the creation of learning communities that defy the constraints of time and distance as it provides access to knowledge that was once difficult to obtain.

The power of the Internet to transform the educational experience is awe-inspiring. (p. i)
The enthusiasm about the Internet and its ability to impact education is not limited to the United States. The government of Canada, through an organization named Canada’s Schoolnet, published a research report detailing their preliminary results. This report, *Learning without Boundaries* (2001), explains that there are two major findings:

First, in situations where appropriate support conditions are provided for teachers, increases in student learning are found. Also, integrating ICT [information and communications technology] in classrooms is enabling teachers to shift their pedagogical approach towards a balance between teacher-centered instruction and learner-centered, collaborative problem solving and in critical thinking. (¶ 2)

Claims such as these are not limited to governmental bodies and the reports they generate. Throughout educational literature, authors echo similar claims (Harris, 1994, 1998; Mambretti, 1999).

This enthusiasm extends beyond schools and governments to the museum community with many museums creating online activities and virtual environments for their Internet visitors. An outgrowth of this enthusiasm for educational uses of the Internet includes the annual Museums and the Web conference. While not focused merely on museum education and the Internet, this conference presents and promotes research and theory development related to using the Internet for museum education programs. For instance, in their 2003 paper on the impact of museum and school partnerships through the web, Dianna Newman, Patricia Barbanell, and John Falco explain the assessment model they developed related to their project in New York that connected schools and museums via videoconferencing. Other relevant topics from the Museums and the Web conference include teacher participation in online museum communities, developing student activities online, and the evaluation of museum educational programming on the Internet.
All members of the teaching and research community do not accept the glowing endorsements about the benefits of computers and the Internet. Sherwood Dowling, a researcher and museum educator, cautions against extreme fervor with regard to the educational potential of the Internet. He believes there are striking similarities between the current enthusiasm for the Internet in education and past enthusiasm for the education potential of television. Dowling (1996) writes “Television’s failure to transform education was not technological. Television failed to meet the pedagogical needs of the educational community and was viewed as enrichment rather than as an integral part of the educational process.” I believe that if the Internet, as a tool to advance education, is to avoid a similar fate, educators must carefully consider their uses of it, thoroughly investigate the claims of its benefits, and revise their teaching strategies to take advantage of its unique characteristics.

Considering that the Internet is one in a long line of technologies embraced by the field of education with the hopes that it may improve public school education, it is important to closely study the research reports generated about its use and effects while its uses are still developing. Within the discourse surrounding educational uses of technology, there are numerous claims extolling ways the Internet can positively affect students and teachers. Among these claims are two that are at the heart of this study: the ability of the Internet to promote critical thinking and the potential of the Internet to build online communities of teachers. These both relate to the potential of the Internet to overcome the physical restrictions of the school and expose students to museums, and thus have the potential to develop stronger connections between museums and schools.
Justification of the Study

Because of the increased availability of computers and the Internet in public school classrooms and because of the decisions being made to promote their uses in public school classrooms, I feel that analyzing research reports of Internet usage is crucial. A well-developed knowledge base relating to effective uses of the Internet in education may help this technology avoid the path of educational film, educational radio, educational television, and educational computing programs. One argument made for using the Internet in education is that it allows students to visit places and interact with objects in ways that would not be possible with traditional means. A manifestation of this view is the increasing popularity of virtual field trips, virtual tours, and virtual museum experiences.

Goals of Education

Before delving deeper into the classroom uses of the Internet, I find it necessary to state my ideal view of the goals of public education in North America and explain how using the Internet relates to some of these goals. The writings of John Dewey, Howard Gardner, and Lev Vygotsky heavily influence my ideas. My ideas are not fixed and absolute, but in a state of flux. Additionally, I do not believe that some goals are always more important than others. First, I address theoretical views on the purpose of education and then I specify roles for teachers and students.

Through education, students should learn to understand themselves, their interactions with others, and the world. Students need to learn about and respect their own culture as well as other cultures in their community and throughout the world. Teachers should provide students with learning opportunities that connect classroom
learning to out of school contexts and students should learn how to transfer knowledge from one situation to another. In addition, students need to learn to carefully consider different perspectives on issues and understand the complex reasons for the existence of these divergent theories. At the same time, students should learn many ways that different topics, issues, and concepts are intricately connected to one another and influence each other. Studying these connections, complications, and confluences can help students learn about the relationships among topics. It is essential that students learn to value alternative ideas and understand the importance of creativity. Their learning ought to include investigating, synthesizing, analyzing, and creating, and not be limited to memorizing facts. Additionally, students need to use their emotions as well as their cognitive abilities to understand their world. They should utilize their bodies and minds to perform, create, demonstrate, invent, and think. Students need to have opportunities to collaborate with their peers and learn from each other, as well as from their teachers. Within this framework, the arts are extremely important as they offer students ways to learn about, understand, and experience their world.

To further these goals, teachers should utilize multiple strategies that emphasize the connections between and among different disciplines and school subjects, as well as connections with the world outside of school. Teachers should act as guides to help students come to learn about their world. Classroom instruction should reflect the different ways students learn and relate to Howard Gardner’s theory of multiple intelligences (1993). Lessons and activities should allow students to demonstrate their knowledge in a variety of ways. Structuring learning activities around open-ended problem solving goals and allowing students to work collaboratively may promote
student learning. In addition, students need to become aware of their own thought processes and learn to be aware of them.

Using the Internet to Achieve Educational Goals

Certainly, using the Internet in public schools will not accomplish all these goals, but I believe that it can offer important ways that will further some of them. The Internet can enrich students’ learning and their abilities to think in divergent ways. Through various means, students can communicate with experts, participate in explorations or simulations, explore virtual recreations of places that no longer exist, partner with students at schools around the world, along with many other activities. Additionally, the Internet allows teachers to find other teachers who have the same areas of interest and participate in online communities. This is especially important for new teachers and art teachers who often report feelings of isolation from their peers (Cohen-Evron, 2001; Poole, 2001; Yap, 1994, 1997).

Critical Thinking

My views about critical thinking are closely aligned with Nicholas Burbules and Rupert Berk (1999) who describe the relationship between critical thinking and critical pedagogy. They explain that the concepts do not have to be in opposition, but that aspects of both can be blended to bring about richer understandings of the world. I do not believe that teaching students to think critically should be limited to evaluating the “reliability” of the web sites or books that they consult. Instead, I believe that teaching students to think critically should include looking at issues from various points of view, delving into the reasons for the existence of multiple points of view, and helping students develop their own ideas and understandings of complex issues.
Through the Internet, students have access to a larger amount of information than ever before. However, access to information is not enough to guarantee that students are thinking and learning. To improve their ability to think about and understand the information they locate, students should learn multiple ways to analyze, assess, and evaluate information. In addition, they need to learn about the reasons for the existence of multiple competing discourses surrounding many topics. For instance, students can easily locate multiple perspectives on an historical event using the Internet as opposed to reading one version in a textbook. Learning about an event from the different perspectives of those involved can help students understand the multiplicity of possible interpretations of any object or event. The relative ease with which individuals can post information on the Internet allows oppressed groups to present their own versions of historical events that may differ significantly from the information circulated by the dominant group. Students may read these divergent information sources, think about the multiple viewpoints, and come to their own conclusions. Some students will find the existence of divergent information confusing, and may have a difficult time forming an opinion. Even if they do not come to a conclusion, it is important that they become aware of the complexity of the issues. Students may participate in interactive Internet activities that allow them to direct their own learning and construct knowledge in a social environment. However, to take advantage of these possibilities, educators must change how they teach, and adapt to the strengths and possibilities that the Internet offers.

Certain aspects of the Internet make it unique compared to previous technologies in the classroom. These include its non-linear nature, the speed of communication, the quantity of available information, the possibility of student-directed learning, the ability of real-
time collaboration of physically distant individuals, the synchronous and asynchronous
nature of communication tools, and many others. In addition to these aspects of the
medium, teacher comfort and knowledge regarding the Internet may significantly affect
its use and usages in public schools.

Community Building

Melissa Poole (2001) notes, “Despite a variety of strategies for encouraging
greater collegiality in teaching, including teacher coaching, mentoring, and
interdisciplinary teams, teaching remains, for many, a private endeavor” (p. 1). Because
of the communication tools available through the Internet, it can enable teachers to
communicate with others around topics of mutual interest. Utilizing discussion boards,
chat rooms, and listservs allows veteran teachers and new teachers to share ideas and
build communities around mutual concerns. Research in this area suggests that teachers
beginning their careers find online communities useful for exchanging lesson plans and
learning classroom management strategies, whereas veteran teachers prefer to discuss
theoretical and pedagogical issues relating to their teaching (Barab, MaKinster, Moore, &
Cunningham, 2001). Some researchers suggest that building online communities of
practice will help new teachers adjust to their positions as educators and that the Internet
and online communities assist individuals in making the transition from pre-service to in-
service teachers (Poole, 2001).

Relationship to Museum Web Sites

Many schools cannot provide experiences for their students beyond the physical
structure of the school building because of a variety of constraints including financial,
temporal, and policy issues. In addition, students who are able to participate in field trips
to museums or other informal learning environments may not be able to pursue their individual interests during the actual visit. Because of safety concerns for students and objects and because of overarching institutional philosophies, student field trips are often limited to following a group and listening to a docent. Educational museum web sites can allow students to experience physically distant phenomena and allow them to pursue the areas that interest them as individuals and over longer periods.

Currently, many museum web sites include educational information for teachers and students. The Internet and educational museum web sites can allow students to interact with objects in ways that are not possible during an actual field trip. In addition, museum web sites can enable students to extend their experience beyond the time they are physically present in the museum. Many current educational museum web sites focus on the aesthetic presentation of images, text, lesson plans, workshop schedules, and resources. While these are all quite valuable, museum web sites could also engage students and teachers in thinking about art objects, questioning the ways they are exhibited, investigating the history of the objects, sharing ideas related to the museum and its collection, building connections between museum and school experiences, and looking at the relationships between cultures and the objects they create.

Description of the Problem

Sally, now an 89 year-old woman, first had electricity at her home shortly before the end of World War II. For years, she and her husband waited to get connected to the electrical grid in their rural community. Because of the cost and because of the war effort, there were many, many delays. Finally, one day, the electric company workers came and completed the connection to their house. They were elated to be able to use electric lights. For days, her four small children ran from room to room flicking the light switches on and off, always amazed by what would happen. After a few weeks, the novelty wore off and they adjusted their lives to the new technology. Soon, they could hardly remember a time when they
did not have electricity. Many years later, they became aware of the negative effects of electricity, especially the pollution that was generated by the electric company burning coal.

This story illustrates my views of the current situation with regard to educational uses of the Internet. I believe educators and policy makers put content online because it was possible and because they were excited to see that they could put it online. However, now the novelty is beginning to wear off and difficult questions are being raised about the efficacy of teaching with the Internet. There are hundreds of research reports that claim teachers’ uses of the Internet are producing a variety of results ranging from richer student learning (Dowling, 1996; VanFossen, 2001) to limited and superficial information collecting (Coulter, 2001; Ebersole, 2000). These research reports reflect the multiple competing discourses at work with regard to the potential benefits and drawbacks of using the Internet in public school classrooms. Some of this research is funded through grants from the federal Department of Education and state Departments of Education, others studies are funded by businesses marketing particular technologies, and some research is conducted without funding by those deeply involved with the integration of the Internet into public school classrooms. Regardless of the source of funding, power plays an important role in constructing the discourse regarding educational uses of the Internet and is at work in many ways through these research reports. In addition, the language used to describe and explain the various phenomena associated with this topic also directs the future of the discourse. Therefore, it is imperative to read these materials critically and use this information in the analysis of the research itself.
Statement of the Problem

Working from a Critical Theory perspective, I conducted a critical analysis of the research literature on Internet usage in public schools. Because this topic is extremely broad, I focused on two particular areas within this discourse that relate to schools and museums: using the Internet to promote student thinking and creating online communities with the Internet. Throughout this analysis, I explored how these topics relate to using the Internet to provide students with meaningful experiences with museum objects. These areas relate to each other and also relate to the possibilities of schools and museums working together to create meaningful experiences for students. Throughout this analysis of the literature, I concentrated on research reports related to secondary school and to art classrooms, when they were available. Though I included research from art museums, most of the research reports on museum education came from science and history museums. The majority of the literature I reviewed deals with public school classroom settings at a variety of levels.

Research Questions

The primary goal of this research was to analyze the general education literature on educational uses of the Internet and look for implications for museum practice. To understand more about the literature and to analyze it in ways that helped me relate it to uses of the Internet with museums and schools, I began by addressing the following questions:

What is the nature of the literature?

What are the common themes throughout the body of research?

What is the role of the researcher as related to those being researched?
What is the goal of the research?

What silences are present in the body of literature?

Who is in a position of power regarding the research project?

What methodology, methods, and paradigm is the research using?

From this analysis, I gleaned suggestions that can be applied to the development of educational museum web sites. I synthesized the results of these research articles into recommendations for the developers of museum education sites and teachers to assist them in creating sites to strengthen the connections between their institutions and create meaningful experiences for students while using the Internet. While there are similarities between general education and museum education, there are also important differences. Among these are the concern museums must show for the care of their objects including the copyright laws that affect their use of images. During the process of conducting the literature review, I kept in mind the limitations inherent in using museum objects in order to produce guidelines that can be of use to museum personnel.

The secondary, and related, goal of this research was to address the issue of power and how it works to construct acceptable uses of the Internet in public school settings. This is extremely important, as it seeks to recognize the various agendas that currently function within this discourse. Through this examination, I sought to identify and understand the priorities of schools and museums regarding uses of web sites and how these priorities shape the discourse surrounding educational uses of web sites. To do this, I addressed the following questions: Who is in a position of power with regard to generating research studies of students using the Internet? What are the parameters of acceptable discourse surrounding educational uses of the Internet? What topics or ideas
are currently neglected in research reports? How does power work in the construction of research reports dealing with educational uses of the Internet to promote higher-level thinking and to develop virtual communities? What do these research reports tell us about the overarching agenda of the Internet in public schools? What language is commonly used to compose the discourse surrounding this topic? What areas are neglected and which receive considerable attention?

One example of this is the discourse of reverence for the “authentic” object in museums. If images of museum pieces are readily available online, this may affect the way individuals view these same objects in a museum setting. Decision makers in museums may restrict which objects are represented online, therefore preserving the “authentic” experience of viewing that object only while physically present in the museum. Therefore, those in power at a museum have a great influence over the objects that students and teachers can view online. The reverence for “authentic” objects supports the need for the physical structure of museums and necessitates physical presence in a gallery to view the object. Web sites have the potential to disrupt this discourse of “authenticity” and may affect museum policy.

Literature Review

The focus of this study is the educational uses of the Internet in K-12 education, and specifically, how the Internet can be used to promote critical thinking and how the Internet can build communities of teachers. The majority of this literature is research studies conducted by university personnel studying students and teachers. Additionally, a number of studies relate Internet usage to various theoretical positions, especially constructivism.
The literature on uses of the Internet in K-12 schools is quite extensive and studies report divergent results. The knowledge base regarding educational uses of the Internet is developing, and as new technologies emerge at a rapid rate, it is difficult for educators to remain well versed in them. In fact, technology is growing faster than the ability of researchers to measure or understand it; some authors note this trend and realize that many changes in technology and accessibility will occur between their completion of a study and its publication (Barker & Whitting, 2000). There are many studies that look at the access of students and teachers to computers and the Internet (Cattagni & Westat, 2001; Holloway, 2000; Rose, 2001; Tapscott, 1998; U.S. Department of Commerce, 1999; U.S. Department of Commerce, 2001). However, there are fewer studies investigating the effects of Internet usage in public schools, especially the longitudinal effects (Nickell, Field, & Roach, 2001).

There is a growing body of information for teachers about how they can use the Internet with their students (Crane, 2000; Cross, 2002; Harris, 1994; Harris, 1998; Kocher, 2001). Beverly Crane (2000) promotes the use of the Internet for students to actively think about and evaluate the validity of the information they collect online. In this activity, students use a worksheet to answer a series of objective questions from different websites. They investigate the sources of the websites and note any inconsistencies in the content from the different sites. In addition, some researchers advocate the use of curriculum pages in K-12 classrooms (Kocher, 2001; Love, 2001). A curriculum page is a teacher-created list of educational web sites relating to a particular topic of study. Students access the curriculum page and choose which resources they
want to use. Because teachers or educators create them, a person in authority has
previously vetted the sites. Since they start with a list of relevant web sites, students are
not as likely to stray off topic (Ebersole, 2000).

These activities are representative of much of the literature regarding classroom
uses of the Internet. Some researchers note that before teachers can engage students in
constructing their own knowledge through the use of the Internet, the teachers themselves
must be comfortable using the Internet with students as part of class lessons (Coulter,
2001; Ebersole, 2000). The activities discussed above focus on information gathering
and evaluation, and they may help teachers gain the necessary comfort to move their
classroom uses of the Internet to a higher level. While not taking advantage of all the
potentials available with the Internet, these activities are important as experiments for
many teachers to gain confidence and become more creative and adventurous in their
uses of the Internet.

**Internet and Critical Thinking**

Though there is research addressing to how using the Internet to develop student
thinking skills, it often relates to students thinking about the reliability of their sources,
not considering issues beyond this. It is important for students to learn to use the Internet
to collect information and conduct research, and there are additional ways to incorporate
use of the Internet in education to promote critical thinking and provide students with
experiences not possible in any other format (Harris, 1998). Beverly Crane (2000) notes
that using the Internet may encourage student thinking. She also points out that teachers
may need to alter their pedagogical practices before incorporating the Internet into their
lessons.
Teacher Community

As access to the Internet has dramatically increased in the last decade, so too, have the number of online communities dramatically increased. Online communities exist in a variety of forms on seemingly every topic in existence. The range greatly in terms of the communication between and among members, with some focusing on one-to-one communication and others involving large-scale group interactions. Though some exist solely through textual exchanges, there are other communities that utilize audio and video available through the Internet. In writing about communities, John Dewey (1916) notes:

Persons do not become a society by living in physical proximity, any more than a man ceases to be socially influenced by being so many feet or miles removed from others. A book or a letter may institute a more intimate association between human beings separated thousands of miles from each other than exists between dwellers under the same roof. (p. 5)

Here, Dewey indicates the potential for persons physically distant to develop and maintain a sense of community through their communication. Many researchers and educators believe that online communities thrive and provide valuable experiences for their members, though other scholars are critical of the concept and believe online interactions do not constitute a community.

Relationship to Museum Web Sites

The topics of developing critical thinking skills and developing online communities of teachers are related to museum web sites. Even though there are now countless museum web sites, many focus on marketing goals, increasing the number of visitors, or informing the general public about their exhibitions and events. Though there is research on museum web sites, much of it focuses on the development of the content,
rather than the uses of the sites in a school classroom. Additionally, few studies investigate the possibilities of museum web sites in public school classrooms. I believe that museum web sites can be structured to help students build critical thinking skills and to foster the development of online communities of teachers.

Purpose

The purpose of this research is to critically investigate research related to public school uses of the Internet in order to develop suggestions for creators of museum education web sites. According to Joan Gallini (2001), “…increasing optimism about the benefits of web-based learning with mediated tools in the absence of theory and a solid research base concerns educators” (p. 15). She calls for new research to investigate the connections between web-based education and constructivism. Other authors argue for the importance of considering social and cultural factors when researching educational uses of technology (Chuang, 2001; Hung, Chua, & Koa, 2000).

As museum educators increasingly utilize theory and research in their practice, it is important for the web sites they develop to reflect this praxis. This research will assist educators, including museum educators, in developing educational web sites that may engage students and teachers in a variety of thinking, communicating, and inquiring activities.

Methodology

The methodology for this study is a theoretical analysis that is rooted in a Critical Theory perspective. The initial steps were to develop parameters for the literature, collect the literature, and read it. In the next phase, I formulated a system for interpreting and closely investigating the goals and power structures at work in the research reports. I
used grounded theory to closely analyze the trends at work in the literature. From this, I developed a list of common words, phrases, and concepts to look for in the literature and used this data to generate some suggestions for museum education web sites.

Design and Methods of Data Collection

Specifically, this project is a theoretical analysis and reflection on the existing research studies of Internet uses in K-12 classrooms around two topics. The data came from published research reports on uses of the Internet in K-12 school settings. I created the parameters of the literature in the two areas that I analyzed. After creating the parameters, collecting the literature, and reading it, I developed a framework to analyze the studies, noting both what is there as well as what is neglected. At this point, I sought out articles on topics that I felt were neglected in the body of research I had previously analyzed. Inherently, this study was limited to research published in English and widely available in journals, newspapers, online, and in books. It is quite likely that it only reflects current Internet uses in North America and does not reflect how teachers and researchers throughout the world think about, use, and study the Internet.

Methods of Data Analysis

As I interpreted the data, I utilized concepts of grounded theory including the “systematic inductive guidelines for collecting and analyzing data...(Charmaz, 2000, p. 509). Throughout the process of collecting and analyzing data, I looked for emerging and frequent themes and trends within the data, while also looking for data that seemed to contradict the common results. I share Barney Glaser’s view of grounded theory (1992; 1998) and believe that grounded theory should not be used to analyze data in order to validate another theory, but should be used to generate theory. Though it is impossible
for me to approach this research without any biases, I gathered the data and sifted through it looking for interesting and emerging areas instead of manipulating it to make the data fit into my pre-conceived categories. Kathy Charmaz (2000) writes, “Grounded theory offers a set of flexible strategies, not rigid prescriptions” (p. 513). As I analyzed the data, I considered issues of power and how it serves to construct the research being reported as well as how the research benefited those who were researched. Additionally, I kept a research journal throughout this process and used it to reflect upon the decisions I made and how they impacted the ways I analyzed the data.

Significance of the Study

As teachers are increasingly asked to do more with their students during the school day, it is important to carefully study what these new requirements accomplish. Researchers who focus on uses of the Internet in K-12 classrooms find differing results. It is extremely important to critically examine the underlying beliefs and principles behind these research studies in order to understand the goals of the research. There are many claims about the Internet and its potential benefits to public school teachers and students. By closely investigating two claims, I added to the existing body of knowledge on the Internet as a tool to advance education. In addition, this study of research studies may be useful to those developing educational uses of the Internet as a means to review the existing literature on the topic.

Limitations of the Study

This research is limited to results of studies or experiments that are published in English and widely available through the Internet or the library. Because I am the only person who analyzed the articles, my biases and beliefs about research, public school, the
Internet, museum school partnerships, etc. are certainly embedded in this research. The inclusion and exclusion criteria I created also limited the articles that I chose to analyze, focusing on current ones. As a qualitative researcher, I concentrated on large themes and ideas in the work that emerged from my analysis and understanding. Certainly, another qualitative researcher or a quantitative researcher might come to different conclusions when analyzing the same data.

Overview of the Dissertation

As this is a qualitative research project, many issues emerged as I worked through the project. Some of the initial notions I had about how the research process would unfold turned out to be false. Also, the initial data analysis altered my thinking about certain findings while I was conducting the research. I realize that dissertations are frequently written in the past tense with little attention paid to the areas that change throughout the research process. Approaching this dissertation from that perspective felt extremely artificial because the research contained so many emergent themes and my direction followed what I found in the data. Within Art Education, there is a debate about the importance of the artmaking product verses the importance of the artmaking process; I am firmly on the side of the process (Walker, 2001, 2003, 2004). Thus, I translate this issue from artmaking to research and present this dissertation as both a finished product of a research project and as a conscious process piece that contains my changing notions about this research project, the difficulties I encountered, the decisions I made during the process, and the implications for the field. This trend will emerge throughout the remaining chapters through the tenor of the dissertation, my journal entries, the anecdotes about teachers, and the discussion of the data.
The review of related literature is in chapter 2. This focuses on the main areas of this dissertation, developing critical thinking skill through using the Internet and building online communities of teachers. In addition, I review literature on the history of educational technologies, museum education, museum web sites, and other related topics. Chapter 3 explores the methodology I developed for this research project, Critical Content Meta-Analysis. A combination of literature review, content analysis, meta analysis, and discourse analysis, this methodology enabled me to understand a variety of texts on the topic. In chapter 4, I explain the results of the data analysis for the portion on critical thinking. I cover the results of the previously published studies and present my ideas for how this research can be translated into museum education practice. The focus of chapter 5 is on the data analysis of the research on online communities of teachers. Because of the many connections to other areas, I also explore related theories including situated learning, communities of practice, and networks of practice. I present the conclusions from my research and suggestions for further research in chapter 6. Also, I reflect upon the process and describe how this research changed my views on the topics and on conducting research.
CHAPTER 2

LITERATURE REVIEW

The areas of inquiry addressed in this research are numerous and broad. Therefore, this literature review contains both information on the background issues as well as the issues that are at the heart of the study. The background issues include computer and Internet technologies in education, the development of educational museum web sites, the need to conduct research on museum practice, and using the Internet in public school classrooms. The focus areas are using the Internet to develop students’ critical thinking skills and using the Internet to build online communities of teachers.

This chapter begins with an overview of the literature I reviewed and follows with a brief history of educational technology, focusing on motion pictures/films, radio, television, computers, and the Internet. I discuss the implications of the digital divide and present a justification for the study, based upon the contemporary applications of educational technology. Next, I give an overview of classroom uses of the Internet including possibilities for the Internet in education. I present five common uses: WebQuests, curriculum pages, multimedia projects, virtual field trips, and social action projects. I turn to the two focus areas and present a brief review of the literature on promoting critical thinking and understanding with the Internet and building communities.
of teachers. After discussing online communities and current school uses of the Internet for teachers, I review the literature on museum education and the current state of educational museum web sites. At this point, I focus on the ways museum educators are using theory and research to improve practice, how they implement constructivism in museums, and how they implement hermeneutics in museums. After a discussion of museum research, I highlight two specific examples of museum research: a piece in reader’s theatre and a qualitative analysis. The section on museum education concludes with a discussion of the reasons for conducting museum research and a description of virtual museum field trips and museum web sites. The chapter ends with an explanation of the relevance of these topics to my larger research project. In chapter 3, I review the literature related to my methodological decision making process. In chapters 4 and 5, I discuss the focus areas of this study, developing critical thinking skills with the Internet and building communities of teachers online as well as provide the analysis and conclusions from the meta-analysis that is the heart of this study. In chapter 6, I review the conclusions and make suggestions for further research.

The intersections of these diverse areas of literature have not been investigated previously, therefore the majority of the research I review centers on one specific issue at a time and does not address the relationships between and among these topics. Because of the amount of information on each of these topics, I focus on specific aspects that are pertinent to my analysis of these research reports. Since this study is a meta-analysis of previously published research, it is important to review relevant research in each of the areas I investigate. My hope for conducting this meta-analysis is to create guidelines and suggestions for museum educators to utilize when designing and implementing
educational web sites and developing relationships with schools. Thus, I consider this project to be an initial step toward developing stronger relationships between teachers and museum educators and improving the educational content on museum web sites.

**Overview of the Literature**

Most authors present extremely positive views of educational technologies, museum educational programs, or uses of the Internet, though others are cautious in their endorsements or focus on the detriments. It is important to note that the vast majority of the literature I located on these topics is remarkably positive. The authors believe that using technology in classrooms is exciting, revolutionary, and has the potential to substantially improve education and that students involved in museum education programs will be learning. There are authors and researchers who express alternate viewpoints and question the benefits of technology in schools, at least as it is currently used (Bryson & deCastell, 1998; Congdon, 1997; Cuban 1986, 2001; Ebersole, 2000; Maddux, 2002; VanFossen, 2001). However, critical reports are not common and it is especially difficult to locate criticism among governmental reports on technology usage in classrooms. Though I do believe that the Internet can add to student experiences in schools, I am hesitant to proclaim the amazing benefits inherent with this technology at this point.

In 1920, during the peak of the radio revolution as an educational technology, a teacher wrote the following poem:

*Antiquated*

Mr. Edison says
That the radio will supplant the teacher.
Already one may learn languages by means of Victrola records.
The moving picture will visualize
What the radio fails to get across.
Teachers will be relegated to the backwoods,
With fire-horses,
And long-haired women;
Or, perhaps shown in museums.
Education will become a matter
Of pressing the button.
Perhaps I can get a position at the switchboard. (as cited in Cuban, 1986, p. 5)

It is prophetic how relevant this poem from more than 80 years ago is to the situation today with regard to the uses of the Internet in K-12 classrooms. Instead of wholeheartedly endorsing these technologies because they are new and exciting, educators and administrators need to carefully consider the benefits and drawbacks of altering educational practices to include using the Internet. Additionally, museum experiences can add to the lives of students, however, my views and those of others need to be troubled and closely examined. Conducting a meta-analysis of these research reports and accounts of classroom practices will allow a careful analysis of both the potential benefits and drawbacks of using the Internet in public schools and with museum collections. Because of the existence of multiple viewpoints, I focus this literature review on the most salient aspects of these extensive topics and present diverse views of them.

History of Educational Technology

The current emphasis on teachers using the Internet during class time is the most recent manifestation of the promise of technology to benefit the field of education. There is a long history in the United States of bringing technological innovations into the classroom with the hope, and often the assurance from manufacturers or policy makers, that using these innovations will improve education. Common claims include improved
student learning, personalized learning, and experiences that were not possible before the introduction of the technology (Cuban, 1986; Kent & McNergney, 1999). Larry Cuban (1986) traced the history of technological advancements in schools from 1920-1986, focusing on film, radio, television, and personal computers. He noted similarities with regard to how the use, or lack of use, was conceptualized and described this as the “exhilaration / scientific-credibility / disappointment / teacher-bashing cycle” (p. 6). Even though these “high” technologies “…largely failed to generate a substantial reform of education” (Kent & McNergney, 1999, p. 22) “low” technologies including textbooks, blackboards, and overhead projectors significantly altered teaching practices (Kent & McNergney, 1999). I share Todd Kent’s and Robert McNergney’s belief that computers and the Internet are the two most recent additions to the list of technologies that have entered school classrooms with broad claims about their potential. Kent and McNergney point out the importance of reflecting upon the past uses of technology and their effects when considering current and future uses of technology in classrooms. In order to help understand the degree to which certain technologies affected classroom practice, David Dockterman (1988) conducted an historical study of technologies used in schools. He writes, “…while some technical innovations have become standards of formal education, many are rarely used by teachers. Their value remains questionable. What factors determine which technologies will be welcomed into the classroom and which rejected?” (p. 1). Dockterman explains a problem he had in finding literature that included the voices of the teachers who implemented technological innovations in their classrooms. He writes,
…case studies and journal articles on reform efforts tend to be overly optimistic. Even surveys of teachers and administrators can be misleading. The actual voice of the typical teacher who is given the task of integrating a new technology into his or her classroom is rarely heard. (1988, p. 23)

In doing my research more than a decade later, I encountered the same situation that Dockterman noted. I use reports and studies that feature the voices of the actual users of the technologies whenever possible, but I mainly rely on research reports because I was not able to locate sufficient quantity of the former to analyze for this study. To help place contemporary uses of computer and the Internet into their context, I briefly trace the use of film, radio, and educational television as important precursors to the current situation in school computing.

Motion Picture/Films in Education

Shortly after the introduction of motion pictures in 1895, claims about their educational uses emerged (Kent & McNerney, 1999). In 1922, Thomas Edison made the following statement:

I believe that the motion picture is destined to revolutionize our educational system and that in a few years it will supplant largely, if not entirely, the use of textbooks.

I should say that on the average we get about two percent efficiency out of schoolbooks as they are written today. The education of the future, as I see it, will be conducted through the medium of the motion picture…where it should be possible to obtain one hundred percent efficiency. (as cited in Cuban, 1986, p. 9)

Research published in the 1920s and 1930s showed results that seemed to prove the usefulness of educational films. Although teachers did use them, their acceptance into daily classroom practice was not widespread. Cuban (1986) explains that teachers were willing to change their daily practices, but that the expectations of school reformers...
promoting the use of educational films did not match the technology to the ways teachers perceived their own needs in the classroom. In addition to this disconnect about teachers’ classroom needs, there were numerous technological and temporal issues that limited teachers’ use of educational films. According to David Dockterman (1988), these limitations included: the difficulty of securing both a projector and a film at the same time, the inability of many teachers to preview films before using them, the time constraints of their class periods being approximately 50 minutes, the difficulty of replaying certain relevant segments, and the possibility of inappropriate student behavior in dark classrooms.

*Radio in Education*

The early decades of the twentieth century saw the advent and widespread use of radio technology. Educational reformers championed radio’s benefits in a similar fashion to the zeal of previous reformers relating to educational uses of film. Claims about the educational potential of radio included,

> The central and dominant aim of education by radio is to bring the world to the classroom, to make universally available the services of the finest teachers, the inspiration of the greatest leaders…and unfolding world events which through the radio may come as vibrant and challenging textbook of the air.” (Darrow, 1932, p. 79)

In his book *Radio: The Assistant Teacher*, Ben Darrow presents a series of vignettes explaining successful uses of radio technology throughout the United States. He also presents sample classroom uses for teachers to try as well as caveats to avoid common problems, including faulty speakers. Cuban (1986) explains that like film, radio was not widely accepted in classrooms. Common problems included the mis-matched timing of radio broadcasts and class schedules, the cost of purchasing radio equipment, the need for
upkeep and repair of the machines, the lack of appropriate radio shows related to the curriculum, and the inability of many teachers to listen to radio programs before using them in class (Cuban, 1986; Kent & McNergney, 1999).

Television in Education

After the end of World War II, television gained popularity throughout the United States. In 1952, the Federal Communications Commission set aside 242 channels specifically for educational use (Docktermann, 1988). This governmental endorsement of the technology occurred one year after the Ford Foundation created two funds specifically to promote educational broadcasting (Saettler, 1990). Thus, the impetus for the integration of television into classrooms came from both government and industry. The money spent on developing educational programs, putting televisions in classrooms, and on teacher training was significant. However, the reformers were certain of its benefits and felt that the time and financial expenditures were more than worth it for the potential outcomes. In fact, they made claims such as, “…no innovation has marched so quickly and confidently into the field of learning. It moves into the future of American education as a major resource” (Hall, 1962, p. 51, as cited in Dowling, 1996). Others believed that, “A medium with so much potential, with so many needs to meet, and so many plans being made for it, is likely to continue to grow for a long period of time” (U.S. Office of Education, 1962, p. 3, as cited in Dowling, 1996). Although there were successful uses of it, educational television was never widely accepted into daily classroom practice. Kent and McNergney (1999) believe that two reasons for this situation may be the paucity of quality programs available and the “teacherless” nature of the programming. They explain that a large portion of educational programs were
created by experts and were intended to be self-contained modules. Because the educational television programs were conceptualized in this manner, they did not necessarily relate to the local or state curriculum or to what teachers did on a daily basis.

*Computers in Education*

In the late 1950s and early 1960s, university professors at the University of Illinois and Dartmouth developed educational computing systems for university students (Molnar, 1997). As microcomputers became more common in business, industry, and academia, many people began to consider their usefulness in K-12 classrooms. In the early 1970s, Seymour Papert focused his attention on educational computing for young children. As part of his project to help children learn mathematics, he developed a computer programming language named LOGO to help elementary school children learn mathematics (Molnar, 1997). The National Science Foundation became involved with the computers in education movement in the late 1960s by supporting the development of computing networks that involved high schools and colleges (Molnar, 1997).

Throughout the 1970s, interest in educational uses of computers increased and because of technological changes, the size and price of computers decreased significantly. During the late 1970s and into the 1980s, school districts utilized significant financial resources to put computers in public school classrooms and computer laboratories. In 1982, *Time* magazine declared the computer to be its “Man of the Year” (Cuban, 1986). In 1984, Seymour Papert made the following prediction,

There won’t be schools in the future….I think the computer will blow up the school. That is, the school defined as something where there are classes, teachers running exams, people structured in groups by age, following a curriculum – all of that. The whole system is based on a set of structural concepts that are incompatible with the presence of the computer….But this will happen only in
communities of children who have access to computers on a sufficient scale. (as cited in Cuban, 1986, p. 72)

In 1992, Lewis Perelman published his widely cited text *School’s Out: Hyperlearning Is in*. In this book, he echoes Papert’s earlier sentiments and predicts the end of schooling as traditionally conducted in the United States and argues that the days of physical school buildings are limited. He believes that the nature of learning would change because of the widespread use of computers in the classroom and that students would be engaged in what he terms “hyperlearning.” Unique features of hyperlearning include the importance of connections between subjects and topics and the non-linear possibilities inherent in using computers. Additionally, when working with computers, students can move ahead when they are ready, allowing for more flexibility and individualization of instruction.

Cuban takes a substantially different view of the situation with computers in the classroom and where it will lead. Through his summary of earlier educational technologies including film, radio, and television, he points out the relationship between the situation in the mid 1980s and the earlier euphoria that accompanied previous technologies. Unlike many of his contemporaries, Cuban emphasizes that, “The similarities in claims, media interest, and investment are too vivid to simply brush aside as cynical mumblings from Neanderthal educators” (1986, p. 73). He raises a number of questions relating to computers in the classroom including whether computers should even be used in classrooms. He proposes that social forces encouraged schools to utilize computer technologies in the classroom and is skeptical of the claims made about the “results” of computer usage.

*Writing and reading all about computers in education has made me reflect back on my own early experiences with computers in schools. School was the first*
place that I was aware of using a computer. I think it was in first grade, in 1979, when I began to write simple programs on a TRS-80 computer. We had to write BASIC programs to calculate how many days old someone was, to display a graphical representation of our names created with Character strings, and calculate what age someone would be in the year 2000. We worked independently and in groups and saved our efforts from day to day on audio tapes with a tape recorder. In later grades, we participated in simulated adventure explorations and an archaeological dig. My early computer experiences had nothing to do with drill-and-practice or computer-based instruction. In fact, they were constructivist and inquiry-based in many ways. Later on, I realized that these experiences with computers were only in my Enrichment class. At the time, I never wondered if all students in my school had these opportunities. Now, I wonder if everyone at the school had the opportunity to use computers in school, and if they did, were they given the same freedom to explore and learn that I was given? (Excerpt from Research Journal, January 18, 2004)

Early forms of computerized instruction included programmed instruction, computer aided instruction, computer aided learning, and computer based instruction (“A Brief History,” n.d.). Programmed instruction and computer-aided learning were primarily based around the idea of making the learning process faster. Students received facts from the computer program and then were tested on their memory of those facts. Central to the idea of using computers in school classrooms was the idea that teachers can use computers as tools to improve productivity among students. Cuban (1986) believes this is reflective of the idea that learning is a mechanical process, that what teachers do in the classroom will inherently produce certain student learning outcomes. However, he mentions that, “No persuasive body of evidence exists yet to confirm that belief” (p. 88). Additionally, he explains his view that, “Classrooms are steeped in emotions. In the fervent quest for precise rationality and technical efficiency, introducing to each classroom enough computers to tutor and drill children can dry up that emotional life, resulting in withered and uncertain relationships” (p. 89).
Even though these machines and styles of learning were quite celebrated when they first emerged, the results of their usage have not been without controversy. Some studies show that students in public schools primarily use computers for word processing, tutorials, and playing games. These uses do not take advantage of the possibilities of the machines and do not promote understanding in students (Collins & Ollilia, 1990; Plomp, 1996). In her dissertation research, Li-yan Wang (2000) notes that “Despite the promises and predictions made by educational researchers in the early 1980s, computer technology has not revolutionized education. In some classrooms computers continue to sit idle in dark corners collecting dust” (p. 19). Though some reformers believe it is up to teachers to change their teaching, Wang believes researchers need to help teachers by providing them with examples of how they can utilize computers in their classrooms. I agree with Wang’s assertion about the responsibility of researchers to aid practice and I will provide concrete examples in chapters 4 and 5 of ways museum education web sites could be structured.

Internet in Education

The United States Department of Defense developed ARPANET, the precursor of the Internet in 1969, but it was not widely available to or used by the general population until about 25 years later. To enable users to easily exchange information, Tim Berners-Lee proposed the idea of the World Wide Web. The initial version of the web was text-based and emerged in 1990 (Berners-Lee, 1999; Whittaker, 2002). Even though the web made it easier to use the Internet, it was still not frequently used by those outside the military or academia. When the first web browser with graphic capabilities, Mosaic, was developed in 1993, Internet usage significantly increased among the general population.
(Whittaker, 2002). Jason Whittaker (2002) writes “The year of the Web was 1995, when it went from being undervalued to overvalued in a matter of months” (p. 21). In the next few years, the number of Internet users increased exponentially and there were widespread accounts of the potential benefits for using the Internet in K-12 classrooms.

As with other technological reform movements, the federal government has played a significant role in encouraging Internet usage in education. The Telecommunications Act of 1996 was signed into law by President Bill Clinton and contained a specific provision, known as the e-rate program, to provide discounted rates for schools and libraries to access the Internet (“FCC Chairman Kennard Celebrates,” 1999). In November of 1999, the chair of the Federal Communications Commission declared that, “The e-rate is working, enabling children in over one million classrooms to access a whole new world of knowledge. It is a critical investment in the next millennium for our schools, our children, and our country” (“FCC Chairman Kennard Celebrates,” 1999). In the late 1990s, during the highpoint of e-commerce, the belief that the Internet could revolutionize education was widely held by governmental officials, policy makers, reformers, and educators. Judi Harris (1998) notes that the goal of having all classrooms connected to the Internet had, “local, district, state, regional, and national support” (p. vi). In fact, the national support came from the highest levels of the government with the U.S. congress creating the bipartisan Web-based Education Commission. This organization held a series of hearings culminating in a formal report submitted to President Clinton. This document, The Power of the Internet for Learning, considers the potential of the Internet from a variety of perspectives including accessing hardware, teacher training, developing content, legal requirements, and many others. It is
important to note that the affiliations of the participants included the following sectors:

K-12 schools, universities, research organizations, federal government agencies,
congressional staffers, state government agencies, the technology industry, the
communication industry, the educational technology industry, educational advocacy
groups, Smithsonian museums, and many others. In her 1999 text, Internet Technology
for Schools, Catherine Mambretti writes

The Internet is at the center of one of the most significant and dramatic
technological revolutions in history: the emergence of an incredibly powerful new
means of communication, transaction processing, information retrieval, and
problem-solving. This technology has the potential to transform many of the
foundations of society, especially education. The Internet has enormous potential
to make fundamental changes in the way in which Americans learn, not only
during their early years but throughout their lives. More than simply a means of
enhancing existing educational processes, the Internet is also increasingly
becoming the principal mechanism for delivery of K-12 curriculum materials in
all disciplines. (p. 1)

Her claims are representative of educators excited about the potentials of the Internet.
However, such sentiments about the benefits of computers and the Internet are not
accepted by all members of the teaching and research community.

A number of years after these initial claims were made, educators are now in the
position of assessing the impact of the Internet on their classrooms. Researchers, policy
makers, reformers, and educators obviously hold diverse views about the effectiveness of
using the Internet in public school classrooms. In a 1997 article on the future of
computers in education, Alfred Bork notes “there is STILL little worthwhile software to
use in schools, 30 years after this use began. This includes the vast amount of mostly
low-quality material to be found on the World Wide Web” (¶ 20). In reviewing the
changes that occurred in educational technology between 1986 and 2001, Cuban (2001)
notes that although access to computers has increased, and students and teachers report using them more during class time, education has not dramatically changed to fulfill the early hopes of reformers. The current discourse around using the Internet in education relates to the Cuban quote I mentioned previously with regard to the “exhilaration / scientific-credibility / disappointment / teacher-bashing cycle” (p. 6). Based upon my analysis of the literature, educators have passed the exhilaration phase, are in the midst of the scientific-credibility phase, and may soon enter the disappointment phase. Thus, this is an appropriate time to reconsider Internet integration strategies for public school classrooms.

*Digital Divide*

Although there are many exciting educational uses of the Internet and computers, not all students can take advantage of them. Because many schools do not have adequate computers or access to the Internet, students are unable to utilize these technologies as learning resources. A major power issue affecting educational uses of computers and the Internet is the digital divide, also called the knowledge gap. The term “digital divide” refers to disparities in accessing and using technology; these disparities are linked to socio-economic status, race, ethnicity, country of origin, English fluency, and many other factors. Don Tapscott (1998) writes, “The issue is not just access to the new media, but rather whether differences in availability of services, technology fluency, motivation, and opportunities to learn may lead to a two-tiered world of knowers and know-nots, doers and do-nots” (p. 256). Although the prevalence of computers and Internet access in homes and schools is significantly greater today than it was several years ago, it is the gap between those who have access and those who do not that is growing (Tapscott,
1998). In the United States, both the Department of Commerce and the Department of Education actively research and publish findings about the digital divide. In a 2000 report, the U. S. Department of Commerce found that between 1998 and 2000, the gap between the number of Black and Hispanic households with Internet access and the national average grew.

Other than home and work environments, public schools are the most frequent place people access the Internet. This holds true especially for those living in rural areas (U. S. Department of Commerce, 1999). Some recent studies show that universal access is increasing, however, the digital divide persists. In some cases it is widening, and is affecting public school students throughout the United States. A 1999 study found that geographic location, economic resources, and grade levels are no longer accurate predictors of a school’s access to the Internet. In fact, this study found that all schools are “equally likely to have Internet access” (Holloway, 2000, p. 90). However, when the availability of the Internet in individual classrooms is considered, this study indicates considerable differences among schools. Wealthy schools had an average of 74 percent of instructional classrooms connected to the Internet, but schools in poorer areas (those with at least 71 percent of students eligible for free/reduced-price lunches) reported only 39 percent of instructional classrooms connected to the Internet. Between 1998 and 1999, the number of instructional classrooms with Internet access in high-poverty areas remained stagnant (Holloway, 2000). The student-to-computer ratio is also widening; in high-poverty schools it is 16:1, and in wealthy schools it stands at 7:1 (Rose, 2001). Many students from low-income families do not have access to cutting-edge technologies
at home; they “will get access to 21st century technologies through their school or they won’t get it at all” (Rose, 2001, p. 10).

An eight-year study released in 2003 by the U.S. Department of Education found that many discrepancies still exist between urban and rural districts, poor and wealthy districts, smaller and larger districts, and higher and lower minority population districts. Though the differences in access to hardware are not as significant as they once were, other inequities remain. For instance, schools with the lowest minority enrollment were the most likely to have a full-time paid technology specialist. Additionally, the ratio of students to computer with Internet access was higher in high poverty districts than in low poverty districts (NCES, 2003).

In order to improve student access to technology, the U. S. Department of Education advances numerous suggestions that may dramatically improve access to computers (Cattagni & Westat, 2001). These options include changing school funding formulas to make technology allocations equal in wealthy and poor districts, allowing students to access computer labs outside school hours, enabling students to “check out” a laptop, designing multimedia and educational software that reflects an awareness of racial, ethnic, and cultural diversity, and providing funds for teacher training, support, and instruction (Holloway, 2000).

Importance of the study

Because of the increased availability of computers and the Internet in public school classrooms and because of the decisions being made to promote their uses in public school classrooms, I feel that analyzing research reports of Internet usage is crucial. A well-developed knowledge base relating to effective uses of the Internet in
education may help this technology avoid the path of educational film, educational radio, educational television, and educational computing programs. One argument made for using the Internet in education is that it allows students to visit places and interact with objects in ways that would not be possible with traditional means. A manifestation of this view is the increasing popularity of virtual field trips, virtual tours, and virtual museum experiences. The intersection of educational uses of the Internet and museum education is at the heart of this study.

Classroom Uses of the Internet

Opportunities to use the Internet for educational purposes have greatly expanded in the last several years. In 1997, the United States Department of Education recognized this trend and stated that one of its top seven priorities was, “Every classroom will be connected to the Internet by the year 2000 and all students will be technologically literate” (as cited in Barker & Whitting, 2000, p. 190). Although public schools did not achieve this goal, it is important to recognize the many ways the Internet changed the field of education. In fact, technology is growing faster than the ability of researchers to measure or understand it. Barker and Whitting note this trend and believe that many changes in technology and accessibility will occur between when they complete a study and when it is published. Effective practices that integrate educational uses of the Internet are still developing, and as new technologies rapidly emerge, it is difficult for educators to remain well versed in them (VanFossen, 2001). Educational museum web sites are plentiful, but there are few published accounts of studies that critically examine the development, use, and effects of these sites. Additionally, there are few studies investigating the effects of web usage in public schools (Nickell, Field, & Roach, 2001).
Because of the paucity of research on the use of museum web sites in schools, my
discussion of the Internet in public schools is general and addresses many different issues
related to using web sites in schools.

Recent research indicates that only a small percentage of K-12 classroom teachers
utilize the Internet during class time (Becker & Ravitz, 1999; VanFossen, 2001). A study
of social studies teachers who use the Internet and web sites in their classrooms found
that students’ primary use is for low-level information collection (VanFossen, 2001).
Phillip VanFossen (2001) notes that student web activities rarely take advantage of the
potentials of the web and often lack significance. Bob Coulter (2001) cautions that when
teachers are not well prepared to use the Internet with their students, the students may
collect vast amounts of information of questionable merit. In addition, Samuel Ebersole
(2000) found that when given little instruction about using the Internet, students primarily
surf and look at commercial sites, with little or no thinking about the sites they use, the
information they locate, or the source of the information.

Possibilities for the Internet in Education

Many teachers are uncomfortable with computers, and predictably, their
discomfort leads to little and limited use of technology with their students (VanFossen,
2001; Zhao, et al., 2001). However, when provided with adequate professional
development and training, teachers often become enthusiastic users of the Internet to
revitalize teaching and learning (VanFossen, 2001). A compelling endorsement for using
web sites in education includes the following observations:

The web supports manipulation of information including generating, transmitting,
storing, processing, and retrieving.
The web serves increasingly as a communication facilitator – students can communicate with teachers, experts, other students, parents, and collaborate with people throughout the world.

The web is a creation environment - students are able to create and publish their own informative web sites.

The web serves as an instructional delivery medium – web sites provide digital educational activities. (Mioduser, Nachmias, Lahav, & Oren, 2000, p. 56)

Once teachers understand the potentials of the web and develop their own technical skills, they can work toward the seamless integration of technology into traditional forms of teaching and learning – some educators refer to this as “transparent” technology (Hogan & Gomm, 2000). Several trends in transparent classroom uses of web sites are emerging – these include WebQuests (Dodge, 1995, 2000), curriculum pages (hot lists) (Kocher, 2001; Love, 2001), developing multimedia projects and web sites as assessments (Buchler, 1999; Hertzfeld, 2002), the use of virtual field trips (Buchler, 1999; Cooper & Cooper, 1999), and social action projects (Harris, 1994, 1998).

*WebQuests.*

In an effort to organize and categorize educational uses of the web, Bernie Dodge (1995, 2000) developed the concept of WebQuests. WebQuests are inquiry-oriented activities for students to develop higher-order thinking skills while using web sites as information sources. WebQuests have a specified format to guide student inquiry; the sections include an introduction, task, process, resources, evaluation, and conclusion. A well-developed WebQuest requires more than information gathering; students must also process, evaluate, and synthesize the information to form their own conclusions. Often, WebQuests involve students working collaboratively and culminate in a class discussion, presentation, structured debate, or another activity connected to classroom interaction. A
good WebQuest focuses on an issue that has multiple viewpoints represented on the Internet, such as a social, political, environmental, or health related issue. Jean Cross (2002) teaches in-service and pre-service teachers to create their own WebQuests to use in their classrooms. She explains that teachers who learn to develop and implement them report overwhelmingly positive experiences in terms of student enthusiasm and learning.

Curriculum Pages.

Curriculum pages are somewhat similar to WebQuests, but less complex. A curriculum page is essentially a teacher-created list of educational web sites relating to a particular topic of study (Kocher, 2001; Love, 2001). Teachers direct their students to the site with the curriculum page, and students can use the links to easily access the sites selected by the teacher. Curriculum pages can help combat the problem of students searching (surfing) endlessly to find information on a particular topic. However, without clear instructions on what they are to find and how they are to utilize the information, the educational value of using curriculum pages is questionable.

Multimedia Projects.

Lynne Hertzfeld, a teacher-researcher, (2002) describes student-created multimedia projects relating to poetic devices. Her students, many of whom previously struggled to understand poetic devices, enthusiastically learned about rhetoric through lyrics from popular music. Using the Internet as a source for images, text, video, and audio, students made multimedia presentations with Hyperstudio that investigated poetic devices in the songs of their chosen artists. After successfully teaching this lesson to her own students, she worked with another teacher in her district to implement the same lesson. Results from the students’ pre- and post-tests showed a dramatic increase in their
understanding of poetic devices after creating their multimedia projects (Hertzfeld, 2002). Her incorporation of the Internet and popular culture into the lesson on poetic devices certainly makes it interesting and motivating for students. However, the Internet is used as a resource to take things from; I was disturbed that her presentation did not mention copyright issues with regard to the images, text, video, and audio that her students downloaded from the Internet and then used as part of their projects.

*Virtual Field Trips.*

Virtual field trips are one way schools can expose students to a wide variety of resources that they cannot visit themselves. Jean Shields (2001) notes that museums play an important role in on-line learning for students because they provide access to primary source material. There are currently thousands of web sites featuring virtual tours that enable students (or any visitors) to experience diverse places that may be physically distant or no longer exist (Cooper & Cooper, 1999). In one instance, designers created a virtual room to house images of the paintings originally displayed in Duke Alfonso’s 17th-century Ferrara home (http://www.webexhibits.org/feast) (Douma & Henchman, 2000). This virtual re-creation is perhaps the most realistic way for contemporary visitors to experience these artworks in their ‘original’ setting.

*Social Action Projects.*

Judi Harris (1998) and Theresa Michelson (n.d.) explain the importance of building student learning around problem solving activities and they delineate several ways students can use the Internet to solve meaningful problems. Among the numerous activities they advocate, simulations and social action projects both promote student thinking skills. Simulations provide opportunities for students to learn about complex
issues or events through interaction. Students may participate in the launch of an airplane, design a building, trade stocks, or work to replenish the ozone layer. Simulations may include experts who can answer student questions through e-mail, they may function through the use of software, or they may be solely based on content available on-line. Of the Internet learning activities Harris advocates, simulations are the most complex, requiring a great deal of time for teachers to coordinate and prepare the content. In explaining simulations, Harris writes “the depth of learning they offer and the task engagement participants display often convince project organizers to spend the additional time and effort necessary to make them work” (1998, p. 40).

Through social action projects, students use the Internet to research various social issues, select an issue to focus on, plan an approach to tackle the issue, and implement their plan. The Internet is used as a tool to further student thinking, learning, and action. Social action projects can be interdisciplinary and allow students to learn from authentic problems faced by people throughout the world. Although their proposed implementation strategies may not result in the desired effect, students learn a great deal through this problem solving experience (Harris, 1998).

Promoting Critical Thinking with the Internet

A trend in education has been to teach students critical thinking skills (also called higher-order thinking) (Ennis & Paulus, 1965; Ennis, 1967, 1991; Jonassen, 2000; Paul, 1990, 1995). The meaning of “critical thinking” and what types of thinking the term encompasses continue to change throughout time. Initially, I used the term “critical thinking” to describe the type of thinking skills that using the Internet can promote because the term is common throughout the literature on using the Internet in K-12
classroom settings. In conducting searches of online databases, I also found frequent reference to “higher-order thinking” and some mention of teaching for “understanding.” Many educators, including Martha Wiske, Howard Gardner, and David Perkins (1998), write about the importance of teaching for understanding rather than teaching students to simply pass tests. Though the ideas behind teaching for understanding change and evolve over the years, they are also based on important principles. However, there are underlying similarities throughout the literature on critical thinking, higher-order thinking, and understanding. These three terms are related in that they describe learning and thinking that encourages students to apply learning to novel situations, to evaluate, assess, analyze, synthesize, or question the information they find, and to consider multiple possibilities. Although “higher-order thinking” and “critical thinking” are widely used terms, they are limited in scope and do not account for the wide variety of thinking that using the Internet can promote. Instead, uses of the Internet in K-12 classrooms should focus more on developing critical thinking skills to build student understanding. In the majority of the literature that I reviewed, the concept of student understanding is broader than the concepts of critical thinking and higher-order thinking. I will address all three topics because they are related and involve some similarities. As described by David Perkins, teaching for understanding involves the following:

Understanding…calls for more than just reproducing information. Understanding also is more than a routine well-automatized skill….In a phrase, understanding is the ability to think and act flexibly with what one knows. To put it another way, an understanding of a topic is a “flexible performance capability” with emphasis on the flexibility. (1998, p. 40)
Perkins and other researchers, including Howard Gardner, Vito Perrone, and Martha Stone Wiske, involved with the Teaching for Understanding project at Harvard University, worked with a group of schools to develop a framework to describe their views of teaching and learning (Wiske, 1998). Though some authors clearly delineate the way they use these terms, many do not offer specific definitions. This represents an assumption that the reader “knows” what “critical thinking,” “higher-order thinking,” or “understanding” is, and that there is no need to describe the terms. I found this problematic because the articles describe different student experiences with the Internet. It is difficult for readers to assess the potential transferability of research findings if the reader is not aware of the underlying meanings the author ascribes to the terminology at the heart of the study.

The argument that the Internet helps develop critical thinking skills is often cited as one of the benefits of including the Internet in K-12 instructional time (Kurubacak & Gonzales, 2002; Radlick, 2002; Salpeter, 2003; Taylor, 2002). In general, the term “critical thinking” is used in literature on the Internet to describe the process of determining if the information contained in web sites should be considered accurate or valid. Obviously, this raises numerous issues relating to the concept of “accuracy” and the existence of multiple viewpoints relating to many topics. Additionally, I recognize the difficulty of ascribing an absolute definition to contested terms including “accurate”

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2 For an extended discussion of the terms validity, accuracy, and reliability, please refer to the Validity/Reliability/Accuracy section in chapter 4.
and “valid.” For the purpose of this literature review, I will follow the trend in the literature and use the terms “accurate” and “valid” interchangeably to refer to information that is widely considered factual and verifiable through multiple sources. Nicholas Burbules and Rupert Berk (1999) write about the similarities and differences between critical thinking and critical pedagogy. They explain that the critical thinking literature “…concerns itself primarily with criteria of epistemic adequacy: To be ‘critical’ basically means to be more discerning in recognizing faulty arguments, hasty generalizations, assertions lacking evidence, truth claims based on unreliable authority, ambiguous or obscure concepts, and so forth” (p. 46).

In other contexts, the term “critical thinking” has different connotations. In a 1995 article in *Studies in Art Education*, Candace Stout argues for the importance of developing critical thinking skills in students enrolled in art education courses. Drawing from the work of Richard Paul (1990, 1995), she explains that critical thinking includes metacognition, the ability to ask relevant questions in a timely fashion, thinking independently, valuing personal experiences, and other traits. When compared to many other descriptions of critical thinking, Stout’s description is broader, it allows for more subtleties of thought, it embraces different ways of knowing, and it relates to artmaking and art criticism.

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3 I feel it necessary to point out that many disenfranchised and oppressed people have seized upon the Internet to voice their stories that often disrupt the dominant discourses promoted in the United States. Their experiences may not be “widely considered factual and verifiable through multiple sources.” Personally, I believe this is a strength of the Internet and students could learn about multiple viewpoints on various issues by reading web sites that are not mainstream. The majority of the literature I located does not share my opinions and emphasizes the importance of helping students sort through the information on the Internet to find the “facts,” never questioning the origin of the “facts” or whose power they serve to reinforce.
Limiting the discussion of critical thinking/higher-order thinking and the Internet to a systematic assessment of “accurate” information does not allow for the consideration of many different ways of thinking about how to use this technology in the classroom. Certainly, the Internet contains a wide variety of information that is more or less appropriate for students to review and use for schoolwork. Teaching students ways to discern differences between materials from a variety of sources is an important skill (and should not be limited to information on the Internet). Additionally, when teaching students to be careful consumers of information from the Internet, teachers should not falsely privilege information from print sources. I encountered this situation firsthand when one of my former undergraduate students bought a magazine at a local bookstore to help with a multimedia project about September 11. Though it used all the visual and textual “codes” of news magazines, the magazine she selected did not contain a publication date, photographer’s names, photograph dates, authors’ names, or any other identifying information. The entire publication was filled with undated images and text without bylines and the obvious implication was that the stories and images were post-September 11. The anti-Islamic text was punctuated with images of middle-eastern looking young men rioting, protesting, marching in the streets, and burning American flags. It was not a current issue of an existing magazine, but a seemingly nameless periodical of the souvenir variety that proliferated shortly after the death of Princess Diana. My questions about the magazine puzzled her, because she had the notion that images and text from a magazine, not from the Internet, were inherently believable.

Although the majority of the literature focuses on the idea that critical thinking as checking the “accuracy” of information on the Internet, there are articles that present
alternate views. For instance, Kimberly Vidoni and Cleborne Maddux (2002) write about ways teachers can use WebQuests in their classrooms to improve students’ critical thinking skills. They believe that it is important to research ways of integrating the Internet into instructional time, focusing on improving critical thinking. Additionally, they explain that some definitions of critical thinking include the awareness of one’s own thoughts and thought processes as well as the ability to think about and analyze ideas from multiple perspectives. Because students often work on WebQuests as collaborative groups, they will need to engage in conversations about their thoughts on the issue. Thus, they will have to explain and defend their own ideas while being exposed to the ideas and thoughts of others. Since WebQuests often utilize primary source materials, they allow students to read and interact with information created by those who experienced it. This may be quite different from the interpretations of historical events and controversial issues offered in many school textbooks. WebQuests are a good match for the Internet because it is a non-linear medium, and WebQuests are non-linear in nature. Vidoni and Maddux argue that WebQuests present the necessary structure allowing students to thrive when using the non-linear, virtually structureless Internet. Through the data analysis, presented in chapter 4, I will problematize the varied results of the research reports on using the Internet to develop critical thinking skills. Additionally, I will look for the underlying assumptions the authors have about critical thinking as related to using the Internet in K-12 classrooms.

   Teacher Community

   Teachers benefit from professional communication with their peers, often learn new teaching practices from the success of others, and may improve their teaching skills
through contact with experienced colleagues. However, the culture of contemporary North American schools does not always foster these types of community-building exchanges. Linda Darling-Hammond (1997) points out that teachers have few opportunities to engage in dialogue with peers about their practice. In fact, the culture of sharing ideas and teaching practices is not well established in many schools (Barab, MaKinster, Moore, & Cunningham, 2001). Many factors contribute to the limited extent of teacher community including the structure of the school day, the present model of in-service training, and the lack of a tradition of sharing (Barab, MaKinster, Moore, & Cunningham, 2001).

Researchers argue that developing a sense of community among teachers may foster shared teaching practices, improve professional development, and build support networks (Barab, MaKinster, Moore, & Cunningham, 2001; Chiappini, Chioccariello, & Gibelli, 2000; Mayes, 2001). John Dewey (1916) explains the concept of community:

There is more than a verbal tie between the words common, community, and communication. Men live in a community in virtue of the things which they have in common; and communication is the way in which they come to possess things in common. What they must have in common in order to form a community or society are aims, beliefs, aspirations, knowledge – a common understanding – like-mindedness as the sociologists say. (p. 4)

In order for teachers to form a community, they need to develop prolonged communications with one another. By virtue of their profession, many teachers share common “aims, beliefs, aspirations, knowledge” (Dewey, 1916, p. 4). However they rarely have the opportunity to participate in sustained communication related to their common practice. As many have noted, teachers often report feelings of isolation from
others in the profession (Bright Futures for Exceptional Learners, 2002; Lawyer-Brook & Sherry, 1996; Yap, 1994, 1997). Dewey (1916) continues:

Individuals do not even compose a social group because they all work for a common end. The parts of a machine work with a maximum of cooperativeness for a common result, but they do not form a community. If, however, they were all cognizant of the common end and all interested in it so that they regulated their specific activity in view of it, then they would form a community. But this would involve communication. Each would have to know what the other was about and would have to have some way of keeping the other informed as to his own purpose and progress. Consensus demands communication. (p. 5)

The situation Dewey presents is one form of community. This situation certainly exists in some schools, but it is not common throughout the school districts in North America. Major barriers to greater teacher communication include the temporal structure of the school day, the physical distance between schools, and social customs embedded within schools. Many contemporary researchers believe that the Internet has the potential to overcome these barriers and may help develop a greater sense of “communities of practice” within the ranks of teachers (Barab, MaKinster, Moore, & Cunningham, 2001; Bright Futures for Exceptional Learners, 2002; Lawyer-Brook & Sherry, 1996; Mayes, 2001; Yap, 1994, 1997). Sasha Barab, James MaKinster, Julie Moore, and Donald Cunningham (2001) describe the importance of communities of practice and explain how they relate to the use of on-line communities for teachers. They write that a community of practice “involves a collection of individuals sharing mutually defined practices, beliefs, and understandings over an extended time frame in the pursuit of a shared enterprise” (p. 76). These researchers struggled to implement a community of practice within the confines of an on-line teacher professional development program and found that teachers benefited from their interaction with other teachers.
On-line Community

Edward Valauskas (1996) describes an on-line community as, “a collection of individuals who use computers, software, and other means to discuss common interests transcendentally, outside of time and space” (¶2). Within each district or each community of teachers, on-line communities are manifested in unique ways. It is crucial to differentiate between ways schools utilize the Internet to bring distant opportunities to teachers and the development of an Internet community.

Current School Uses of the Internet for Teachers

School districts may use the Internet to bring professional development opportunities, distance education courses, and cooperative planning experiences to their teachers (Bright Futures for Exceptional Learners, 2002; Creating Connections, n.d.; Lawyer-Brook & Sherry, 1996). Other ways school districts utilize the Internet include developing teachers’ proficiency and self-confidence with computers. These are important and useful endeavors, but these programs are often based upon an expert transmitting her or his knowledge to the learners in the group (Barab, MaKinster, Moore, & Cunningham, 2001). An alternate situation to the transmission model is the development of online educational communities in which members interact as peers.

Though every on-line community is unique, they all involve communication of their members. I think that teachers are more likely to participate in an on-line community when they see a benefit for themselves and their teaching or if it meets a need that they cannot meet through interactions with their peers at school. Teachers often report feelings of isolation especially with regard to learning about emerging trends in their field; this is particularly true for those who work in rural districts (Yap, 1994, 1997).
In her research with teachers in rural districts, Kim Yap (1994, 1997) found that many teachers utilized Internet communities to interact with and learn from other teachers. In their research, Sasha Barab, James MaKinster, Julie Moore and Donald Cunningham (2001) found that novice and experienced teachers were interested in different types of on-line interactions. Teachers with less than five years of experience wanted to communicate about lesson plans and classroom management issues. Veteran teachers expressed an interest in discussing pedagogical issues and curricular issues with colleagues. The development of online communities of teachers may offer opportunities to collaborate with and learn from others with similar goals. Additionally, through interacting online, teachers and museum educators may develop partnerships that improve student experiences and further the goals of both institutions.

Museum Education

There is little scholarly agreement about the origins of museums; consequently, authors differ in their beliefs about the early days of museum education. Museums developed as cultural institutions in the United States and Europe beginning in the late eighteenth century and continued growing through the nineteenth and twentieth centuries (Hein, 1998). Historically, education received less attention and funding than other museum functions. Over time, museums created educational programs for adults and children, and some collaborated with local schools (Alexander, 1979). The twentieth century witnessed the expansion of educational opportunities for school groups. Today museum and school personnel work together in a variety of ways including museum educators and teachers collaborating to create programs for students that complement school curricula. To help further the relationships between schools and museums,
museum educators create pre-visit and post-visit activities for students and teachers, develop educational web sites for school use, and study the effects of their programs. Research on educational museum programs is especially valuable in helping museum educators and teachers evaluate and assess their programs and develop a knowledge base about learning in and from museums.

Current State of Educational Museum Web Sites

Museum presence on the web has significantly increased in the past several years; in 1993 only a few hundred web sites of any kind existed, by 1997 there were more than three million, including several thousand museum sites (Johnston & Jones-Garmil, 1997), and today the search engine Google searches more than 4.2 billion web sites. Museums create web sites primarily to disseminate information, to increase their profile, to educate, to entertain, and to market goods and services. Because of the ease with which museum personnel can circulate information and users can access this information, museum web sites are becoming increasingly popular (Johnston & Jones-Garmil, 1997). Although museums now have a sizable presence on the web, including the movement that established a top-level domain name of .museum (similar to the current .com, .edu, .gov, .net, .org, etc.) (O’Donnell, 2001), there are only a few studies that look critically at the development and uses of museum web sites. Most articles relating to museum web sites are descriptive, focusing on the content of these sites, not the uses of them. The literature primarily relates to the development of and the users of educational museum sites (Bandelli, 2001; Douma & Henchman, 2000; Frost, 2001; Gesualdo, 2000; Johnson, 2000; Luarca, Rochester, & Cunningham, 2000; Roy & Christal, 2000; Semper, Wanner, Jackson & Bazley, 2000).
Using Theory and Research to Improve Practice

Although education has been a concern of many museum professionals since the founding of their institutions, little theoretical, evaluative, or research-oriented literature emerged before the 1970s. In a 1975 article, Barbara Newsom noted the lack of scholarly writing about art museum education programs and explained why studying this field is crucial:

There is virtually no body of evaluative literature in this field, only the bare beginnings of a formal network of communication among museum educators, and until recently no program for training these staffs. Museum educators are thus forced to do their work on a hit-and-miss basis, inventing programs on their own without professional knowledge or experience to guide them, and often repeating, unwittingly, programs and mistakes of the past. (p. 54)


Constructivism in Museums

Constructivism is one of the most prevalent theories in contemporary museum education. Numerous scholars, educators, and researchers articulate different descriptions and different theories of constructivism. Because of the widespread acceptance of constructivist theories, as an umbrella theoretical framework, I discuss the
theory in general terms before explaining its relationship to museum education. Constructivist theories are widely associated with Lev Vygotsky and Jean Piaget as well as contemporary scholars including Maxine Greene. There are many types of constructivists, but generally this view of education posits that knowledge is constructed by individuals and cannot be simply transmitted from one person to another. Unlike an object that can be readily passed from an instructor to a child, knowledge is uniquely constructed by each person. Constructivist theorists emphasize the social nature of knowledge construction and the importance of students working with others to further their learning. Also central to Vygotsky’s constructivism is the concept of the zone of proximal development. This refers to the things that a learner cannot do alone, but can accomplish with scaffolding or assistance from peers or teachers. Constructivist views have dominated school education for a number of years, but only recently gained widespread popularity and acceptance in museums.

George Hein (1998) believes museums should change their practices in a variety of ways to promote the emergence of what he terms *The Constructivist Museum*. In relating various aspects of constructivist educational theories to museum education and exhibition policies, he asserts that museums should actively assist visitors in creating connections between their prior knowledge and museum exhibits. He points out the importance of fostering visitors’ physical and intellectual comfort in museums and recognizes that, historically, few museums embraced these ideals. Hein also explains that museum educators need to consider the diverse learning styles of their audience, how collaborations can foster museum learning, and how the social environment of the
museum influences visitor experiences. Of particular interest is his point that museums should actively explain how they construct meaning when creating an exhibition.

During 2001, the Missouri Historical Society held an exhibition that included the curators’ and educators’ preliminary sketches, exhibition plans, ideas about museum practice, and thoughts about the exhibition. They showed their thought processes, made their decisions obvious, and let viewers think about how the decisions of curators, exhibition designers, and educators impact the meaning individuals make from the exhibition. This exhibit is an example of what Hein argues for in showing the public the decision making process behind museum exhibits, and when possible, including them in the process in a variety of ways.

Eilean Hooper-Greenhill (2000a) offers an example of inviting the public to participate in museum decision making with the controversy surrounding the Ghost Dance Shirt, a Lakota Sioux Indian garment from the 1800s. This Shirt, purchased by a Scottish museum in 1892, became the subject of a repatriation lawsuit filed in 1992 by the Wounded Knee Survivors Association. Throughout the legal battles, the museum displayed the Shirt with text panels explaining the situation and included a comment book asking for visitor thoughts on the repatriation of the garment. During the next several years, the museum changed the display of the Shirt and held public forums to discuss its fate. The public showed a great deal of interest in the lawsuit and overwhelmingly expressed the belief that the museum should return the Shirt to the Lakota Sioux. In their written remarks, many people made connections between the conditions of the American Indians and the Scots. Comments included, “We as a nation have witnessed our own culture being ravaged and treated with disrespect and
contempt…the Shirt should have been handed back immediately” (2000a, p. 159). In 1999, the museum returned the Shirt to the Lakota Cultural Center in South Dakota. By asking visitors for their input and de-mystifying museum exhibition procedures, this museum actively encouraged visitors to make meaning for themselves. Although the above example deals primarily with adult audiences, students can be engaged in issues regarding museum practice too.

**Hermeneutics in Museums**

Hooper-Greenhill (1994b) describes the effects of educational psychology on museum practice and explains how museum exhibits are learning environments. She explains the influence of educational theories and how they expanded the traditionally narrow view of education in museums. In particular, she focuses on the process of interpreting objects as related to Hans-Georg Gadamer’s hermeneutic circles (Hooper-Greenhill, 2000b). She relates making sense of objects to the hermeneutic cycle, developing understanding through the continuous movement between the parts and the whole. Of particular importance to this research is her assertion that, “All interpretation is, therefore, necessarily historically situated” (2000b, p. 141). Meaning making in museums is a continual process involving past experiences, traditions, human biases, current situations, the objects, and the social setting of the museum (Ogbu, 1995). The notion that meaning making is individual, ongoing, and subject to interpretation is fundamentally different from early ideas of museum education programs when educators communicated “the” correct interpretation of an object. Expanding the realm of interpretation validates the experiences of diverse visitors and enables them to make connections among themselves, the objects in museums, the people who created the
objects, and the contemporary display of the objects. Hooper-Greenhill (2000b) explains that the traditional definition of interpretation, as related to museum objects, is quite different from the philosophical definition used in hermeneutics. She explains that interpretation in a museum focuses on museum personnel delivering “objective bodies of authoritative facts to passive receivers” (p. 143). Although this attitude may not be as prevalent in educational departments of museums, it is common in curatorial departments (Ogбу, 1995). Hooper-Greenhill believes museum personnel should re-think the concept of interpretation and shift educational and curatorial practices to reflect a hermeneutic view of the process of interpreting museum objects. This may include recognizing the context in which an object was created; acknowledging the culture of the creator; and exploring how temporal, geographic, cultural, economic, etc. differences influence the interpretation of an object.

*Museum Research*

Museums, like other institutions, focus on continually improving their educational programs. To further this goal, they often conduct research; studies of museum visitors and their experiences first emerged in the nineteenth century (Alexander, 1979). Recent efforts concentrate on understanding specific ways visitors learn and the effects of museum experiences on students. John Falk and Lynn Dierking (1992, 1995, 2000) are well known in the museum education community for their early research about learning on field trips and investigating the variety of contexts that comprise a museum visit. Other researchers conduct large-scale studies to document conditions existing in museum educational programs (Eisner & Dobbs, 1986; Hizry, 1996; Newsom & Silver, 1978). Although surveys are a common form of educational research in museums, other studies
offer in-depth qualitative investigations of a particular group or experience in the museum setting (Anderson & Lucas, 1997; Brodie & Wiehe, 1999; Falk & Dierking, 1992; Henderson & Watts, 2000). There are currently many different accepted forms of conducting and presenting museum research. The majority of the research I located is quantitative and investigates science museums, however some museum research is qualitative and focuses on different types of museums. I selected two research studies that are relevant to this project because they offer diverse viewpoints about the nature of research, ways to present research, and how research can alter practice.

*Reader’s Theatre.*

Lee Brodie and Lenora Wiehe (1999) conducted qualitative research on field trips and collected data from teachers, students, museum educators, and tour guides over eight years. Their study, entitled *Yellow Busloads From Hell: A Museum Field Trip in Three Voices,* is written in “readers’ theatre,” allowing the voices of all participants to tell their own stories. Through the story of a school visit to a history museum, they describe the different goals of all the participants. They show that museum educators, teachers, and students do not share the same ideas about what a museum visit is, nor do they have the same understanding of what constitutes a successful learning experience. Through their careful investigation of the pitfalls of museum visits, they also point out ways teachers can work with museum staff to create successful museum experiences. Though not claiming that their findings can be generalized across all museums, they present their research with thick description (Geertz, 1983) so that the reader will be able to decide which aspects transfer to her/his unique situation. Their research is unique in that it
presents multiple, conflicting perspectives, expectations, and goals for a museum field trip.

Qualitative Analysis.

Susan West (1998) studied the development and implementation of an art museum web site based upon the Imperial Tombs of China exhibit at the Orlando Art Museum. She conducted a qualitative study that included interviews with students and teachers as well as numerous surveys. Though she utilized a qualitative methodology, she presents her data in the form of numerous charts, tables, and graphs. She placed an emphasis on evaluating the content of the site through the use of survey data. Intermixed within the statistical charts, West utilizes comments from study participants about their reactions to the web site, the exhibit, and their efforts to use a web site with their students. This research project presents itself as qualitative, however, the researcher makes claims about herself as unbiased and relies heavily on statistics.

Reasons for Museum Research

Alberta George (1999) comments about the importance of conducting research on learning in museums. She notes:

Researching and understanding the process of learning are essential, but unless we apply that knowledge to everything we do – the exhibit plans, the labels, the teaching strategies, and all our communication – we will not be successful in expanding and diversifying our audience. (p. 41)

She points out that conducting research is not the end of a process, but the beginning. Museum educators must not only study their programs, but must also alter them when necessary. Falk and Dierking (2000) explain why it is important for museum educators to understand how people learn. They believe museum exhibits could be more effective
if exhibit design reflected an understanding of “the nature of learning, the reasons people seek out and use museums as places for personal learning, and how contextual factors can be used to facilitate learning” (p. 177). The growing interest in theorizing and researching museum practice brings about greater reflexivity in the field. When museum educators consciously relate their work to theoretical literature, they can make connections between their work and other scholarly writing. Through research, museum educators build a body of knowledge about successful museum programs. Additionally, museum educators use theoretical and research knowledge to improve their relationships with the schools they serve. This knowledge can connect museum education to the larger field of education, yet allow it to retain the aspects that make it a unique discipline. If researchers systematically study educational museum web sites, they will be able to build a substantial body of knowledge about successful programs. This knowledge base could assist others in the field when planning, developing, updating, and evaluating their institution’s educational web site.

Virtual Museum Field Trips/Museum Web sites

As museum presence on the web increased substantially, the development of educational museum web sites flourished. Within the category of museum educational web sites, there are many similar features among numerous sites. Sites may include teacher resources of various types: lesson plans, suggestions for incorporating museum information into curriculum, useful links, information about scheduling tours or how to visit the museum, teacher workshops, and seminars. More often than not, these are static areas where teachers read or print information. However, Donna Gesualdo (2000) believes that web sites for teachers and students can be interactive, allowing users to
share images and text. She cites the example of the web component of the Visible Knowledge Program (VKP) of the New Museum of Contemporary Art in New York City. This dynamic, interactive web site contains specific sections for teachers and students. Through on-line forums, the museum encourages the teachers and artists involved with their program to interact and share ideas. Although the number of teachers currently using the VKP site is less than Gesualdo originally hoped, the museum educators are working toward their goal of creating an “international network of educators using the site as a work space and sounding board for current museum and art education practices” (http://www.vkp.org/) (Gesualdo, 2000). The student component of the VKP site allows students to interact in many of the same ways that their teachers can. Not only can students create their own web sites in the studio portion, they also are able to post images of their artwork and personal statements. In addition, they can use the site to communicate with other high school students studying the same lessons (Gesualdo, 2000).

Other educational museum web sites have areas where students can view objects or experiments and interact with the objects in a variety of ways including The Art Institute of Chicago (http://www.artic.edu/cleo/), The Exploratorium (http://www.exploratorium.org), and the Museum of Modern Art (http://www.moma.org/onlineprojects/artsafari/index.html). Through these sites, students can access information from physically distant museums, or view things usually reserved for scholars. They can also experience exhibits or objects in ways that are not possible during a museum visit. For instance, students and teachers may be able to explore particular items that interest them in-depth, they can choose the objects they want to learn
about, and they can move freely from one section of the museum to another. Neither these activities nor this degree of freedom is usually available during a traditional museum field trip.

As the Internet increasingly supports the use of video, virtual tours and virtual museums are more common aspects of museum web sites. Paolo Paolini et al. (2000) describe four emerging paradigms relating to web sites featuring virtual museums. The first is a traditional web site that presents the objects in a manner similar to the physical museum, but does not include information about the physical museum building. The second is a traditional web site that includes images and text representing highlights of the collection, without relating them to the larger collection. The third type of virtual museum features a virtual representation of the actual building; the sequencing of objects in the virtual museum resembles the arrangement in the actual museum. The fourth is a virtual building that does not relate to an existing physical structure. Visitors can investigate the virtual structure and its contents in ways that are not possible in reality. The structure of the virtual rooms may relate to the objects they contain. Virtual recreations are one way to hypothesize about spaces that no longer exist.

Katherine Cennamo and Susan Eriksson (2001) explain their study of the potential of museum web sites to promote scientific inquiry. After conducting an analysis of approximately 100 science-related web sites, they noted emerging themes and created categories to organize the types of sites. Their categories focus on the content web sites provide to users and include: information, demonstrations, explanations, searches, off-line activities, on-line activities, and collaborations. They are careful to note that most sites provide several, but not all, of these functions. After performing an
in-depth investigation of several inquiry-based sites, the authors developed their own site to promote inquiry-based learning through scientific inquiry. Through interactive web components, they engage students in investigating objects in the museum’s collection and teach them to use scientific inquiry methods. In addition, the site provides resources for teachers as well as the general public (http://www.vtmnh.vt.edu/muse-it/Default.htm) (Cennamo & Ericksson, 2001).

Relevance to My Research

Through the meta-analysis of research reports and teacher accounts of Internet usage, I investigated the topics of developing critical thinking skills through the Internet and building communities of teachers using the Internet. Continually, I related the analysis of the research to potential uses of the museum web sites to develop stronger relationships between museums and schools. These topics are particularly salient when considering different aspects of the Internet and its use by teachers and students. Because they are often cited arguments for the benefits of using the Internet in public school settings, these topics are relevant to the general discourse of technology in education. As stated earlier, the fact that the Internet is one in a long line of educational technologies championed to have dramatic effects on public education needs to be considered when altering public school practices. Instead of simply accepting the claims made by proponents of this technology, administrators, curriculum specialists, museum educators, teachers, parents, and students need to think about the benefits and drawbacks of changing their current educational practices. Considering that school budgets are tightly constrained, it is also important to scrutinize the source of the calls for reform, and who stands to profit financially from changing school practices. As I will discuss later, some
of the research relating to the effects of technology is funded by groups that gain financially when schools are wired for the Internet and need to purchase hardware or software.

In particular, I am interested in understanding how research from K-12 educational settings can be applied to museum practice in ways that benefit teachers, students, and museum educators. Many museums are currently investing considerable resources into developing, expanding, and updating educational web sites. It is important to develop web sites around sound educational practices and museum educators can look to general education for some guidance in this area. The field of museum education is increasingly using theory and research to guide practices and the development of educational museum web sites should follow this trend. Because many of these educational web sites are intended for use in school settings, it is crucial to develop them around educational research. The two particular areas that are at the heart of this study are using the Internet to develop critical thinking skills in students using the Internet to build online teacher communities. In addition, assessing the effectiveness of these sites as ways for students and teachers to experience museum objects is crucial. This meta-analysis seeks to understand these areas in greater detail by looking across broad ranges of literature in each of the areas.
CHAPTER 3

METHODOLOGY

In this chapter, I describe how I came to this qualitative research project and how I situate myself in the qualitative paradigm. I explain the development of my interest in this topic and the qualitative basis of the research. Through an exploration of critical theory/power and my research assumptions, the reader learns about the lenses through which I view this topic. I provide a detailed description of my personal biases followed by a section on the methodological development process I utilized. The methodologies I explore are literature review, content analysis, discourse analysis, and meta-analysis. The discussion of these methodologies emphasizes their strengths, implications, and limitations as related to the development of the hybrid methodology I created. I delve into the relationship between technology and critical theory before a specific discussion of my research methods that includes the development of the analytic instrument. In collecting the data, I created inclusion and exclusion criteria to limit the scope of this study and to keep the analysis centered on uses of the Internet to develop critical thinking skills and to develop online communities of teachers. Throughout the research and writing process, I maintained a research journal that serves as another source for my data. The chapter ends with a discussion of the role of triangulation in this research and my conclusions about the methodology I developed.
Development of the Topic

When Drew taught school, many teachers in the building had no experience using computers themselves, and even fewer teachers had experience using them with students. The school district created a computer lab in his building and all teachers were required to learn the basics of a few programs, focusing on word processing and calculating grades. However, they did not learn strategies for using the lab with their students. On a variety of occasions, he took his students to the lab and enjoyed the time spent there. Drew often wondered about the way he taught in the lab, if there were better pedagogical methods, if students learned anything in the lab that was not possible through traditional art instruction methods, if there were topics he could not cover because he chose to use class time in the lab, and if students were making good use of computers as an artmaking medium or simply clicking around to make something look “cool?”

Upon entering graduate school, I read numerous articles about using computers and the Internet in K-12 classrooms. The claims from some of these articles surprised me and caused me to wonder about the ways the Internet was revolutionizing education. At the same time, the large Midwestern university that I attend implemented numerous initiatives that focused on distance education through the Internet. Though some of my experiences in these courses were positive, others were not. Many of my classmates were also involved in taking online courses and through numerous discussions on the topic; we became aware of the aspects of the distance education courses that worked for us and those that did not work for us. However, I became increasingly skeptical as I read published reports of similar initiatives at other universities and in public school districts. Though some research reports questioned the benefits of putting content online and questioned the types of experiences students have online, these reports were certainly in the minority. In general, the reports suggest that students in distance education courses have extremely positive experiences; have little trouble with the technology; and learn just as much, if not more, than in traditionally structured classes. Every class that I have
taken with an online portion had some issues ranging from students and professors who were not comfortable with the technology, to confusion about student assignments online and how to complete them, to system-wide technical failures. My classmates and I had mixed experiences in online courses, but the literature emphasized merely the positive effects. This led me to question the reports I read relating to K-12 uses of technology, perhaps the reality of the situation was mixed and the published accounts were merely reflecting the positive effects.

As I considered the implications of these research reports and their use within contemporary data-driven decision making in schools, it became obvious to me that I needed to understand more about the body of literature relating to uses of the Internet in K-12 education. The number of articles I amassed on the topic continually grew with every trip to the library and every Google search. I realized that I needed to consider the articles not as separate instances, but as part of a larger discourse on using the Internet in public school classrooms.

Putting a computer in every classroom, connecting the classrooms to the Internet, and issuing guidelines about their use does not constitute an inherently effective policy of Internet integration in K-12 classrooms. At the same time, I think that there is a substantial unrecognized bias among many researchers to show the benefits of Internet technology in classrooms because of the funding structures of their research projects. Increasingly, I am suspicious of the research I read about the Internet because it is deceptively neat and tidy. Some of the articles I read on this topic mention the challenges of changing classroom practice to effectively integrate the use of the Internet, but many do not. I am skeptical about the large claims, that are sometimes presented as
unchallenged, currently being made about educational uses of the Internet, specifically that using it helps improve students’ critical thinking skills and that it has the potential to create online communities of teachers.\textsuperscript{4}

**Qualitative Basis**

For decades, the positivist research paradigm was the only accepted way to discover knowledge, facts, and truth. In many fields, positivism is still the most accepted research paradigm. Researchers design experiments and test hypotheses to determine cause and effect relationships, focused on measuring and quantifying data (Flick, 1998). Positivist researchers believe in one reality that is discovered through carefully formulated experimental work by a neutral researcher. The nature of positivist research assumes that the world contains facts and universal principles that careful researchers can establish.

At one time, I considered positivist research an excellent way to learn about the world, but I now situate myself between interpretivism and critical theory. Numerous realities exist, each person experiences reality differently, and individuals communicate their reality(ies) through language. Because humans are bound by the languages they use for thinking and speaking, communicating experiences of reality can be difficult. Cultures greatly influence reality and construct knowledge. Individuals vary in the way they come to understand the knowledge from their cultures, constructing it within the larger framework made available to them by their cultures. Because of the symbolic nature of language, communication of knowledge can be difficult and may involve slippages of meaning.

\textsuperscript{4} For an extended discussion, see the literature review in chapter 2.
Critical Theory/Power

At the same time, I am concerned with social change and issues of power. Because of these concerns and my belief in the existence in multiple realities, critical theory is an important framework. Realities are constructed by communities and are intersubjective, affected by power, and used to sustain the community itself (Sipe & Constable, 1996). The construction of these realities is mediated by numerous factors including social status, political beliefs, economic status, ethnicity, gender, religious affiliation, all of which are in a continual state of flux. Critical theorists try to understand the underlying social construct of knowledge and believe that power is closely tied to what is accepted as knowledge. Societies accept and reject certain ideas and these decisions affect all members of the society, endorsing some knowledge and discrediting other knowledge. Power plays a considerable role in the acceptance and rejection of knowledge with those in power acting to reinforce and naturalize the situation of their empowerment. Michel Foucault (1980) explains that, “The eighteenth century invented, so to speak, a synaptic regime of power, a regime of its exercise within the social body rather than from above it” (p. 39). This represented a contrast between past systems of power and domination where a monarch was all-powerful and power worked from a top down model. Power created practices of domination that were part of daily routines, were substantially less visible than in previous times, and were perpetuated by individuals who were also subjugated by the practices (Gore, 1998).

Research Assumptions

As a researcher, I situate myself within the boundaries of qualitative research because I ascribe to Norman Denzin’s and Yvonna Lincoln’s (2000) belief that,
“Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make the world visible” (p. 3). Maxine Greene (1997) writes, “Qualitative thinkers resist the conception of science as a body of finished propositions derived from empirical research or a set of formulations to be applied as technical rationality to the shifting, induplicable situations in which people live” (p. 190). I do not believe in the concept of an objective truth that can be discovered. It is not my desire to form generalizations about this research, instead I hope that readers of this dissertation will be able to transfer the aspects of this research that are applicable to their own situations. Because of my biases and beliefs, I do not use a hypothesis, I do not generalize, and I do not seek to make predictions. Instead, I choose to study the character, legitimacy, content, and subtleties contained in these reports.

This dissertation is my interpretation of these research reports, not a discovery of an existing truth or set of facts. It is my hope that this research will cause teachers, museum educators, and policy makers to reconsider why and how they are using the Internet with their students and to carefully contemplate the implications of using the Internet. Additionally, the findings may affect the planning and implementation of educational web sites, specifically those created by museums for K-12 audiences. Teachers and administrators should ruminate on both the positive and negative effects of any technology before adding it to their classroom/district. In doing so, they may find better ways to use the technology, decide its use will add little value to their environment, or find a non-traditional way to integrate the technology with existing classroom practices. If teachers, curriculum specialists, and administrators become critical consumers of technology, recognize the advantages and disadvantages of using it, and
develop an understanding of how it will change existing classroom practices and communities, they may be able to make adjustments in their classrooms, schools, and districts that can improve student learning.

Personal Biases

I have personal biases with regard to this topic and the uses of research reports to justify and build school practice. From the start of my research, I firmly believed that using the Internet in public school classrooms could add to the lives of students in ways that are not possible through other media. At the same time, I was skeptical about current uses of the Internet in classrooms and believed that the potential was still undeveloped. I am aware of the argument that when something is added to a school curriculum or to the school day, something else must be removed. I do not think that the issue of what content or activities are being lost when the Internet is used in classrooms has been thoroughly investigated. However, this issue may become moot when technology integration practices take the form of working toward existing educational goals, this is the ideal situation. Internet usage should not be conceptualized as simply an add-on to the curriculum or a way to occupy students who finish their work early, but as an integral part of meeting pre-existing educational goals.

Effects of Using the Internet

I am not convinced that current practices of Internet integration are accomplishing their goals in classroom practice. Studies show that many classroom uses of the Internet involve students collecting large quantities of information of questionable merit and struggling to understand, apply, evaluate, or synthesize the information they collected (Coulter, 2001; Ebersole, 2000; VanFossen, 2001; Zhao, et al., 2001). These researchers
found that many teachers use the Internet with their students to accomplish things that simply translate or speed up a pre-existing task, for instance, completing a worksheet online. Additionally, they use the Internet to amplify traditional educational practices, for instance, taking a multiple-choice test online so that the scoring will be immediate. Thus, I consider the knowledge base for Internet integration practices to be still developing and think that it will continue to grow over the next several years.

Opportunities to Learn from Museums

When I taught 7th grade art, my school was less than an hour by bus from Washington, DC and Baltimore. I took students on field trips to museums as often as possible and believed that visiting art museums contributed significantly to the ways my students thought about the world and about art. Seeing students respond to viewing artworks in person that we had previously studied in class continually surprised me. Their insights about the artwork were influenced by seeing it in person, participating in a tour, and by listening to and dialoging with their peers. In addition, there always was a palpable sense of excitement among the students before, during, and after the field trip. Through museum field trips, they also learned a great deal about career opportunities in the visual arts, beyond the obvious role of an artist. Because of the physical, financial, and logistical limitations, visiting museums in person is not practical for all students, however the Internet may offer museum experiences for students who are not able to visit in person.

In addition to the educational experience museums offer for studies, many also provide a variety of teacher resources including lesson plans, curriculum guides, visual aids, interactive materials, and others. Through workshops and other in-service
opportunities, teachers can learn about museum exhibits and resources. However, these workshops are often only a few times per year and usually do not include opportunities for developing a continuing dialogue. I attended a number of teacher-focused workshops in the Washington, DC/Baltimore area and all of them followed the same basic format: curator-presented slide lecture emphasizing art historical facts, educator-presented overview of the educational materials they developed, exhibition viewing time (either guided or unguided), and reception/snacks. This model privileged art historical content knowledge and did not address social theories of learning. Teachers can learn a great deal from other teachers about the ways they integrate museum experiences into their classrooms and how they handle the entire museum visit. Connecting people in physically different locations and allowing asynchronous communication are two of the strengths of the Internet. Therefore, the Internet has the potential to create opportunities for teachers to interact with others who are physically or temporally distant. Additionally, it can be advantageous for museums to work toward developing online communities of teachers based upon their mutual interest in connecting their school teaching to museum resources. Thus, through the Internet, teachers and students could experience museum objects in ways that are not possible in real life and they may be able to develop relationships with other teachers, students, or museum educators. These potential uses of the Internet are unique and separate it from past technologies. Motion pictures, radio, television, and computers operated from a delivery system where a content expert made the lesson and the students consumed it. With some exceptions, communication was unidirectional. It is the variety of types of communication it enables,
the rapidly expanding access, and the ease with which students, teachers, and others can create content for the Internet that differentiate it from previous educational technologies.

Methodological Development

This methodology is emergent in nature and changed a number of times as I read, considered, and reconsidered the literature. My original idea was to conduct a literature review of research reports of Internet usage; however I needed to trouble the idea of what it means to “read.” This led me to consider the work of Robert Scholes (1989) as well as John Frow and Meghan Morris (2000). These authors emphasize the importance of intertextuality and looking at the multiple identities of the author and reader. Scholes writes that seeing is a form of reading and of coming to an understanding about a text. His theory is relevant both to understanding these research reports as well as to understanding the complex interactions in classrooms that are the basis of the research reports. Frow and Morris explain that, from a cultural studies perspective, any reading is partial and recognizes the political aspects of all knowledge. These theories of reading enabled me to see my understandings and interpretations as influenced by culture, power, personal experiences, etc. and caused me to trouble the concept of reading and understanding a text outside its context. This led me to read about numerous methodological approaches to understanding texts, both as individual units and as they function to construct a discourse.

Literature Review

Initially, I conceived of this project as a literature review of research reports on Internet usage. However, as I read more on the topic, considered the role of power, and questioned how this information could be used in a constructive manner, a traditional
literature review seemed unable to address the stated and unstated information, biases, and assumptions contained in these reports. Numerous qualitative research books explain the importance of a literature review as a crucial step in the research process (Berg, 2001; Bogdan & Bicklen, 1992; Krathwohl, 1998). A literature review chapter is a requirement in most dissertations. However, these sources do not agree about the degree to which the literature review should be critical of the content of the literature. The literature review portion of the research may be limited to summaries of related research literature and to the theoretical framework of the methodology. The majority of the information I found about literature reviews frames this as a preliminary step in the research that is necessary to familiarize the researcher with related work and issues in the field (Berg, 2001; Krathwohl, 1988). One text (Bogdan & Bicklen, 1992) advises researchers (especially students) not to review much literature before beginning their research because this might significantly alter their interpretation and analysis of data. The drawback is that a substantive review of literature could “curtail inductive analysis – an important advantage of the qualitative approach” (p. 75).

Few texts I located complicated issues of reading, interpretation, data inclusion/exclusion, and representation as related to the literature review. An exception to this is David Krathwohl’s (1988) How to Prepare a Research Proposal in which he complicates and problematizes numerous issues related to literature reviews. Krathwohl advocates a critical review of literature involving a great deal more than reading and summarizing. In addition to advising researchers to review both contemporary and historical research, he encourages researchers to explain the flaws of related research and discuss the theoretical groundings that relate to the studies they review. He explains the
importance of relating contemporary research to previous work in the field, while also elaborating about the new aspects of the current research project. Krathwohl’s approach involves far more contemplation, consideration, and criticism of literature than other approaches to literature reviews I found.

Even though Krathwohl’s description of literature review is deeper and more complex than others I encountered, it does not emphasize the context of the research sufficiently and fails to place the literature within a larger cultural framework. In addition, he does not elucidate the importance of investigating the silences in the literature or asking questions about whose viewpoints are represented and whose voices are not represented within the current literature. Instead, he focuses on the idea that the new research should add to the field. His work does not raise the issue of investigating why others have not asked the current research questions or investigating how the current research contradicts or reinforces past research.

Content Analysis

As I read, I was aware of the frequent usage of particular terms and phrases throughout many of the articles. At the same time, the concepts addressed, the assumptions underlying these concepts, the ways in which they were addressed, and the school subjects being studied were similar in many of the articles. The similarities included a focus on math and science as areas for Internet integration as well as an underlying attitude that involving uses of the Internet into class time is a useful idea. These conceptual and linguistic similarities led me to consider using content analysis as a methodological approach to make sense of the variety of reports of Internet usage. Used in a variety of fields including education, media studies, folklore, political rhetoric,
business relations, law, health care, etc., content analysis is a methodology frequently employed in quantitative and qualitative research to analyze different types of texts. Premised on empirical methods, it is one the oldest forms of textual analysis used in social science (Titscher, Meyer, Wodak, & Vetter, 2000).

In classical content analysis, the researcher develops codes and uses these to analyze qualitative data. After choosing the texts (these can be interview transcripts, documents, video transcripts, web sites, etc.), the researcher codes each unit of text based on the themes developed in the codebook. This creates a matrix of individual textual units that the researcher then analyzes using quantitative methods. Multiple people often share the coding duties and the results are compared to ensure the reliability of the ways the individuals apply the codes. The results may be compared to a hypothesis to determine if the group of texts contain the expected outcomes (Ryan & Bernard, 2000).

As with virtually all methodologies, different authors advocate unique ways of conducting content analysis. Catherine Marshall and Gretchen Rossman (1995) write that content analysis is more than just a method or a methodology.

Best thought of as an overall approach, a method, and an analytic strategy, content analysis entails the systematic examination of forms of communication to document patterns objectively. A more objectivist approach than other qualitative methods, traditional content analysis allows the researcher to obtain an objective and quantitative description of the content of various forms of communication. (p. 85)

The use of the word ‘objective’ with regard to research disturbs me because I recognize the fact that I am not objective, no research reports are objective, and no claims by the authors of these reports are objective. The description of content analysis offered by Marshall and Rossman oversimplifies the meaning of texts and gives the impression that
there is one way to interpret the content. The meaning of a text is not fixed and will change with relation to time, place, culture of the reader, context, etc.

Marshall and Rossman (1995) make another observation about content analysis that I find more compelling when they describe it as, “…unobtrusive and nonreactive. It can be conducted without disturbing the setting in any way” (p. 86). If I were collecting data from interviews or classroom settings, my presence would alter the setting and would affect the responses of the interviewees. Because I can study these documents after publication, my presence in the situation will not alter any responses. However, I cannot ignore the fact that a researcher was there and her/his presence certainly affected the situation. Since I was not the researcher involved in the collection of data, I must trust the written accounts of how the data were collected, what the biases of the researchers are, how the data were interpreted, how the researchers handled disconfirming data, if the researcher obtained the necessary permissions, etc. It is likely that all the published reports I am analyzing were conducted following ethical principles of research, but it is impossible to know this. In essence, it is no longer solely my presence and my biases that will affect the data, but a combination of my biases, the biases of the original researchers, and their presence in the research situation.

At the same time, this research project is taking place over the course of several months, thus my views are in a state of change. As I read more articles on these topics, they affect my biases, ideas, and pre-conceived notions about the application of Internet technology in K-12 settings. Through a research journal (discussed in detail later in this chapter), I track changes in my thought process and used these notes to reflect upon my analysis of the articles.
The emergence of ‘qualitative content analysis’ in 1988 complicates the types of analyses that the term ‘content analysis’ includes. According to Stefan Titscher, Michael Meyer, Ruth Wodak, and Eva Vetter:

It has become clear ‘that the range of procedures in content analysis is enormous, in terms of both analytical goals and the means or processes developed to pursue them’ (Merten, 1983, p. 46). If one were to accept this interpretation, one could describe as variants of content analysis all those methods of text analysis which somehow approach texts by means of categories, since it is no longer a matter only of the communicative content of texts but also their (linguistic) form. In content analysis it is, therefore, more a question of a research strategy than a single method of text analysis. (2000, p. 55)

They explain that qualitative content analysis emerged during the 1950s from a debate regarding the importance of analyzing the frequency of concepts versus developing understanding of the context of usage for these terms. Whereas early forms of content analysis only focused on empirical analyses of terms, qualitative content analysis takes a number of forms including a three-step process developed by Mayring (1998, as cited in Titscher, Meyer, Wodak, & Vetter, 2000). This process includes summarizing the material to maintain its content, but reduce its size; explaining the material, often involving the creation and use of a chart; and structuring the text according to content, form, and scaling (Titscher, et. al, 2000). The descriptions of qualitative content analysis I read do not account for the subtleties underlying the assumptions in research reports and do not include information from other areas beyond the specific topic of study.

**Discourse Analysis**

Discourse analysis works in the vein of critical social theory and deals with the investigation of codified structures of knowledge (Powers, 2001). Based on the theories of Foucault and neo-Marxists, discourse analysis seeks to understand the meanings that
are constructed in societies to allow those in power to control the others (Titscher, et. al, 2000).

Power-relations have to do with discourse (Foucault, 1990; Bordeau, 1987), and CDA [Critical Discourse Analysis] studies both power in discourse and power over discourse. Society and culture are dialectically related to discourse: society and culture are shaped by discourse, and at the same time constitute discourse. Every single instance of language use reproduces or transforms society and culture, including power relations. (p. 146)

Therefore, discourse analysis is involved with political aspects of research and ways people come to know the world. There are numerous different ways to perform a discourse analysis, but most involve making interpretations after investigating the power relationships at work in a particular situation (Powers, 2001). The reason for conducting an analysis is to create a tool for action that can then be used to change the existing power relationships. To understand a discourse, the researcher needs to read all the literature, interview the participants, observe the situation, conduct discussions with those involved, and read commentaries about the situation. The researcher often has questions in mind as she/he conducts this entire process; however, it is likely that the researcher will also develop and answer new questions during the research and data analysis. After reviewing all the data and synthesizing the information, the researcher builds her/his arguments from the information collected, often using quotations from the documents or interviews to help support the assertions (Powers, 2001).

Because discourse analysis is inherently interested in power relationships and political influences, it is a useful lens for my topic, especially considering the critical theory framework I employ (Foucault, 1980). Foucault writes

For me, it was a matter of saying this: if, concerning a science like theoretical
physics or organic chemistry, one poses the problem of its relations with the political and economic structures of society, isn’t one posing an excessively complicated question? (1980, p. 109)

He further explains his view that investigating the inter-related nature of psychiatry would be easier because it is inherently related to social institutions. It is important to consider not just the research reports of educational uses of the Internet, but also the political and economic structures at work in these research reports. Because the discourse surrounding the educational uses of the Internet is relatively new and is rapidly producing “truth,” I also need to analyze where and how this “truth” develops. In explaining the changes in medicine at the end of the eighteenth century, Foucault describes how a, “whole new ‘régime’ in discourse and forms of knowledge” developed (1980, p. 112). He also states:

But the important thing here is not that such changes can be rapid and extensive, or rather it is that this extent and rapidity are only the sign of something else: a modification in the rules of formation of statements which are accepted as scientifically true. (Foucault, 1980, p. 112)

I do not believe that there is a direct relationship between medicine in the late eighteenth century and uses of the Internet in public schools in the twenty-first century. However, I raise this point because I see similarities between the rapid changes in knowledge Foucault writes about and the contemporary changes in knowledge relating to schooling and the Internet. There may be a rush to presume positive effects of this new technology and changes in the “rules of formation of statements which are accepted as scientifically true” (p. 112). Power is not inherently good or bad, but it gives people the ability to secure what they need. Power relationships affect the way researchers conduct studies of educational uses of the Internet, how the data is interpreted, how schools utilize the
information these research reports generate, what additional research questions are deemed worthy of study, and what results researchers believe to be the truth and circulate as the truth.

Though I am focusing my study on research reports of Internet usage in education, this research does not exist in a vacuum and is part of a larger discourse in contemporary North American society about technology and education. Within education, there is a specific discourse related to the uses of technology in classrooms. Discourse analysis is an important framework and is relevant to my topic and study; however, it is significantly broader in scope than the direction I chose to pursue. Because I choose to limit myself to research reports of Internet usage, I am ignoring other aspects of the discourse of educational technology. Due to the quantity of information available on the topic, I limited myself to analyzing published reports of Internet usage. Although conducting interviews and observations of different forms of Internet usage in K-12 classrooms would be helpful, it would expand the amount of data considerably and make it unmanageable. Discourse analysis is also interesting to me because I am increasingly informed by critical theory as it relates to technology and education. Because both critical theory and discourse analysis have an end goal of making a change or reformulating the current situation, this research paradigm and methodology complement each other.

Meta-Analysis

Krathwohl also addresses the topic of quantitative “meta-analyses” in which a researcher analyzes a body of research literature relating to a specific topic to look for similarities or compare findings across studies. He cites the body of literature within

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quantitative research about conducting literature summaries and combining data to come to conclusions across the research (Glass, McGaw, & Smith, 1981; Light, 1979; Light & Pillemer, 1984; Rosenthal, 1984, as cited in Krathwohl, 1988). Krathwohl explains that meta-analyses are used when the purpose is, “understanding phenomena in ways that traditional reviews are likely to miss” (p. 47). Though the technique of combining research studies may provide valuable insights, Krathwohl also mentions criticisms of the technique. Some researchers feel that combining the results of a variety of research reports of questionable merit will provide results that are again of questionable merit. Additionally, Krathwohl explains that published articles are often biased toward showing positive results; therefore these biases could be amplified in meta-analyses. His examples and caveats are important to consider in relation to this project.

Qualitative meta-analysis is a relatively recent trend in qualitative research, gaining popularity within the last fifteen years. According to James Banning (n.d.), there are two common forms of meta-analysis within qualitative research, “the ‘metaphoric translation’ approach within the field of ethnography (Noblit & Hare, 1988) and a thematic synthesis approach most often associated with grounded theory (Patterson, Thorne, Canam, & Jillings, 2001)” (¶ 1). Banning explains that both of these approaches to meta-analysis investigate the context of the situation and the research. He summarizes the work of other researchers in this area and suggests that qualitative meta-syntheses should include an analysis of theory (meta-theory), an analysis of method (meta-method) and an analysis of findings (meta-analysis). An aggregation of findings alone does not lead to sufficient understanding of the research phenomenon. The analysis of the role of theory and methods within the studies under examination must also be part of the synthesis procedure. (¶ 3)
Banning describes the importance of triangulation when conducting a meta-analysis and terms this form of triangulation ‘ecological triangulation.’ The emphasis in ecological triangulation is to develop, “procedures that focus on the mutual interdependence among theory, method, and findings” (¶ 4). He writes that when conducting the meta-synthesis, the researcher needs to consider the following questions, “What theoretical framework was employed in the study (meta-theory)? What methods were used in the study (meta-method)? And, what interventions with what persons under what conditions produced what outcomes (meta-analysis)” (¶ 4). I utilized Banning’s theories when creating the analytic framework for understanding the articles.

*Technology & Critical Theory*

Simon Cooper (2002) investigates the intersections of technology and critical theory. In *Technoculture and Critical Theory*, he investigates the writings of modern and postmodern theorists including Martin Heidegger, Walter Benjamin, and Jean-Francois Lyotard as related to technology. Cooper explains his view that the development of new technologies increases the domination that some have over others. He writes about the ways that, “technology-in-use works to reconstitute our mode of being in the world, both directly and indirectly” (p. 1). He argues that the concept of technological determinism should be dismissed and, “that we can say a ‘yes’ and a ‘no’ to technology” (p. 3) at the same time. Instead of questioning if certain technologies are “good” for society, Cooper advocates that societies should question the effects and changes technologies bring and seek to understand their implications for society. He also believes that the changes in meaning (such as how the term ‘human’ changes because of cloning or how the term
‘community’ changes because of virtual communities) are a significant area for investigation.

The writings of Neil Postman (1993) resonate deeply with me and clearly relate to some of my biases about technology. In *Technopoly*, Postman explains numerous ways that technologies that seem to be neutral are not and challenges the notion that technology improves society. While some consider him a Luddite, I believe that Postman advocates a responsible balance between understanding the benefits of new technologies and recognizing their negative aspects as well. Even though he does not overtly address educational uses of the Internet in this text (it predates widespread availability of the Internet), many of the concepts transfer to the current situation of Internet usage in public schools. Postman explains his view that in contemporary North American societies there is a glut of available information and not enough time for individuals to sort through it. Schools and universities thus take on the role of determining what knowledge is important and presenting this “legitimate” knowledge to their students. At the same time, they develop theories to justify the inclusion and exclusion of various types of knowledge.

Because of the strengths and weaknesses of the above described methodologies, my interest in critical theory, and my increasing awareness of the positive and negative effects of technology, I chose to weave strands of several methodologies together to form the basis of my methodological approach to analyzing literature. I named the methodology Critical Content Meta-Analysis because I work from a critical theory paradigm, include the analysis of literature, work within the boundaries of the discourse
on technology in schools, investigate power, and seek to develop a deeper understanding of the phenomenon based on other research in the area.

Methods

Related to the issue of reading is the notion of what I am looking for as I read these reports and how I understand and interpret my findings. I firmly believe in the concept of grounded theory as described by Barney Glaser (1978) and Kathy Charmaz (2000). They advocate coming to the data without a firmly established set of guidelines, and instead building the theory from the ground up, based upon emerging themes. However, I found that when I read each report without any framework my resulting notes were difficult to decipher and did not help me understand the relationships between and among the themes of the various articles. Therefore, I utilized the method of theoretical sampling (Charmaz, 2000) to code the data to form initial categories for later analysis of the data. In general, I consider it advantageous for researchers to approach data without rigid pre-conceived ideas of what they will find in the data; however, in this case that was difficult. Additionally, because of the biases of every researcher, it would be impossible to approach the data without predilections to one view or another.

I read a number of research reports on the topics I am investigating and took notes as I read them. From my initial coding notes, I formed categories that I clarified through a series of iterations. I created an Excel spreadsheet with each of the categories as headers and left blank spaces for taking notes as I read the articles again and added new articles to the body of literature for analysis.

As I read each article, I took notes based on the analytic categories in the blank Excel spreadsheet. While the categories worked well for some articles, they did not
capture the nuances and important aspects of other articles. This realization led me to create additional iterations, each one was increasingly detailed. After creating one framework, I used it as I read a number of articles on the topic, made changes to it, read additional articles, and again made changes. My initial idea was to create one analytic instrument and use it with the two bodies of literature that I analyzed. However, after reading multiple articles from the different areas and following the threads of those articles in other directions, it became clear that the questions I needed to ask of the articles were different. After making numerous additions, deletions, alterations, and adjustments, I arrived at a set of analytic frameworks that I felt were flexible enough to allow for unexpected results, but codified enough to keep my readings and understandings focused.

Inclusion/Exclusion Criteria

The number of articles written about the Internet is staggering. Selecting the articles to include and exclude certainly affected the outcome of my findings and was a difficult task. The initial way I selected the articles was through the online search features of the library database research indexes. I entered terms related to the areas I am researching: developing critical thinking skills using the Internet and building online communities of teachers. Different authors use different terms to refer to the same concepts, thus complicating the ways I searched for these articles. For instance, some authors use the term “critical thinking,” while others use the term “higher order thinking,” and still others talk about “thinking skills.” From the tenor of the articles, it is obvious that they are referring to similar types of thinking; however, the searchable databases use differing keywords to classify the articles. This significantly complicated
the location of articles and affected the ones that were selected for inclusion in this research. I conducted searches online through Google and found the same situation with regard to different terminology used to describe the same concepts. I made the decision to limit my search terms to the following: “critical thinking and the Internet,” “higher order thinking and the Internet,” “teacher community and the Internet,” “communities of practice and the Internet,” “museum education and the Internet,” “online museums and education.” When making these choices, I focused on research reports that were published in journals or books, either online or in paper format. I feel strongly that there is no inherent benefit to traditional journals versus online journals (such as *First Monday*). I used reports from educational web sites and articles available online through university web sites. In choosing articles, I emphasized articles written since 2000 and tried to use as many current articles as possible.

Related to the above issue is how researchers decide what data to include and exclude when publishing their research. Edmund Gordon, Fayneese Miller, and David Rollock (1990) write: “Knowledge, technology, and the production of knowledge are cultural products and are not culture-free” (p. 14). How the researcher writes the results of the study is affected by her/his culture as much as the entire research project. Researchers must carefully construct their reports to ensure that their reflexivity does not overshadow the voice of their subjects (Fine, Weis, Weseen, & Wong, 2000). It is also necessary for researchers to face the difficult ethical issue that their data may hurt those it was intended to help if they publish it. I do not want my research to be used to justify keeping computers and the Internet away from students, but I feel it is necessary to raise the issue of the negative effects of this technology. The majority of the reports I analyzed
show overwhelmingly positive results from the use of the Internet. However, by comparing the reports as a group, I was able to identify numerous overlooked areas of research as well as areas that may produce results of questionable educational merit. Because Internet usage in K-12 schools is at an experimentation phase, I chose to include all the conclusions from my research. There is a great deal of learning involved in experimenting, and this experimental learning, even if it does not bring the expected results, should not be dismissed as irrelevant. At the same time, I feel that researchers need to be aware that they are experimenting and that what they do may not have the expected results. Thus, the extraordinary claims about using the Internet as a panacea for problems in education should be tempered with the idea that these uses are at the experimental phase and that new uses may emerge.

Research Journal

Beginning in the fall of 2003, I started a research journal. In this journal, I recorded my changing notions about the direction of this research project, the emerging themes of the methodology, the challenges and problems I encountered, as well as the themes and trends that emerged during the research. Some of the codes that I used for the data came from the notes I took in the journal. I also recorded my thoughts about many of the issues I struggled with, including triangulation, validity, my relationship to the data and the research, and issues about the meta-analysis of the literature. Often, after a meeting with a committee member, I used the journal to help me understand the direction I needed to pursue and how that related to my research. It provides a record of my thought processes and shows how my decisions and decision-making changed through the process of conducting the research and writing this dissertation. Continually, I
struggled with the issue of my biases and how these impacted the ways that I understood the research reports and the data I generated by analyzing them. Additionally, I used it to reflect upon my experiences as a public school student and teacher using technology and as a member of different types of communities, face-to-face and online. As I finish this dissertation, I am still making entries in the journal and realize that using it pushed my thinking, served as a place where I could try out ideas before putting them in the “real” dissertation, and allowed me to record my thoughts as I struggled with my methodological decision-making. Excerpts from the journal are included throughout this dissertation, primarily in chapters 4 and 5.

Triangulation

The issue of how to triangulate my research has challenged me a great deal. As this research is based exclusively on the analysis of documents, I initially did not see how I could effectively utilize other methods of data collection without changing the nature of the project. Norman Denzin (1978) delineated four types of triangulation including: data triangulation – using multiple sources of data; investigator triangulation – using multiple researchers; theory triangulation – using different theories to analyze the data set; methodological triangulation – using several methods to investigate a research question. Of these, theory triangulation and methodological triangulation are the most relevant to my study.

Kathy Charmaz (2000) takes a different view of triangulation and cites her agreement with Laurel Richardson (1994) and prefers to utilize the term ‘crystallization.’ According to Charmaz, “Crystallization recognizes the many facets of any given approach to the social world as a fact of life. The image of the crystal replaces that of the
land surveyor and the triangle” (p. 392). Charmaz explains the importance of drawing from outside disciplines and experiences when analyzing data. She offers an example from her own teaching practice and explains that her students must all maintain a journal in which they record their reflections on the research process and describe their process. Using this journal both forces them to keep track of their methodological decision making as well as helps them to understand their work in a different way.

A third and related way to think about triangulation is described by James Banning (n.d.) and is called “ecological triangulation.” He explains that ecological triangulation looks at the theoretical basis for the study, the methods used for collecting data, as well as the interventions that produced the outcomes. After reading a variety of articles looking for these three areas, researchers can begin to compile their findings and investigate, “what evidence across cases (articles) do theory, method, and the analysis of persons and conditions support interventions with positive results” (¶ 1). Thus, each article is investigated, then compared to the larger group of articles to find similarities between the uses of theory, methods, and results.

Of these three views of triangulation, crystallization and ecological triangulation relate to my topic in the clearest ways. While I do not plan to draw from other disciplines for my triangulation, I will incorporate notes, thoughts and ideas from the research journal I am keeping. Additionally, Banning’s thoughts on ecological triangulation are useful to help me understand how the researcher’s theoretical assumptions, methods and findings are related. Looking broadly across the body of articles for similarities and differences will allow me to come to an understanding of the themes and trends throughout the literature.
Limitations

Because this study is an analysis of literature, it is limited to the work that publishers deem appropriate and that people post on educational web sites. Certainly there are numerous teachers throughout the United States using the Internet in interesting, informative, and innovative ways with their students. Many of these uses may not be represented in the literature. Additionally, this is a qualitative study of many quantitative reports, and the detailed statistical analysis of these reports is not reflected in my review of them. Because I am the only person coding the data, my biases are certainly a limiting factor. If another person coded the data, she/he would likely find different aspects to be more compelling than others and would likely form different categories and codes to understand all the data. As mentioned previously, the keywords that searchable databases use to describe and categorize articles also significantly impacted the articles that I located and analyzed.

Conclusions

By developing a hybrid methodology, I learned about many of the subtle, underlying aspects of literature review, content analysis, discourse analysis, and qualitative meta-analysis as methodological approaches. Using critical content meta-analysis to analyze published research reports of Internet usage allowed me to understand the forces at work in implementing Internet integration in public schooling. The different strands of this methodology enabled me to investigate this literature from a variety of perspectives. Working from a critical theory approach, I continually questioned issues of power and who is empowered and disempowered by the results of this research. From this methodological approach, I learned both about the content of the literature, the
related theories, and the goals of some of the advocates. Additionally, through keeping a research journal and including parts of it in this document, I allowed the reader to understand some of my thoughts throughout this process. Instead of conceptualizing this research project as a finished product and the dissertation as a formal report of that project, I conceptualized it as a process and this document represents one view of my path during this process.
CHAPTER 4

CRITICAL THINKING

When Melissa was teaching art, her principal was asked to undertake the National Blue Ribbon Schools Award recognition process. She participated in the writing team and was excited to learn that the special recognition area for that year was arts education. When she convened the other art teachers in her building to brainstorm about their contributions to curriculum and instruction, their conversations continually strayed from the content of their curriculum to student thinking and the types of thinking that were fostered by the arts. They discussed their daily experiences teaching and encouraging students working on open-ended problems, trying solutions, rethinking their artwork, adding new ideas, consulting visual resources, starting over, looking at how others approached the process, changing their minds, and developing an awareness of their decisions. Surely, they felt, this was the “critical thinking” they were hearing so much about in faculty meetings and in-service days.

This chapter presents an overview of my findings on the topic of using the Internet to promote critical thinking, also called “higher-order thinking” or “understanding,” in public school students. To situate this research, I begin by exploring the background of critical thinking in education. Next, I explain the data collection and analysis that serve as the basis of this research, including the initial development of codes and categories and the later development of analytic categories. I discuss the nature of the literature I analyzed, examine the types of studies conducted on critical thinking and the Internet, and discuss two concepts that became important, the idea of training and

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5 I wish to mention the nature of the term critical thinking and its relation to past literature that may be interpreted by some to exclude the types of learning fostered in the arts. However, as will be obvious in my working description of the term critical thinking, this is not how I interpret it.
other emerging trends. Following this, I address the use of terminology in the research, focusing on the terms validity/reliability/accuracy and critical thinking. The analysis continues with a discussion of the intended audience for these articles and the analysis strategies the articles present to promote critical thinking. I address the biases and assumptions of the authors as well as the silences in their articles and explore the common trend of consumption of information from the Internet. At this point, I begin developing the relationship between this analysis and museum work by considering the implications for museum education. This leads into my ideas for developing museum practices relating to critical thinking, based upon this research and the concepts of hyperlearning and hyper-connective thinking. I propose ways to integrate hyper-connective thinking and museum education including reCognizing works of art and student-created Internet content. Finally, I explore the relationship of hyper-connective thinking to the literature, the relationship to public schooling, and build connections to art education and museum education. Throughout this chapter, I include entries from my research journal relating to the collection and analysis of the data and my changing thoughts on the topic. Additionally, I include anecdotes based upon my experiences and experiences others shared with me on relevant issues. Because of the length of this chapter, I include an outline, shown below, to help guide the reader.

I. Background to Critical Thinking in Education
II. Data Collection and Analysis
   a. Codes and Categories
   b. Analytic Categories
III. Findings
   a. Nature of the Literature
      i. Types of Studies
         1. Training
         2. Emerging Trends

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b. Use of Terminology
   i. Validity/Reliability/Accuracy
   ii. Critical Thinking

c. Audience
   i. Deskilling of Teachers

d. Analysis Strategies

e. Biases and Assumptions

f. Silences
   i. Negative Aspects of using the Internet
   ii. Digital Divide
   iii. Lack of Disconfirming Data
   iv. Consumption

IV. Implications for Museum Education
   a. Developing Museum Practices Relating to Critical Thinking

V. Hyperlearning

VI. Hyper-Connective Thinking
   a. Hyper-Connective Thinking and Museum Education
   b. ReCognizing Works of Art
   c. Relationship to Public Schooling

VII. Connection to Art Education and Museum Education

VIII. Conclusions

Background to Critical Thinking in Education

In his dissertation based upon historical research on critical thinking, James Streib (1992) traces the notion of critical thinking back to early Greek philosophers. Streib reviewed literature on critical thinking from 1910 to 1992 and explained four distinct shifts in the literature that reflect the changing dominant notions of critical thinking and what it encompasses. He believes that the critical thinking movement emanates from John Dewey’s writings on reflective thinking. In these early works, Dewey emphasizes the scientific method as the basis for thinking and inquiry. The second phase builds on the work of Dewey and includes Edward Glaser and B. Othanel Smith, the originator of the term “critical thinking.” In 1953, Smith wrote, “Now if we set about to find out what…[a] statement means and to determine whether to accept or reject it, we would be
engaged in thinking which, for lack of a better term, we shall call critical thinking” (as cited in Ennis 1964, p. 599). This definition is representative of the common notion of critical thinking at the time, that it related to judging the accuracy of statements. The third stage that Streib identifies involves narrowing the definition of critical thinking to focus on evaluating a statement as accurate or inaccurate and no longer engaging in an analysis of the scientific method or problem solving. In 1964, Robert Ennis explained his understanding of critical thinking as, “the correct assessing of statements” (1964, p. 599). He emphasizes the idea of teaching students to come to “correct” conclusions after being presented with information and further writes,

A critical thinker is characterized by proficiency in judging whether:
1. A statement follows from the premises.
2. Something is an assumption.
3. An observation statement is reliable.
4. A simple generalization is warranted.
5. A hypothesis is warranted.
6. A theory is warranted.
7. An argument depends on an ambiguity.
8. A statement is overvague or overspecific.
9. An alleged authority is reliable. (p. 600)

Whereas Smith does not place an emphasis on correct versus incorrect thinking, Ennis feels this distinction is quite important. Additionally, Ennis believes that Smith’s idea separates critical thinking from creative thinking. Ennis elaborates his understanding that creative thinking involves producing an idea and that critical thinking involves evaluating an idea. Though he feels that it is difficult or impossible to separate these two in practice, he explains that this is necessary when teaching thinking skills (Ennis & Paulus, 1965).

The final stage Streib identifies broadens the previous definitions and encompasses problem solving. In later years, Ennis revised his previous concept of critical thinking
and expanded the descriptions substantially. In 1991, he explained his understanding of critical thinking as, “reasonable reflective thinking focused on deciding what to believe or do” (p. 22). He also addresses other ideas relating to critical thinking including concepts of higher order thinking, problem solving, and metacognition.

Another widely recognized current authority on critical thinking is Richard Paul, who describes three aspects of critical thinking that he feels are of paramount importance including,

(1) Disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thinking. (2) Thinking that displays mastery of intellectual skills and abilities. (3) The art of thinking about your thinking while you are thinking in order to make your thinking better: more clear, more accurate, or more defensible. (1995, p. 526)

Unlike earlier authors, Paul believes critical thinking involves the metacognitive aspects of thinking. Other contemporary authors emphasize different aspects of critical thinking including reflecting upon thoughts from various perspectives, considering the basis for the arguments of others, and recognizing the importance of systematic thinking (Browne, Freeman, & Williamson, 2000; Cassel & Congleton, 1993; Ennis, 1987; Vidoni & Maddux, 2002). In their review of the literature on the nature of critical thinking, Kimberly Vidoni and Cleborne Maddux (2002) point out both the discrepancies and similarities among the descriptions and understandings of critical thinking offered by different authors. They believe, and I agree, that an important theme throughout the literature is that critical thinking helps individuals learn about and understand their own thinking. This extends beyond an awareness of thinking and includes the ability to consider one’s own thoughts from other perspectives and the perspectives of others (Vidoni & Maddux, 2002). Additionally, Jeris Cassel and Robert Congleton (1993)
mention that instruction should, “encourage exposure, recognition, and acceptance of multiple viewpoints by individuals and encourage providing opportunities for individuals to use critical thinking” (p. viii).

David Jonassen (2000) describes how the concept of teaching and learning critical thinking skills gained in popularity during the 1970s and 1980s as a means of improving student learning and thinking. He writes, “Reproductive learning, resulting from memorizing and regurgitating what the teacher or textbook says, leaves students with fragments of information that are not well connected or integrated” (p. 23). Additionally, he explains that there are numerous ideas currently circulated about the types of thinking that students should engage in while in school. Jonassen argues that, “Among the contemporary conceptions of thinking in schools, I believe that the concept of critical thinking (generalizable, higher order thinking, such as logic, analyzing, planning, and inferring) is the most common…” (p. 22).

The ideas that Paul, Jonassen, Vidoni and Maddux, and Cassel and Congleton express are relevant to my interest in some of the broader descriptions of critical thinking. The concept of critical thinking should not be limited in scope to reflect only logical or rational thinking. As I began analyzing the data, I wrote the following working description of critical thinking in my research journal:

*Critical thinking involves considering an issue, a project, an idea, an artwork or anything else from multiple perspectives. It is highly relevant to the process of creation, especially the iterative aspects of making things. It involves an awareness of the thinking/experimenting/creating process as well as the decisions that guide the process. Critical thinking relates to art criticism in more than linguistic ways and involves ideas of interpretations and the multiplicity of possible interpretations* (Excerpt from research journal, January 10, 2004).

As my data analysis progressed, my views changed and expanded. I will present these
ideas throughout the text with excerpts from my journal.

Data Collection and Analysis

The data for this research are published research and anecdotal accounts of Internet usage in public school classrooms. Because of the enormous quantity of information, I created inclusion and exclusion criteria to focus my research. The criteria include: the articles were written since 1999; they address critical thinking, higher-order thinking, or understanding as related to using the Internet; they were written from an educational perspective; and they address student uses of the technology. Because an overarching goal of this research is to develop suggestions for museum educators to use when creating educational web sites for use in public schools, I focus my research on K-12 school settings and exclude much of what is written on using the Internet to teach critical thinking in higher education.

All my data is hard copies of text. Because I am studying uses of the Internet and computer technology, and based upon the suggestion of one of my committee members, it seemed appropriate to use computer-mediated methods to analyze and interpret the data. Several times, I experimented with optical character recognition (OCR) software. Because of technological problems I encountered, I abandoned this idea and searched for other methods to utilize during coding and data analysis.

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6 This software allows the user to scan text documents as images and then converts the image to digital text on the computer screen. While this technology has advanced significantly in recent years, I was unable to locate a system that could reliably scan a variety of texts. Some of the problems I encountered with this are related to copy quality of texts that I photocopied from journals as well as articles from microform. The OCR software tried to interpret the stray marks from the copy machine as letters. Other issues included the software not always recognizing italics or bold text. Because of these discrepancies, I felt that scanning the texts to analyze in a program such as NVivo or NUD*IST was inappropriate.
After an initial reading of this body of literature, I created the first iteration of data analysis codes. I returned to the articles, re-read them, located more articles, and created a second iteration of data analysis codes. At this point, I created an Excel spreadsheet to guide my note taking. Because of the large number of articles I initially collected and because of the diversity of the ways they addressed the topics, I felt limited in my ability to interpret the articles without a formalized framework. To aid in this phase of the research, I worked toward the development of specific codes and a codebook. As I created these codes, I was aware of the decisions I made and how they influenced the data I would collect and how I would interpret it. I was reminded of Benjamin Crabtree and William Miller’s (1992) point that, “In constructing the codebook, the researcher is always walking a fine line between premature closure and creating codes so encompassing that every line of text requires coding” (p. 99). I developed numerous initial codes that I then discarded because they were not relevant to the larger body of literature and I later developed codes that were relevant to other topics.

One area I am particularly interested in understanding is how the methodology and structure of a research project influence the resulting data. Thus, several of my earliest codes addressed this issue: “methodology statement,” “goals of research,” “effects of research on researched,” and “role of power.” Interestingly, the initial articles I analyzed did not address these issues, thus, I was not able to analyze my data around these codes. Also, I was interested in learning how the concept of critical thinking was addressed in public school arts classes at all levels, so other early codes included “subject,” “grade level,” “audience.” As I worked through the process, some codes
became increasingly detailed while others narrowed to focus on specific issues that came from my initial analysis. There were numerous articles that do not address all the codes that I created and other articles address issues beyond the scope of the codes I created. The problem I encountered with tightly structured codes was that one article might address a specific code, but no other articles addressed the same concept. Thus, I felt I could not build any theories from the codes that only referred to one article or concept.

Because of these issues with using codes, I considered various other options to analyze the data. This led me to realize that my texts had numerous differences in terms of the intended audience, the purpose of the article, the tenor of articles, the rhetorical strategies, etc. In order to analyze them without losing these distinctive features, I developed a slightly broader analytic system that allowed me to understand the unique aspects of each article instead of ignoring them. Rather than coding the data in the traditional sense with the use of a codebook and marking the codes on the actual articles, I developed a system of analysis based on categories that aided my interpretation, yet related to the content of the articles. I use the term “categories” to refer to broader areas than codes that allowed me to interpret the authors’ intent. For instance, few authors stated the research paradigm or methodology that formed the basis of their study. Thus, initially, I was not marking anything on the article dealing with those codes because these topics were not addressed. However, when I stopped actually marking codes on the articles themselves and began thinking of analytic categories, I was able to make interpretive judgments about the texts. This became increasingly important as I worked with the category “silences” and realized that I simply could not code what was not there.
Additionally, categories including “power” and “assumptions” involve my interpretations of the articles, not necessarily specific statements in the text.

Working with an Excel spreadsheet, I created a systematic method of note taking based upon categories. As I read each article, I noted how it addressed or did not address the analytic categories and entered this data into the spreadsheet. After completing this process with numerous articles, I read through the data and made analyses and interpretations based upon the information I collected across the articles. This strategy enabled me to look both at the individual articles and to easily compare and contrast them with other articles. Additionally, I was then able to cross-reference the data to learn about the relationships between and among the categories, thus aiding my data analysis process.

*Analytic Categories*

As stated earlier, I changed the categories numerous times; generally this led to a greater number of categories that were broader than the initial ones I created. Occasionally, I created a new category because a particular article addressed an issue that other articles did not address. The majority of the time, the new categories related to multiple articles. The final iteration of Analytic categories consisted of the following: Author, Title, Journal, Publication Date, Audience, Methodology, Methods, Research Paradigm, Place Self, Biases Identified, Assumptions, Silences, Role of Power, Goal of Research, Impact of Research on Researched, Description of Critical Thinking, CT Acronym and Meaning, Subject, Grade Levels, Themes, Common Phrases, General Description, Findings.
Analyzing the data around these categories enabled me to develop an understanding about how the authors approached these topics within their research. The basis for the categories is from my larger analytic questions for this body of literature including: What are the implications of the concept of critical thinking for museum education web sites? How do authors describe and understand critical thinking in schools, especially as related to art making and art education? How is critical thinking related to museum visits and museum objects? How can student museum experiences relate to critical thinking? These general questions framed my inquiry and led to the development of specific suggestions for incorporating critical thinking into museum education web sites.

From the process of developing categories and analyzing data, I learned many things about the published literature relating to using the Internet to teach critical thinking in public schools. Additionally, because one of my analytic categories was “silences” and because some of the other categories were virtually blank across all the articles, I also have substantial findings about what is excluded in the literature and I offer my interpretations about why I believe it is excluded. In the following pages, I present my findings and explain how the data both reinforce and, in some cases, contradict the themes and trends that emerged. After explaining the data analysis and findings, I offer suggestions for museum education web site taken from my analysis.

Findings

Through conducting the meta-analysis of the literature on using the Internet to develop critical thinking skills in students, I learned a great deal about contemporary Internet integration strategies in public schools. I present the findings below categorized
by the following headings: nature of the literature, use of terminology, audience, analysis strategies, biases and assumptions, silences, and consumption.

Nature of the Literature

I know I intended to do a critical content meta-analysis and that I related this to literature review. But, I’m not sure how this will work out simply because the studies are so different that they do not address the topic in related ways. How can I put the findings together in a coherent way if the underlying research questions seem to be so different? (Excerpt from research journal March 14, 2004)

The majority of the literature I located on this topic falls into one of two main categories: research reports and anecdotal accounts. The research reports were written predominantly by university professors and the anecdotal accounts were primarily written by classroom teachers. Because the focus of my study is uses of the Internet in K-12 classrooms with implications for museum web sites, I excluded some of the research that focused on university students and integration practices used in college settings and included the research conducted with K-12 school students. However, because there is not a great deal written on K-12 implementation of critical thinking strategies, I did include some of the higher education data that seemed the most transferable to public school settings. The anecdotal accounts take two main forms: descriptions of what individual teachers have done in their classrooms and suggestions from librarians or administrators for teachers to implement.

Though many of the research reports focus on higher education, there are studies that look at K-12 education. These include numerous quantitative reports, a few qualitative reports, reviews of previously published literature, as well as philosophical research. What I found lacking was a breadth of qualitative studies of classroom practice.
involving K-12 students and teachers. Detailed descriptions of Internet integration to promote critical thinking were difficult to locate. In general the articles presented a brief overview of the curriculum or activities implemented to teach critical thinking through the Internet and a limited summary of the results. Presenting descriptions of the classroom setting, the goals of the project, the obstacles faced by the teachers and researchers, as well as the successes and failures of the project would help others know if the results are transferable to different situations.

One article that provides an investigation of numerous possibilities relating to critical thinking in public schools is by Vidoni and Maddux (2002) and investigates using WebQuests to promote critical thinking. WebQuests are inquiry-based activities focusing on open-ended issues that have students use information resources from the Internet.7 Their qualitative philosophical work considers the history of critical thinking, the development of WebQuests, the criticisms of WebQuests, the contemporary implementations of critical thinking curricula, and the question of whether critical thinking skills can be taught. Additionally, they compare the possibilities of developing student critical thinking through WebQuests with contemporary writing on critical thinking. Their research offers new directions for implementation of future research relating to WebQuests in education and builds an important link between the theories of critical thinking and practical applications using currently available technology in K-12 classrooms.

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7 For more information on WebQuests, refer to chapter 2.
Types of Studies

Throughout the body of literature I analyzed, there were numerous studies that review previous literature. Many of these literature reviews are quite extensive (Astleitner, 2002; Bradshaw, Bishop, Gens, Miller, Rogers, 2002; Higgins, 2001; Jonassen, 2000; Kurubacak & Gonzales, 2002). Astleitner (2002) notes the lack of experimental studies and calls for more research on students in classrooms to determine the effects of different types of Internet usage on their critical thinking skills. He believes that when researchers speculate about cause and effect relationships without testing them, that their results may not be useful to those implementing curricula. He writes,

To sum up, it can be stated that the effect of collaborative learning with new media on critical thinking, cannot be evaluated properly. The given results show some instructional elements that can help to improve the situation, but these elements have not yet been tested with in controlled research….Overall, the state-of-the-art research on collaborative learning; new media, and critical thinking shows no consistent findings. (p. 7)

Though I disagree with the premise that “controlled research” is necessary to ascertain the effectiveness of teaching critical thinking by using the Internet, his argument that there have not been enough research studies of this topic is salient. This gap in the literature surprised me and I continually searched for more articles that reported on situations in which teachers implemented critical thinking curricula with their students and reported the results. I found very few research studies dealing with K-12 school audiences. Maureen Radlick’s (2002) thesis study is somewhat of an exception to this trend. She conducted focus groups and interviews with students about their existing strategies for evaluating and judging information on the Internet. However, Radlick’s work does not clearly explicate the meaning of critical thinking, nor how it relates to
students and the ways they come to use the Internet for information. Additionally, I am bothered by some of her assumptions about the sources of information and what should be believed and what should be disregarded. She makes vast generalizations about information sources and their perceived validity; I discuss this in detail in the section on Validity/Reliability/Accuracy.

*Training.*

Computer Based Instruction (CBI) has a long history related to drill-and-practice and other types of rote memorization activities. Though the term “critical thinking” sounds antithetical to the type of learning historically promoted with CBI, there are some lingering elements. One example of this comes from Judy Salpeter’s (2003) article in which she mentions the need for students to “hone fact-finding skills” (p. 2). In another example, Tago Sarapuu and Kristjan Adojaan (1999) discuss student uses of a web site designed to help them think critically about Estonian plants and animals. However, part of their emphasis is on drill and practice to help students memorize facts about these plants. In Astleitner’s (2002) piece, he frequently uses the term “training” to refer to ways students should learn to think critically with the Internet. I believe these linguistic references and the learning trends they represent are reflective of the continuing influence of CBI on the use of computers in schools. The silences throughout these articles relate to why students need to learn to locate facts, memorize particular information, and train themselves to use the Internet. Articles from these perspectives do not explain the relationship between these practices and critical thinking. Additionally, they are operating from a perspective that is close to Ennis’ early views of critical thinking that
emphasize the importance of ascertaining if a statement is logical or follows from its antecedent.

**Emerging Trends.**

Two specific trends relating to unique aspects of the Internet cited in the literature include the use of WebQuests and Weblogs (blogs). The concept of a WebQuest originated in 1995, they are now widely available online, and are well known in educational settings. Vidoni and Maddux (2002) explore the potential of WebQuests to develop critical thinking skills and write that they may be a powerful way to promote critical thinking in schools. They maintain that locating information is no longer an issue, but students need to learn to understand different information from a variety of perspectives. In explaining the benefits of WebQuests, they write, “Therefore, WebQuests challenge student intellectual and academic ability rather than Web searching skills” (p. 104). Instead of emphasizing finding “correct” information, they believe that WebQuests encourage students thought about open-ended issues and. Vidoni and Maddux also point out that through the Internet, students can easily locate many different perspectives about issues. They cite Carla Mathison and Cathy Pohan (1999) who write, “Material found on the Internet is often more current, raw in nature,…and unpublished and thus not otherwise readily available” (p. 53 as cited in Vidoni & Maddux, 2002, p. 104). The incorporation of this quotation in their article marks a departure from many other authors who write about using the Internet to teach critical thinking. Instead of fearing the ease with which individual can post information, they choose to capitalize on the multiplicity of ideas and use these to expose students to a wide variety of ideas about issues. Additionally, through the incorporation of the quote from Mathison and Pohan,
Vidoni and Maddux emphasize the immediacy and current nature of information on the Internet.

In another article from 2002, Maddux explores the use of WebQuests as one means to help educational uses of the Internet. However, he mentions several issues that he believes are problematic relating to WebQuests, including his view that a great deal of literature accepts their benefits without questioning their effects. He explains his opinion that WebQuests often neglect a developmental perspective and present themselves as if they would be useful for students of any age. Maddux also questions the reliance of WebQuests on some form of group activity and writes that though it may be useful to learn in a group, this is not the optimum situation for all students. Cynthia Peterson, David Caverly, and Lucy MacDonald (2003) also address WebQuests as a means to help students learn real world opportunities to use what they learn in a classroom, thus promoting thinking skills about how concepts transfer from school settings to their lives. One example they offer relates to a WebQuest entitled “Who built Stonehenge?” In this WebQuest, students take on different roles while researching the controversial issue of the origins of Stonehenge. They use the Internet to access primary sources, compare different theories, and then develop and defend their ideas, presenting them to the class. This example also marks a departure from other uses of the Internet to promote critical thinking because disparities and divergent information are at the center of the project and students are expected to explore their thinking and evaluate the information that they choose to accept or reject.

Jo Ann Oravec (2002) explores ways blogs can be used to expand critical thinking skills by helping students see how others understand and explain the materials they find
on the Internet. Blogs are often maintained by individuals and are somewhat similar to online journals with dated entries that may include references to quotidian activities. Because blogs focus on critique, often related specifically to content on the Internet, Oravec feels they can help students learn to critique information from the Internet and to make their own judgments about what they read online. She also mentions that, “through actively responding to Internet materials, students can define their positions in the context of others’ writings as well as outline their own perspectives on particular issues” (p. 618). Because individuals often write blogs, they tell unique stories frequently relating to Internet content. Through the embedded use of hyperlinks, students can easily see the content themselves and come to their own conclusion, which may agree or disagree with the conclusions of the blogger. Thus, they are learning to assess information as well as consider their own biases and the relation of their biases to the information they come to believe.

Both WebQuests and blogs are compelling uses of the Internet to develop critical thinking because they expose students to various viewpoints, push students to address complex issues, and take advantage of the unique aspects of the Internet rather than attempting to automate a traditional task through a new technology. These uses of the Internet relate to contemporary descriptions of critical thinking, including meta cognition and understanding issues from a variety of perspectives.

Use of Terminology

An initial code I used to analyze the data was the author’s “description of critical thinking.” Few of the articles I analyzed clearly and carefully articulated the author’s understanding or working description of critical thinking. In fact, the majority mentioned
the term critical thinking without explaining its nuances and numerous authors did not offer any description of it whatsoever. Analyzing the literature around the “description of critical thinking” code separated it into two distinct bodies: the first is the articles that do not clearly articulate the authors’ descriptions of critical thinking and the second is the articles that explore the nuances of critical thinking. Within the group that does not explicitly articulate a working definition, there is a degree of variation in their implicit assumptions. Though some do not address the issue at all, others do in superficial ways lacking reflexivity. In general, these descriptions operate from the perspective that there is a widely accepted view of critical thinking, that critical thinking should be logical in nature, and that evaluating the validity of information from the Internet is of paramount importance. However, before I explain the issues related to the descriptions of critical thinking, it is necessary to trouble the concepts underlying the claims about critical thinking and the Internet, especially the emphasis on locating valid, reliable, or accurate information.

Validity/Reliability/Accuracy

The term “validity” is used throughout the literature on critical thinking virtually interchangeably with “reliability” and “accurate.” I wish to point out that these terms are used in quite different ways than they are often used within the literature on qualitative research methodologies. In the body of literature I analyzed, the term “validity” is frequently used to refer to information that can be verified through multiple data sources and that is widely believed to be “true.” The underlying assumption seems to be that information or a source is valid, reliable, or accurate if multiple people or multiple sites
tell the same story. However, within qualitative research literature, these terms have nuanced meanings depending upon the author or the context.

Joseph Maxwell (1992) explains his views that simply accepting any type of research as valid is inappropriate and that this is not an answer to the crisis of representation. Instead, one way researchers can “avoid relativism is to call upon a ‘realist conception of validity that sees the validity of an account as inherent, not in the procedures used to produce and validate it, but in its relationship to those things that it is intended to be an account of’” (as cited in Smith and Deemer, 2000, p. 880). Other authors argue that the concept of “validity” should be reconceptualized to reflect contemporary understandings of research and the term itself. Patti Lather suggests several ways to reconceptualize the concept of validity, the most relevant to this study is the idea of “rhizomatic validity” which relates to the idea that conventional research is symbolized by a taproot. Contrary to this is the notion of a rhizome which is broad with shallow roots, thus alluding to, “how conventional research procedures are undermined and new locally determined norms of understanding are generated” (as cited in Gergen & Gergen, 2000, p. 1032).

In addressing the concept of reliability, Kathy Charmaz (2000) explains her view that reliability arises through the interaction of individuals and data. This is a dynamic process and it is possible for multiple interpretations to exist and to be reliable. When referring to the interaction between people and data, she writes, “Researcher and subjects frame that interaction and confer meaning upon it” (p. 524). The prevalent view of reliability/accuracy I found in the literature on the Internet and critical thinking did not allow for the existence of multiple reliable/accurate interpretations. The majority of the
literature was premised on the idea that information is reliable/accurate if it is represented in multiple places on the Internet or if it comes from a source deemed reliable/accurate because the message presented is congruent with the dominant narrative on that topic. The librarians who participated in Radlick’s (2002) study mention the sites of the U.S. Federal government, research organizations, and reputable newspapers as sites that can generally be considered trustworthy. The concept of trusting information that appears on multiple web sites is problematic, especially in relation to artworks and cultures, because people experience events in different ways. Experiences are framed by numerous factors and this leads to the existence of multiple stories or tales relating to the object, event, culture, etc. All tales are partial and may conflict with the stories of others who shared in the event (Stuhr, Krug, & Scott, 1995). Critical thinking is of paramount importance because of the existence of these multiple conflicting stories. Students need to learn why and how such conflicting, complementary, and contradictory tales come into existence as well as to learn strategies for making sense of them in relation to the student’s own life and experiences.

The concepts of validity, reliability, and accuracy are related to using the Internet because individuals have the ability to share their personal or cultural experiences and understandings regarding their cultures and their experiences with objects. In the past, the majority of the stories that were widely and publicly circulated about art objects were from artists, curators, critics, etc., thus promoting the idea of a master narrative. However, a fundamental power shift has occurred and multiple people can widely circulate their personal, cultural, or artistic experiences with objects through the Internet. These individual experiences may undermine the dominant notions regarding objects and
their possible interpretations. The fact that multiple, conflicting interpretations exist does not create a binary in which differing interpretations must be eliminated so one “valid” or “reliable” interpretation remains. Instead, rhizomatic validity applies to understanding the existence of multiple valid interpretations readily available through the Internet. This may be especially appropriate when considering the local use of an object and the way its cultural context changes when displayed in a museum.

Eileen Hooper-Greenhill (2000a) offers a relevant example when she discusses two collections of Maori objects that were created, collected, and displayed at about the same time. She contrasts the meanings of the objects collected by an English aristocratic man and displayed in a traditional museum setting near his home with those collected by a Maori woman, living in England, who opened her home to visitors to view her objects in the context of her daily life. Though the objects were very similar in terms of formal qualities, the local knowledge and practices of both the English aristocrat and the Maori woman affected the divergent ways they understood, displayed, and used the seemingly similar objects.

The articles I located on using the Internet to build critical thinking skills did not address ideas of validity or reliability in ways that problematized these concepts. Instead, they focused on the idea that when multiple sources contained the same information it should be trusted. Though this sounds like triangulation, a central analytic tool of qualitative research, it is somewhat different. Triangulation is a valuable way to understand a phenomenon, but it is important that the sources of information are from different research methods (Denzin & Lincoln, 2000). In explaining triangulation, Thomas Schwandt (1997) writes, “The central point of the procedure is to examine a
single social phenomenon from more than one vantage point” (p. 163). Though I did not find articles that used the term “triangulation,” it was clear that many articles were premised on the notion that if multiple sources contained similar information, then it was likely to be true. These issues become of paramount importance when considering the descriptions and lack of descriptions authors offer about what the term “critical thinking” entails within the context of their research.

**Critical Thinking**

There is a wide range of descriptions and understandings throughout the literature on critical thinking. The majority of these descriptions relate to the idea of locating valid information or avoiding incorrect information. Additionally, many examples are quite brief and use terms without explaining how they are manifested in the particular article. For instance, in *Keeping Up with the Kids in a Wired World*, Ann Taylor (2002) writes, “Filters have their place, but don’t replace supervision and critical thinking” (p. 43). This is the limit to her discussion of critical thinking. Another relevant example is from a master’s thesis by Maureen Radlick (2002) entitled, *Do They Know What They're Downloading? A Study of How People Determined the Validity of Information from the Internet*. Although the concepts of critical thinking and validity are central to her argument, she does not explain, describe, or question these concepts. Additionally, she does not relate the importance of critical thinking to her research on the Internet and specifically to the group of high school students she studied.

However, there are authors who explain their understanding of critical thinking. One noteworthy example comes from the work of Hermann Astleitner (2002) in which he
reviews research on the Internet and discusses two experimental studies. His description of critical thinking includes the following.

In general, ‘critical thinking’ is a mental activity of evaluating arguments or propositions and making judgments that can guide the development of beliefs and taking action. Gilster, (1997, p. 87) said critical thinking is the most important skill when using the Internet because the Internet is full of false, incomplete, obsolete, etc. information. (p. 1)

Not only is his description significantly more detailed than what other authors offer, he also refers to related literature and situates his arguments in relation to previous research. Vidoni and Maddux (2002) trace the history of critical thinking back to Socrates and explain their view that, “…critical thinking is an introspective approach to understanding one's own thoughts and ideas from an alternative perspective” (p. 105). They summarize various arguments on this topic and discuss some of the contemporary applications. Whereas these descriptions, and others, may not completely align, they do allow the reader to understand the viewpoint of the authors and the nuances of the types of thinking addressed. Thus, the reader has the option to select which aspects of the research may transfer to her/his own situation.

Based on my analysis, the descriptions from Astleitner and Vidoni and Maddux are the outliers in this category because they explain in detail the aspects of critical thinking that their research addresses. In contrast, the majority of the articles on this topic operate from the viewpoint that simply teaching students to be skeptical of the information they locate on the Internet will develop their critical thinking skills. Skepticism is important when evaluating any information source, however it alone is not enough to develop critical thinking. The majority of the articles also do not clearly articulate what it means to be critical of information nor do they address the need to be
critical of information regardless of its source. To me, this is problematic because I believe students need to understand that all sources of information are created by humans who have goals, agendas, and biases. In this sense, textbooks, journals, magazines, television news programs, web sites, etc. should all be evaluated critically.

Certainly, as Radlick (2002) points out “…most information on the Internet does not undergo the same rigors of examination that paper-journal articles and books do” (p. 3). Later, she explains the results of her research with librarians and their advice for evaluating the information that governments post on the Internet. She notes that two sites librarians believe to contain “trustworthy” information are the U.S. Census Bureau and the U.N. Statistical Office. However, based on her data analysis, she cautions against the use of information from other governmental web sites.

Librarians warn that Internet uses should be alert to the fact that governments have agendas. The purpose of the information, whether to persuade or inform, can be used as an indicator or [sic] reliability. Some government agencies’ bias is quite evident as in the case of the Navy using its website to recruit new members or the State Department’s efforts to persuade other governments or public opinion.

Governments of other nations may or may not be reliable but a user can look at some elements to determine credibility. Websites posted by governments of nations which have few watchdog groups or other groups that monitor government activity require careful evaluation. Information posted by governments of former Iron Curtain nations and military governments should be carefully evaluated. One should be aware of the politics of the way nations present themselves to the rest of the world. (p. 22)

Radlick raises important points about the need to understand and be skeptical of the goals of the author or governmental body publishing the information on the Internet. I agree with her notion that information should be carefully evaluated, but am disturbed by the fact that she does not explain what it means to evaluate information or how she believes
students should use critical thinking to evaluate information. Radlick’s statement about
the need to closely analyze the information posted by former Iron Curtain countries or
military governments implies that the governmental web sites of these countries should
not be trusted in the same way that the web sites of other countries can be trusted. Again,
she does not explain why or how students should think critically about this information.
She also neglects to elucidate how student thinking about the information posted by
former Iron Curtain countries or military governments should differ from the ways they
think critically about information posted by other countries. Certainly, as she stated,
“One should be aware of the politics of the way nations present themselves to the rest of
the world” (p. 22). However, she implies that certain former Iron Curtain or military
governments are more likely to post misleading information than other governments. Her
strong assertions, based on her research with librarians and high school students, are
problematic because she does not explain what these assertions mean in the context of
public school classrooms.

Within the literature that does explain the nuances of these concepts, I compared
the ways that different researchers describe critical thinking, higher-order thinking, and
teaching for understanding. One of my earliest findings was that there is virtually no
agreement within the literature as to what the term “critical thinking” entails as related to
using the Internet. This is a significant issue in my research, namely that the terms
critical thinking, higher-order thinking, and understanding are used frequently throughout
the literature with little or no explanation of their meaning. This is reflective of an
unmentioned assumption that these terms are both so widely used and so widely
understood, thus they need no explanation. However, the articles that I analyzed approach
uses of the Internet from substantially different viewpoints and promote different types of thinking, therefore, I disagree with this premise.

Though numerous authors use the term “critical thinking,” “higher-order thinking,” and “thinking for understanding” in somewhat similar ways, there are important distinctions and subtleties that exist in how the terms are used in the literature. For instance, some authors (Ennis, 1987; Paul, 1995) emphasize the logical and rational aspects of critical thinking and other authors emphasize the ability to view an issue from multiple perspectives (Browne, Freeman, & Williamson, 2000; Cassel & Congleton, 1993; Vidoni & Maddux, 2002). David Jonassen’s (2000) viewpoint on critical thinking includes the importance of creativity and considering multiple viewpoints. His viewpoint is one of the few that I located that elucidates the importance of creativity within the realm of critical thinking. As I read and analyzed the range of author’s views of “critical thinking,” “higher-order thinking,” and “thinking for understanding,” it became obvious that they are quite different. Researchers must carefully and clearly articulate the types of thinking their research addresses and describe how using the Internet can improve critical thinking. Please refer to Chapter 2 for an extended discussion of this literature.

**Audience**

*I got some feedback on my Hayes forum paper and it was not supportive. One of the evaluators thinks I am making too much out of what is completely obvious. This person wrote, “Your one and only conclusion was that authors write differently for K-12 teachers than for higher ed audiences, yes? Didn’t the data reveal anything more? Seems like a long way to go to confirm the obvious.”* (Excerpt from a reviewer’s comments on a paper based on this research, research journal, April 21, 2004).

Though the issue of lack of explanations of critical thinking sounds simple at first, as I read more articles and considered this issue, it grew in importance. Another code I
used to analyze the data was “audience” which I determined both based upon the tone and content of the article as well as the journal that published it. When I cross-referenced the “description of critical thinking” category with the “audience” category, it became apparent that the articles that did not overtly address a description of critical thinking were also the articles that were written primarily for an audience of K-12 teachers. The articles that did explain critical thinking and its relationship to the Internet were primarily directed towards a higher education audience. This finding is more than simply a statement of the obvious, but it is clearly problematic because teachers who will implement critical thinking curricula must understand the type(s) of thinking that they are to teach. If they do not understand what critical thinking is, how can they function as effective teachers? It would be a ludicrous proposition to ask an art teacher to teach about visual culture in advertising if s/he did not know what it was or how it related to other types of art. Hermann Astleitner (2002) believes that though educational research has demonstrated the importance of teaching critical thinking, it is not taught on a daily basis. He writes,

The main reasons for this shortcoming are that teachers are not educated in critical thinking, that there are no textbooks on critical thinking available (especially for most European countries), and that teachers have no time and other instructional resources to integrate critical thinking into their daily instruction. (p. 2)

His point that teachers do not know how to teach critical thinking directly relates to the issue of the audience of these articles and how the articles are structured. Certainly, teachers need to know what critical thinking is and how they can help students build critical thinking skills. Teachers should learn a variety of ways to help students make sense of divergent information in divergent ways. They must know about and understand
strategies that will help students understand their world and certainly, critical thinking is one strategy. Clear descriptions of critical thinking should not be limited to articles written for professors, but must be a part of how teachers think about and understand their curriculum and the goals of educating students to think critically. This instance is telling of many realities in research, publishing, and professional development in education.

Judy Salpeter’s (2003) article entitled *Web literacy and critical thinking: A teacher’s tool* kit is also indicative of this trend. In this article, she quotes Alan November’s point that students need to learn “a range of critical thinking strategies, from decoding Web addresses to understanding the pattern of links to searching for the owner of a site” (¶4). She does not further expand on what critical thinking is or why it is important for student to know how to think critically. The quote she uses from November explaining that students need to learn to understand web addresses, how links work, and how to find the owner of a web site is indicative of the underlying viewpoint that these activities are critical. However, these three tasks do not involve critical thinking, at least as described by Richard Paul (1990, 1995), Robert Ennis (1991) or Jeris Cassel and Robert Congleton (1993). Instead, the tasks emphasize the need to understand web addresses, patterns of links, and strategies for locating a site owner promote information finding skills, and do not address critical thinking skills. None of these three activities focuses on the issue of what students should do with the information once they have located it, nor how teachers can help students think critically about what they find. This article operates from the premise that finding information constitutes critical thinking. She also neglects to clarify what critical thinking is and how it can be
developed through the processes she advocates. Though these considerations are certainly important for students when using the Internet, I do not believe that following formulas will promote critical thinking through or about the Internet.

Nancy Patterson’s (2003) article, written for classroom teachers, advocates basic strategies for evaluating Internet resources. She explains that evaluation strategies help students determine if they should believe the information they locate online. However, she does not explain why conflicting information may exist online or what teachers can do to help students make sense of the information when they find conflicts. Her ideas are presented with a simple description that does not focus on the types of thinking that students will be doing. Though she does not use the term “critical thinking” in her article, it was one of the key words used to describe the article in the Education Abstracts database.

Though it is important to help students understand the ease of posting information on the Internet, focusing on simplistic formulaic analysis is not, in my opinion, developing critical thinking. The activities described by these authors favor low-level acceptance of information that is widely circulated in society rather than emphasizing meta cognition or understanding the reasons for the existence of multiple viewpoints. Presenting important concepts, such as critical thinking, for teachers to implement in their classrooms without describing the type of thinking skills that they are to promote is problematic. A disjuncture arises between the concept of critical thinking and its implementation in classrooms if teachers are asked to teach their students to think critically, but are then instructed to do so in a manner that promotes acceptance of ideas without serious consideration. The disjuncture becomes even greater when the thinking
that is described as “critical” is closer to acceptance of mainstream ideas without learning to think about the reasons for the existence of multiple ideas, why people would want to post different ideas on the Internet, or what students agree with and why.

Deskilling of Teachers

This relates to the issue of the “deskilling of teachers” as described by Michael Apple (1995; 1998) and James Beane (1995). As school curricula become increasingly controlled by local, state, and federal government entities, classroom teachers are expected to implement the approved curriculum without questioning it, changing it, or challenging it. Thus classroom teachers are losing power and losing the curriculum development and authoring skills that were once an inherent part of being a good teacher.

In relation to this situation Apple and Jungck (1998) write

The tendency for the curriculum increasingly to become planned, systematized, and standardized at a central level, totally focused on competencies measured by standardized tests, and largely dependent on predesigned commercial materials and texts written specifically for those states that have the tightest centralized control and, thus, the largest guaranteed markets, may have consequences exactly the opposite of what many authorities intend. Instead of professional teachers who care greatly about what they do and why they do it, we may have alienated executors of someone else’s plans. (p. 137)

The idea that teachers should implement critical thinking lessons using the Internet without necessarily understanding or questioning what the goals of such lessons entail is a reflection of shifting the problem of deskilling to a newer medium. Also, this represents an underlying notion of promoting unquestioned acceptance of information provided by an authority figure. It is disturbing that so many articles encourage teachers to implement critical thinking lessons using the Internet in their classroom without describing and explaining the concept. Additionally, this group of articles also promotes
student acceptance of ideas that can be easily verified. Thus, not only do the articles neglect to explain for teachers what the concept of critical thinking actually entails, they also promote low-level student thinking activities. This perpetuates thinking strategies that are not critical in nature and are antithetical to the notion of teaching critical thinking.

Analysis Strategies

I’m not sure that this is a meta-analysis anymore. Melissa raised this as an issue in a writing group meeting. I was so sure that I could put the findings from multiple studies together and get some insights from that. However, the studies are just so different that I’m not sure it’s working. I tried to do ecological triangulation that James Banning writes about. But, when authors don’t state their theories or methodologies, then I am left to interpret it on my own. That isn’t inherently a bad thing, but if it is my interpretation, is it really a form of triangulation? And if these are qualitative studies wherein the author does not identify bias, etc what is going on? This is turning into a big problem for me. (Excerpt from research journal May 7, 2004)

Among the most striking findings in my data analysis is the frequency of formulaic methods for evaluating the accuracy of information from web sites. Numerous articles are built around the premise that teaching students critical thinking skills using the Internet should involve a systematic way of determining the validity of the information from a certain web site. Many of these articles present acronyms for students to use when determining if they should “trust” the information on a web site.

One example of this is the “A.P.E.” acronym, which refers to the steps of identifying the Author, the Purpose, and the Expiration date (Patterson, 2003). Nancy Patterson also mentions the importance of teaching middle schoolers to differentiate between facts and opinions, a concept she believes is difficult for students. Again, this sets up a situation where the reasons for the existence of multiple viewpoints are not
closely investigated. Additionally, what one group considers “fact” may not be considered “fact” to others involved in a situation. In this article, she represents this evaluation method as an efficient way to help students determine if they should trust the information contained on the web site without troubling the underlying assumptions of the site. She also does not clearly explain how the formulaic evaluation she presents relates to helping students develop their critical thinking skills.

Another author, Judy Salpeter (2003), writes about using the Internet and involving critical thinking skills. She reiterates David Jakes’ ideas that an extensive checklist is not necessary for evaluating information on the Internet. He developed a three-step process that includes the following considerations: Applicability, Authority, and Reliability. Students are to use these concepts to guide their Internet search and allow them to focus on relevant information and dismiss irrelevant information or web sites. In describing what students should look for regarding the purpose of the information she writes,

Once you’ve discovered the author’s name, you and your students need to think about whether the author or the publishing organization is an authority. Is the information presented as a contribution to a body of knowledge, or is there another motive for publishing the Web page? (p. 58)

Though at first it seems innocuous, there are several disturbing issues embedded within her statement. As I interpret her statement, students and teachers should believe information on a web site if they can determine that the “author or the publishing organization is an authority.” What does it mean to be an authority? Is an individual who creates a personal web site an authority about her/his culture, or is a museum web site or scholarly research site an authority about culture? In describing authority, she
writes, “Students then determine if the information at the Web site originates from a readily recognizable expert, organization, or qualified person or group. If yes, they use the Web site to answer their questions. If not, they return to searching” (2003). Again, this mirrors the other examples in that students are instructed to use information that comes from a limited group of sources, and if the author is not mainstream, then the students should move to another source. Returning to the previous quote, asking students or teachers to determine if information is published as a “contribution to a body of knowledge” or for another reason, is quite a daunting task. An underlying assumption in her statement is that information contributes to knowledge building or it does something else. This sets up a binary that may not allow for the existence of multiple and sometimes contradictory reasons for creating web sites. Perhaps, a person seeks to share her/his personal story while at the same time encouraging others to become involved in a particular situation.

Salpeter (2003) also mentions the cautions offered by David Warlick that students should not be guided to look for the “best” web site, but should consider the concept as the “best for what?” This implies that different web sites are useful for different goals, instead of blindly privileging information from certain sources in all instances.

Another example of this concept comes from The Research Station at Michigan State University. They promote the idea of A.P.P.L.E.S. (Accuracy, Players, Perspectives, Links, Evidence, Source) and indicate that it is up to the user to evaluate web sites with these concepts in mind. In the description about checking the accuracy, they write, “The best way to do this is to find other sources that give the same or similar information” (1998). This criterion emphasizes that dominant or widely held views
should be accepted while downplaying the voices of dissenters. A silence represented in this criterion relates to how students should come to understand the existence of unpopular or fringe views. If students are taught to accept information that is popular, is this really critical thinking, or is it merely reinforcing the current systems of power in the world? In explaining the players concept, the site states,

> Yet you should also look beyond who wrote the page to who is sponsoring the page. Is it a commercial site (.com)? A nonprofit site (.org)? An educational site (.edu)? Who is sponsoring the page can tell you a lot about the potential for bias. (1998)

It is important for students to think about the sponsorship of a web site and the purposes for its publication. The phrase, “potential for bias” implies that unbiased information is possible. As a post-modernist, I believe that all information is biased. Thus, it is not as important for students to think about the potential for bias, as it is for students to think about and identify the biases of the author as well their own biases. Additionally, they need to think about how their biases and the biases of the authors impact the ways they think about and understand the information they find online.

**Biases and Assumptions**

*I’m feeling better about this research as being between a meta-analysis and a literature review. The more I think about it, a dissertation that only represents the final product seems quite artificial. Throughout the process, I have made so many decisions based upon the data, my insights, feedback from my committee members, etc. To represent the dissertation as completely fixed in time as a final finished product would deny the process aspect of my research. If my committee agrees, I will use these quotes to show how the data analysis changed the methodology. (Excerpt from research journal, June 10, 2004)*

I firmly believe that all researchers are biased and that all research is biased.

Three of the analytic categories I used that relate to this area of inquiry are: if the author places her/himself, if she/he identifies biases, and if she/he states underlying assumptions.
I used these categories to understand how the researchers’ own biases and ideas impacted their research findings and to learn about how they addressed these issues with their data collection and analysis. I was quite surprised by the lack of data in these categories; in fact few authors clearly addressed any of these issues.

None of the authors overtly situated themselves in their own work. Ann Taylor’s (2002) article contains a short statement about MultiMedia Schools, the organization that she co-founded and that funded and published her article. This non-profit educational organization developed as a way to help teachers in Canada access and learn about media resources and their potential classroom uses. Although this is not an explicit statement of her position, it enables the reader to develop an understanding of where she is writing from and offers a glimpse into her biases and goals.

Understanding the assumptions underlying these research reports was quite difficult. Again, none of the authors explicitly stated their assumptions about the nature of research, critical thinking, and learning, thus my findings are premised on my interpretation of what they imply or how they phrase other statements. All the articles I analyzed operated from the assumption that critical thinking is an important skill that students can develop in a school setting. None of the articles troubled the notion of critical thinking or raised any questions about teaching it through Internet use. Other common assumptions included the idea that students will learn critical thinking skills by learning to systematically evaluate information from the Internet, that this is a productive use of the Internet, that critical thinking skills can be taught in a school setting, and that critical thinking skills are a good thing to be teaching students.
One relevant example is from Hermann Astleinter’s (2002) discussion of two quantitative experiments on teaching critical thinking skills through Internet-based lectures to groups of students. The experimental groups each utilized a different format of a web-based lecture and then participated in a learning test. No statistically significant differences emerged among the four different treatment groups of students. The researchers conducted a second test based on some of the positive (but statistically insignificant) results from the first experiment and utilized two groups. One group received a paper about web-based instruction and the other group was given the same information, but through a web-based lecture format. Both groups were tested at the end of 60 minutes. Again, there were no statistically significant results in the performance of these two groups on the assessment instrument. Though he presents a discussion of numerous theoretical positions that relate to the lack of statistical significance in the results, I was unable to find a reference to the possibility that teaching critical thinking through the Internet may not produce the same results as teaching critical thinking without the Internet. Thus, I believe that, though he does not state it overtly, Astleitner is biased toward believing the Internet can be an effective means by which to help students learn critical thinking skills.

Silences

*Is there nothing bad about critical thinking and the Internet? Dr. Stuhr raised this as an issue (criticisms of the concept of critical thinking) a few months ago. I found a wide range of ideas about the benefits and problems with critical thinking, but nothing specifically related to the Internet* (Excerpt from research journal, December 3, 2003).

Throughout the data analysis process, I continually looked for silences around several particular areas: negative aspects of using the Internet to teach critical thinking,
the empowerment or disempowerment of students, feminist perspectives, and authors who address the digital divide. These issues not only resonate loudly with me, but they also specifically relate to the concept of the achievement gap, student access to new technologies and ideas, as well as the potential of the Internet to impact students throughout the United States and around the world.

I was unable to find any articles that mention any negative aspects or unexpected problems encountered when using the Internet to teach critical thinking. Additionally, no authors mentioned other research that problematized the concept of using the Internet to teach critical thinking. After teaching two undergraduate technology-oriented classes and using computers with students in a public school, it is difficult for me to accept that there were no negative or unexpected effects of using the Internet. There may have been negative findings or unexpected results in some of these cases, but the authors chose to focus on the positive aspects and student learning achievements to build their arguments for using the Internet in public schools. However, Ron Oliver’s (2001) article *Exploring the development of critical thinking skills through a Web-supported problem-based learning environment* explains that his project did not achieve its anticipated goals.

Through weekly seminars and online interactions with collaborative groups, students were to develop critical thinking skills. The data analysis showed that students’ ability to solve problems using critical thinking skills did not improve significantly as a result of their participation in this class. Oliver notes multiple possible reasons including that student groups did not all function collaboratively, students focused more on the topic rather than the problem-solving skills, and many students were not reflective about their thinking. Though Oliver reports findings that do not confirm his hypothesis, he does not
question if teaching critical thinking is beneficial to students, if it can be taught through use of the Internet, or if using collaborative groups is an effective way to learn critical thinking.

The digital divide is widely documented in a variety of sources (Cattagni & Westat, 2001; Holloway, 2000; NCES, 2003; Rose, 2001; Tapscott, 1998; U.S. Department of Commerce, 1999; U.S. Department of Commerce, 2001), however, none of the articles on critical thinking mentioned how the research related to or addressed issues of the digital divide. The articles also did not address the race, gender, ethnicity, or national origin of the students or researchers who participated in these studies. I find this disturbing in relation to other published research about students who do and do not have access to the Internet and computer technologies. The research on critical thinking and the Internet may be merely reinforcing good access for students of higher socio-economic status and ignoring the realities of public schooling and the Internet for students of lower socio-economic status.

A few studies provided exceptions to this trend. One is a study involving students in Estonia who used websites to learn about the plants and animals native to their country (Sarapuu & Adojaan, 1999). This research, conducted by Estonian professors, does not inherently investigate the ethnicity of the students, but does discuss the need to create educational materials specifically for Estonian students based upon the flora and fauna students may encounter in their daily lives. Thus, the ethnicity of the students is merely concomitant to the topic of study. A study conducted by Cheng-Cheng Chuang (2001) looks at the impact of using a web site about Chinese art on students of Chinese decent. Though he examines student thinking and uses a framework to analyze student responses
around a critical thinking assessment instrument, this is not a central focus of his study. His discussion of the results emphasizes learning about Chinese art and culture, student experiences with the web site, and student responses to the questions posed through the web site.

Another “loud” silence I found was a lack of disconfirming data and results that conflict with the researchers’ initial ideas. Many of the studies I analyzed were based on previous research, thus the authors of the current research may be replicating a pre-existing situation lacking disconfirming data. However, few authors report any unexplained effects or surprising results from teaching critical thinking. This point refers back to the previous argument I presented from the work of Astleitner (2002) about the need for more studies of critical thinking in K-12 schools. There is a great deal of pressure on those conducting technology-based research to show positive results that justify the expense of the hardware and software.

Consumption

None of the articles I am analyzing deals with art. This feels more like an education research project than an art education project. What would it be like to use the Internet to promote critical thinking in art education? What could students do with the Internet to learn to think? Perhaps one of the differences is that the majority of these articles talk about students using computers and the Internet as they are and as they have been constructed by others. (Excerpt from research journal, January 17, 2004).

Throughout the body of literature on using the Internet to promote critical thinking, I found no articles that address visual art or any art forms and the articles that I located on critical thinking and art were not related to using the Internet. My realization of this gap in the literature led me to reflect upon the uses of the Internet explained in the articles I analyzed as well as the anecdote at the beginning of this chapter about critical
thinking. What does it mean to think critically while making art and how does this relate to using the Internet? As I reread the data and considered this gap, I found that the Internet was addressed as something students should learn to use, not as a means for creating artworks or ideas. I use the term “consumption” to reflect the notion that the Internet, as described and understood in the literature I analyzed, is a thing to be used, primarily as a source of information. Although many articles note the mercurial nature of web sites, links, email addresses, and other Internet resources, they focus on the disappearance of this information. Certainly, information disappears and changes on the Internet at a rapid rate. However, at the same time, new sites, new ideas, new means of communicating, etc. emerge. As a constructivist, the emphasis on consumption of information and assessment of the perceived reliability of this information disturbs me. In my view, knowledge is socially constructed. The Internet presents a vast amount of information for students, however it is more important for them to think about how they are using it and construct their own knowledge than to merely evaluate the perceived reliability of a source. Instead of solely using the information on the Internet, there are numerous other possibilities for students to think critically while they participate in the creation of the Internet. I will discuss this idea further at the end of this chapter.

Implications for Museum Education

What else is critical thinking? How is it related to museum web sites? My thinking on this now relates to the way people come to understand museum objects. When I was at the Guggenehim in Las Vegas, the admission fee included a personal audio device that explained the paintings. As I walked through the gallery, I noticed that everyone had an audio device and I was struck by the silence in the gallery. The audio provided seemingly accurate interpretations of the art works. Also, the audio descriptions made it seem as if there were no discontinuities or conflicting interpretations or questions about any of the artworks. It was an odd museum experience for me because I enjoy speaking
with others about the artworks and coming to understand the art and ask questions of the art as part of a process.…

_As I think more about critical thinking in schools, I am troubled by this experience and the information that I see on museum web sites for students. My view of critical thinking is changing to emphasize the importance of evaluating divergent information and deciding what to think or believe and to understand the reasons why you accept and reject certain information._ (Excerpt from research journal March 31, 2004)

Much of what is written about student uses of the Internet is focused on the ideas of students searching the Internet to find particular information and then evaluating the “validity” of what they find. I was unable to locate literature on student uses of museum web sites to develop critical thinking. The premise of the literature I analyzed seems to be that students will learn to think critically by performing web searches and deciding what information they should believe and what information they should ignore. However, this seems to simply reinforce some of the thoroughly researched notions about student uses of the Internet when they are not clearly focused or carefully directed (Ebersole, 2000; VanFossen, 2001). Researchers have carefully documented the problem of students finding and using information from questionable sources, the ease with which students can become distracted or sidetracked when using the Internet, and the amount of time they spend on commercial sites when looking for information resources. Questions that I have not seen addressed are: “What should students do when they find divergent information on the Internet?” and “What can teachers and schools do to facilitate students’ making sense of divergent information from the Internet?” This issue has implications far beyond the Internet and relates to the ways humans make decisions throughout their lives. Additionally, this type of online critical thinking activity is one that museum web sites are uniquely able to address.
Developing Museum Practices Relating to Critical Thinking

Museum education web sites can build connections between museums and schools. This requires that the content on museum education web sites relates to the goals of teachers and public school curricula and that the content be accessible to teachers and students in their school environment. While issues of access and the digital divide are of paramount importance, they are beyond the scope of this discussion of museum web sites. I chose to emphasize the content of the web sites, the ways students can construct knowledge, and how these relate to developing critical thinking about museum objects.

In 1992, the American Association of Museums (AAM) published the landmark report *Excellence and Equity: Education and the Public Dimension of Museums*. Widely hailed as an important step toward recognizing the importance of museum education within the scope of programming efforts, this was the first report from the AAM to state that education was of paramount importance and should be at the heart of all museum efforts. Though it was well received, this report is certainly not without critics. Shortly after the publication of *Excellence and Equity*, an article titled *The Epistemic Museum* appeared in *Museum News* and actively questioned the type of education that museums provide to their audiences. In this article, David Chapin and Stephen Klein express their views of this AAM publication.

AAM’s recent *Excellence and Equity: Education and the Public Dimensions of Museums* assumes the central problem is that museums are not educating effectively and calls for an enormously increased emphasis on education. We propose an alternative view: through their long history, museums have been exceedingly effective educators. But what do they teach? (1992, p. 60)
They explain their main points that, “Museums inculcate values of the dominant culture…Museums garner loyalties…Museums teach us to behave in sacred places…Museums create social myths” (p. 61). As an alternative to the current situation they described, they suggest that museum exhibits need to emphasize the “connections and causes, not compartmentalizations” (p. 76) in displaying objects and the underlying concepts. Chapin and Klein also explain their view that museum exhibits and research are predicated on who has the power to control the institution. They relate this to the traditional system of a museum operating with trustees and state, “The racist messages of museum exhibits are natural outcomes of the racial make-up of boards of trustees” (p. 76). In their opinions, this is certainly connected to understandings of the world,

Knowledge is value-laden not value-free, knowers are not separate from that which is known, the act of knowing modifies both the knower and the object of knowledge, there is more than one way of knowing, and knowledge is the currency of power. (p. 76)

Also in 1992, Fred Wilson’s *Mining the Museum* installation was exhibited at the Maryland Historical Society. Through a collaboration between The Contemporary and the Maryland Historical Society, this exhibition questioned the history of museum practices and the stories that they perpetuate. In explaining the underlying concepts of this installation, the exhibition catalog explains,

This meant arguing strenuously for a new museology, one that began first with a critique of the decision-making processes that govern all museums. It also meant taking a fresh look at the myriad ways permanent collections can be reinterpreted from other viewpoints to tell a greater range of stories about the human experience. (Ciscle & Lyle, 1994, p. lxxi)

Through this installation, Wilson challenged museum practices, the display of objects, how objects come to be in the possession of certain institutions, as well as other issues
with regard to how culture and cultural objects are exhibited in museums. In an essay about the exhibition, Lisa Corrin writes, “Fred Wilson’s Mining the Museum attempts to address this challenge [racial inclusion] by examining the ideological apparatus of the museum in general and by exploring how one museum in particular has ignored the histories of people of color” (1994, p. 8). During Wilson’s artist-in-residence at the historical society, he studied and researched objects in the collection and the archive. Using existing museum objects, he created a new exhibition that juxtaposed objects in ways that conflicted with, rather than reinforced, dominant cultural narratives. In the first room of the exhibit, he placed a Truth trophy in the middle of six short pedestals. The three pedestals on the right held busts of Napoleon Bonaparte, Henry Clay, and Andrew Jackson. The pedestals on the left were empty, but were labeled for Harriet Tubman, Benjamin Banneker, and Frederick Douglass (all born in Maryland). Here he raises the idea of why the Maryland Historical Society has busts of these white men who had little influence on Maryland while they do not own busts of three Marylanders whose actions influenced the state considerably. Another example is a hand made baby carriage in which Wilson placed a muslin hood from a Klan robe as if it were the linen lining. He placed a group of sterling silver teapots and cups made in the Baltimore Repoussé style, dating from 1830-1880, next to slave shackles made in Baltimore, dating from 1793-1872. Placing objects near other objects that are not traditionally associated with them (according to the dominant cultural narrative), yet are related, significantly changed the meaning of the objects in the museum context. In his video introduction to the exhibition, Fred Wilson mentions that the stories presented in the exhibition are his stories and his views of the collection.
Though this exhibition, the publication of the Chapin and Klein article, and the publication of *Excellence and Equity* all occurred more than a decade ago, recent authors also raise similar questions about trends within museum exhibition and education practices. Eilean Hooper-Greenhill (2000a) addresses similar issues in her book *Museums and the Interpretation of Visual Culture*. Through a series of case studies, she delves into the ways objects are understood and how meanings are constructed by various exhibitions. In *Culture Games* (2004), Olu Oguibe questions the exhibition practices of contemporary museums with regard to African and African American art. He raises issues about marginalization and how exhibitions construct notions of “other” and what these ideas communicate to the visitors. Using the Internet is a way to expose students to a variety of ideas beyond those traditionally presented in museum exhibits.

There are several aspects of the Internet that I feel separate it from previous technologies including the ease with which information can be added or changed, the seamless ways of linking various concepts, the incorporation of images and text with audio and video, the access individuals have to add information, the ability of people to communicate and share information synchronously and asynchronously, and the relationship of the Internet to contemporary computer-generated artwork and ideas. Because of these features, it is an ideal medium for exploring multiple perspectives on an issue. Additionally, because of the social interactions possible through its communication tools, students do not have to learn in isolation, but can learn with others either in person or through the Internet. Earlier in this chapter I explained the numerous terms that describe different thinking strategies (critical thinking, higher-order thinking, higher-level thinking, logical thinking). However, I find these terms lacking when
attempting to describe the types of thinking experiences students can have while using
the Internet in combination with other school activities.

Hyperlearning

One example of a theory related to student use of technology in school settings is
promoted by Lewis Perelman (1992) who argues for the need to reconceptualize the
American system of public education due to the impending technological developments.
He articulates the concept of hyperlearning as an alternative to traditional methods of
teaching and learning. He believes that hyperlearning results from the combination of
teaching and learning with the aid of machines. Hyperlearning includes the following
four threads based upon technological developments:

- The first thread is the “smart” environment, where every artifact you touch
  or are touched by – cars, houses, toilets, clothes, tools, toys, whatever – is
  endowed with intelligence. The special significance of that intelligence is
  that it increasingly includes the ability not only to aid humans to learn but
to participate in learning itself.
- The second is a “telecosm” communication infrastructure that makes all
  knowledge accessible to anyone, anywhere, anytime. The telecosm takes
  the most powerful knowledge, intelligence, and learning capacity of an
  environment that otherwise would be only local, and makes it global. For
  both human and nonhuman learning, the telecosm makes the “best and
  brightest” located anywhere available everywhere.
- The third thread is a kit of “hypermedia” tools that you will need to
  navigate through a knowledge-dense universe. Hypermedia is to
  multimedia roughly what an index is to a book. Only there’s an unlimited
  number of simultaneous indexes and they are built into the text or other
  material – you don’t have to go to the “back of the book” to get a
  reference. The vital role of hypermedia in hyperlearning is to provide the
  technical bridge between informing and understanding.
- As the fourth and last thread in the matrix of HL technology, brain
  technology – a broad category representing the application of biological
  and other sciences to thinking and sensing systems – has a special role.
  Brain tech is, in a sense, the “wild card” in the HL deck. It is contributing
  much of the basic science and technical tools that underlie the other three
  areas of hyperlearning technology: the smart environment, the telecoms,
  and hypermedia. But it also offers a growing potential for biotechnology
that can alter the learning process from the inside out. (p. 28)

Though all four of these criteria are not yet a reality, the Internet is quite similar to Perelman’s idea of the telecosm infrastructure. Perelman writes, “This imminent hyperlearning world, where learning and expertise are diffused everyplace and where people of any age and status may be engaged in learning anytime, makes the infrastructure of ‘schooling’ irrelevant and even obstructive” (p. 63). Unlike Perelman, I do not believe that hyperlearning will necessarily cause an end to traditional education. In fact, the saturation of technology throughout human life creates the need to change education from rote memorization to experiential, open-ended learning experiences.

Hyper-Connective Thinking

I posit the term “hyper-connective thinking” to refer to the complex web of interrelationships that students can learn about and experience while working with multiple inter-related concepts. This type of thinking emphasizes relationships including those between “virtual” and “real” experiences, cognitive and emotional experiences, formal and informal learning, and among various subject areas. Developing an awareness of the process of thinking, not merely the result, is central to hyper-connective thinking. In addition to metacognition, hyper-connective thinking emphasizes individuals understanding how and why they come to think the way they do and understanding what influences their thoughts and actions. Understanding a variety of viewpoints on particular issues and the connections between and among differing ideas is crucial to hyper-connective thinking. Also important is learning about and considering these various viewpoints and building an understanding of the basis for the arguments.
Because of numerous properties of the Internet, using it can be instrumental for developing hyper-connective thinking skills.

Loosely based upon Lewis Perelman’s concept of hyperlearning, hyper-connective thinking is inherently related to using computers and the Internet. I reject Perelman’s claim that formal schooling will become obsolete because of technology and believe that new technologies, including the Internet, reinforce the need for schooling and offer possibilities far beyond what one individual can accomplish when working independently. However, technologies will continue to change the roles of students and teachers and will affect the ways people learn, regardless of the setting. As both Lewis Perelman (1993) and Neil Postman (1992) point out, lack of access to information is not the problem, it is what students do with this information that should concern educators. To help students understand the complex, complicated, and often contradictory messages in contemporary society, schools need to address these incongruencies. Hyper-connective thinking is directly related to this issue because what it means to participate in a democracy changes as new technologies change our lives.

Student thinking in the realm of hyper-connectivity can be non-linear, open-ended, focus on problem- or inquiry-based learning, and creative. The emphasis is on constructivist knowledge building by students developing individual understandings of the topics. Hyper-connective thinking is not useful for rote memorization or for studying topics in limited depth. It is useful for students studying open-ended problems, topics in which interpretation and analysis are crucial, as well as areas of disciplinary overlap. To demonstrate knowledge through hyper-connective thinking strategies, students could
develop visual representations, perform dramas, create online experiences, critique existing interpretations, describe their experiences, and offer new ideas.

**Hyper-Connective Thinking and Museum Education**

Hyper-connective thinking is particularly relevant to thinking about and understanding objects from museums or visual culture. Additionally, hyper-connective thinking is related to using the Internet. To help students develop the thinking skills inherent in hyper-connective thinking, museum educational web sites should feature objects that are the subject of some type of uncertainty, perhaps relating to the object’s provenance, original purpose, legal status, relevance to contemporary society, cultural significance to different groups, contemporary display, etc. These objects and their multiple interpretations, meanings, and contexts provide an opportunity to create meaningful links to numerous understandings about the object or site of controversy.

For instance, Eilean Hooper-Greenhill (2000a) tells a story of Hinemihi, a Maori meetinghouse. This was a commissioned building completed in 1881 in New Zealand, partially buried by the eruption of a volcano in 1886, and purchased by a British man. She\(^8\) was taken apart, shipped to England, and served as a boathouse on the property of a wealthy British family. The meaning(s), location(s), and story(ies) of Hinemihi are different based upon the perspective of the viewer. After becoming part of the National Trust and after an extensive renovation, Hinemihi was blessed in a 1995 ceremony with Maori and English citizens. This ceremony included Maori rituals of challenge, welcome calling, speeches, and greetings as well as British speeches and traditions. Hooper-Greenhill notes the many discontinuities between the ways different participants

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\(^8\) In Maori tradition, it is appropriate to refer to Hinemihi as “she.”
understood Hinemihi. The British citizens involved in the National Trust discussed the importance of caring for the work of art, while the Maori elders addressed the building as a living person. One elder explained that her presence in England would help Maori living there when they were homesick, they could visit her as they might visit a relative. Hooper-Greenhill’s observations about the intense cultural differences with regard to the function of Hinemihi and the relationship of people to Hinemihi is fundamentally important to the concept of interpretation. Hooper-Greenhill points out that various people constructed different understandings of Hinemihi based around many contexts that changed due to Hinemihi’s physical and temporal location as well as the cultural location of the viewer. The different assumptions of the viewer affected what could be seen and understood. The example of Hinemihi is a powerful way to refute the long-held idea that works of art or objects “speak for themselves” (p. 49). Hooper-Greenhill believes this idea implies that their meanings are internal and fixed, thus transcending time and space. She explores the relationships Foucault identified between knowledge and power and writes, “Knowledge directs the target of the gaze and makes visible aspects of things that otherwise remain invisible” (p. 49).

The rededication of Hinemihi and the publicity surrounding the event is an excellent example of how I think students could use museum education web sites to develop hyper-connective thinking skills. A museum could create an educational web site around an artifact of controversy, such as Hinemihi, including a variety of viewpoints through embedded audio and video clips. Additionally, students, teachers, community members, both locally and those who may be impacted around the world, as well as other stakeholders could share their opinions about the object and the controversies
surrounding it. Students could communicate with experts and other students via email, video conferencing, voice over Internet Protocol, or other methods. To take students beyond merely reading information posted and participating in email exchanges, teachers need to create open-ended classroom projects related to the museum web site. Thus, using the site would be connected to school curriculum and the regular classroom activities. Students would need to demonstrate their understanding of the topic or explain their thinking about the issues in a variety of ways. If an in-person museum visit were possible, using the web site should also connect to the activities that would take place in the museum. Therefore, the website could substitute for an in-person museum visit when necessary, but could also supplement when possible. The situation where the web site supplemented the visit is, of course, the ideal.

Throughout the process of using the web site and learning about the issues related to the object, students need to be able to record their thinking process. This could easily happen through the creation of a user profile where a student can record thoughts throughout the process. This will allow anyone with access to the profile an insight into how students think about and understand the issue and the online activities. Additionally, this record may help students think about their thinking, become aware of their thought processes, and how their ideas about the object or issues changed. To help develop student thinking beyond reproductive thinking, meta cognition becomes important. When students are aware of their thinking, understand how they come to think what they think, and recognize how they weigh divergent information when forming their viewpoints, they are moving toward hyper-connective thinking.
ReCognizing Works of Art

Because I keep thinking about museum web sites and museum exhibits, I seem to be taking a mental trip through every museum exhibit I’ve seen in the last five years. One exhibit that influenced me at the time, and still does today, was at the Missouri Historical Society in 2001. When I entered the exhibit, I saw tall glass cases with ornate wooden features. The American Indian objects were placed on glass shelves and labeled with small typed labels. Though my companion did not seem to be struck by this, I was intrigued by how old fashioned the exhibit seemed to be. In the next room, I began to realize what the museum was actually doing when I realized that the objects were a bit more recent and the display cases were also more modern. As I moved through each exhibition space, the changes in the pieces as well as their display created a chronological narrative both of the changes in American Indian objects as well as museum exhibition practices. The final room contained contemporary objects as well as sketches of the exhibition design; audio of conversations among curators, educators, and the artists; and text panels explaining the artwork and the exhibition. This exhibit, or perhaps meta-exhibit, changed how I think about museums and its transparency surprised and delighted me. (Excerpt from Research Journal, June 3, 2004)

Another salient example related to this topic comes from the work of Jacqueline Chanda and Vesta Daniel (2000) in which they write about the importance of ReCognizing art works. They believe that students are too likely to accept an interpretation or idea that is easy to access or is comfortable. Chanda and Daniel argue that this leads to a unidimensional view and may promote egocentricism. They believe that,

In order to study and understand the general import or meaning of contemporary and past art, we must consider the epistemological or knowledge base; that is the origin, nature, and limits of the knowledge as related to the work of art. (p. 6)

Later on, they explain their belief that meanings change with time and this relates to historical and cultural references. Their arguments clearly relate to critical thinking and hyper-connective thinking and have relevance for museum web sites as well. The idea of
going beyond knowledge that is comfortable to explore other ways of knowing is an important facet of ReCognizing as well as hyper-connective thinking. They write

ReCognizing, therefore, demands that we take a broad view of the historical and cultural genesis of images and icons, which link the present to the past. ReCognizing, consequently, entails considering the present meanings in light of the past, past motivations in light of the present, and co-existing realities or truths across time. (p. 8)

Their point about considering meaning across time and in light of other events is applicable to using the Internet. Through a well-developed educational museum web site, students could explore how the meaning of an object has changed throughout time and the contemporary ideas of how it is understood. Hyperlinks can easily connect students to other sources of information and to see objects in different contexts. Images of objects on display at different times and in different places can help students understand how meanings are not fixed, are culturally dependent, and are constantly shifting.

*The Relationship of Hyper-Connective Thinking to the Literature*

Hyper-connective thinking is different from the majority of the literature on critical thinking and the Internet because it does not focus on evaluating the information as valid or invalid, correct or incorrect, reliable or unreliable. Instead, it seeks to understand why and how various stakeholders arrive at different understandings about the same object or material. Additionally, by intentionally exposing students to conflicting ideas relating to an object, their learning will be connected to the reality of museum practice and the world in which they live. This type of thinking will be useful to students both in their lives in the classroom as well as beyond. Because hyper-connective thinking focuses on relationships and understanding differing viewpoints, using the Internet to explore objects and issues is ideal. Hyperlinks in museum web sites provide
an excellent opportunity for students to trace ideas or concepts and to develop an understanding of the connections between these ideas. When teachers have their students learn with museum web sites, the teachers are in a position to have fewer concerns about the ease with which students can become misdirected or overwhelmed with the sheer quantity of information on the Internet.

Relationship to Public Schooling

Though not related to a museum web site, Joanne Harris (2003) offers a relevant example of a lesson relating to hyper-connective thinking9 from a unit she taught on food biotechnology to seventh and eighth grade students. She had multiple goals for her students with this lesson: thinking about divergent information on the Internet, evaluating the information they locate, condensing vast quantities of information, creating pamphlets using a layout program, and sharing the finished product with other students. The various stakeholders involved in either supporting or rejecting genetically modified foods have a great deal of information posted on the Internet. Her students had no difficulty locating information, however they found that often the information from different sources did not agree. This led some students to interview farmers and research scientists as well as to consult other print media regarding genetically modified foods. Students each created a pamphlet explaining their views on issues related to food technology based upon their research. They learned how to evaluate the information they found and that conflicts in existing information are not necessarily indicative of incorrect

9 Hyper-connective thinking is a term I developed to refer to the types of thinking I believe are possible through using the Internet. Joanne Harris does not use this term when describing her project. However, I feel it comes closer to the ideals of thinking that I explained earlier than any other examples I came across in my research on critical thinking.
information. Also, students learned that the source of the information affected the information presented as true. For instance, the agribusiness web sites presented genetically modified foods as being safe while the web sites of environmental groups presented genetically modified foods as potentially harmful. Both types of sites can be deemed reliable, yet their conflicting information created a situation in which students had to decide what to believe and why.

Using Harris’ process as a model, teachers could create art projects based around contemporary issues of controversy. Students could create a brochure or a web site utilizing images that they drew, painted, sculpted, photographed, sewed, collaged, etc. Thus, they could contribute to the Internet, instead of merely consuming it, with web sites based upon thinking critically about current issues or artworks of controversy.

Connection to Art Education and Museum Education

The analysis of the literature I conducted leads me to believe that though teachers and researchers recognize critical thinking skills as being important, they do not agree about what they are, nor do they agree about how the Internet can be used to foster their development. This is leading to a situation in which the acceptance of ideas presented by multiple “reliable” sources is deemed critical thinking. This simplistic notion is common and to counter it, I seek to find ways that museum web sites can promote hyper- connective thinking. Through carefully developing web sites that relate to school curriculum and focus on objects of controversy, student thinking can move beyond assessing the perceived validity of the information on a web site. Instead, students can investigate different ideas relating to museum objects and begin to consider their own opinions and understand museum objects from different perspectives. This multiplicity
of understanding and investigation of divergent opinions and interpretations is ideally suited to learning through the Internet.

Art Education, Critical Thinking, and the Internet

Yesterday, I finally received the book I had requested from the library called Using Internet Primary Sources to Teach Critical Thinking Skills in Visual Arts. This was just published last year and is the only source I've been able to locate that looks specifically at developing critical thinking skills in art through using the Internet. So far, it seems really disappointing. The book is oriented around DBAE with an emphasis on elements and principles of art. It is arranged chronologically by traditional art historical periods with no overt mention of women or artists of color (until the last few chapters). One chapter is devoted to women artists of the 20th century (Kathe Kollwitz, Frida Kahlo, Georgia O’Keeffe, Judy Chicago, Betye Saar, and Jenny Holzer). The other is titled Introduction to Diversity. Art of the Americas is covered in three pages, Asian Art takes two pages, African Art is covered in two pages, and less than one page is devoted to African American artists (evidently the three most important African American artists are Romare Bearden, Jacob Lawrence, and Horrace Pippin).

The book includes extensive web sites explaining art historical time periods and the development of artistic styles as well as exhibits relating to specific artists. At the end of each section, there are discussion questions that refer to specific activities students are supposed to complete. For instance, at the end of the chapter on the Renaissance, students are asked to do the following:
Refer to (long url) and the web site that defines the Renaissance in Italy at (long url). What does the term “rebirth” mean? How did the status of artists change during the Renaissance? Who was Vasari, and why is he an important Renaissance figure?

To me, these are not questions and activities that take advantage of the Internet or promote critical thinking about the visual arts. These questions and activities are premised on the notion that there are correct ideas that students should locate from the one reliable source and then repeat these answers back to their teacher.

Though it is easy to be dismissive of these activities as lacking in the “critical” notion of critical thinking not encouraging student thinking as much as they encourage student repetition of certain information, there may be some value in them. For many teachers, it is scary to use the Internet with their students. They have heard horror stories about what happens when a student finds pornography on the Internet, perhaps they have received parent phone calls about inappropriate images, or maybe their principal or district maintain strict policies against using the Internet. As a beginning step in developing comfort with using the Internet during class time, these activities may be useful. Because they are incredibly structured and work with pre-selected web resources, students are less likely to accidentally arrive at inappropriate material.
At the same time, I am hesitant to endorse uses of the Internet like the ones in this book because I fear that many will try these and simply stop here. If they are used as a beginning step to lead toward student exploration of open-ended problems, socially constructing knowledge, and developing metacognitive skills, I could see how these activities may be useful. However, if teachers only implement activities as they are written about and described in this book, that would be a poor use of the Internet and a mis-use of the term “critical thinking.”

I believe this book replicates some of the older definitions of critical thinking as well as older theories of Art Education and translates these into a new medium – the Internet. As it is the only source that I located specifically relating to critical thinking, the Internet, and visual art, it is likely that others working in this field will utilize it if they are interested in teaching critical thinking. To me, this points out the need for more and deeper research and implementation ideas for art teachers and classroom teachers. (Excerpt from Research Journal, July 2, 2004)

Conclusions

Through conducting this meta-analysis of the literature on teaching critical thinking skills through the Internet, I found many important aspects that relate to developing educational museum web sites. Throughout the body of literature I analyzed, the primary view is that teaching students to be skeptical of the information they locate on the Internet constitutes teaching critical thinking skills. Often, this involves developing a formulaic strategy for students to implement when examining a site (i.e. A.P.E. or A.P.P.L.E.S.). If the information can be verified through other mainstream sites, then students should believe the information. Additionally, there is no agreement among the authors of these articles about the term “critical thinking” and what it includes and does not include. Few articles written for school teachers offer a detailed description of critical thinking and many of the articles operate from the assumption that it is widely understood and thus does not need a description. Issues relating to gender, culture, and access to technology are largely ignored by these articles. Also, problems with teaching
critical thinking through the Internet, if they exist, are not mentioned throughout this body of literature. The articles emphasize ways for students to assess and use the information on the Internet, rather than having students think critically about ways to create material for the Internet. The majority of these articles do not address ways to use the Internet to help students learn about the multiple possible ways to think about and understand complex issues in the world. Additionally, they do not focus on developing meta-cognitive abilities or helping students think about the reasons why divergent information exists on the Internet and throughout the world.

From the meta-analysis of these articles, I developed the concept of hyper-connective thinking as a way to understand how the Internet, and the embedded links and connections, can be used to help student thinking. Hyper-connective thinking focuses on the connections and reasons for the existence of multiple meanings and interpretations. Also, hyper-connective thinking can be implemented through museum web sites to help students think about complex issues related to artworks. These activities online should focus on objects or concepts of controversy within the museum or encourage students to ReCognize artworks. Not only can the Internet be useful for understanding many perspectives on an issue, it also can be useful as an environment for students to create their own content based upon their understanding and publish it online.
CHAPTER 5

DEVELOPING ONLINE COMMUNITIES OF PRACTICE AMONG TEACHERS

When Michael taught middle school in Maryland, he interacted with teachers every day. But, he felt that he did not have much in common with them because most of them had lived their entire lives in the local area. Before he moved there, he had no idea how important local connections and local knowledge would be, or how much the locals valued that knowledge and did not value other ways of knowing. One day, some teachers laughed because he did not know how to, “pick a crab.” As a group, the teachers had the official “markers” of community – entrance/exit rituals, shared purpose, shared sustained communication, division of labor, etc. There may have been a community of teachers at his school, but maybe it was more like a clique. Whatever it was, he did not want to be a part of it and he didn’t think it was open to new comers either.

This anecdote illustrates the experience of one teacher when entering a new school environment. Because he was an outsider in the local community, he did not have many opportunities to learn from and interact with the experienced teachers at his school. Had participating in an online community been an option for him, he might have been able to learn from the experiences of others, ask questions about teaching practice, seek suggestions on curricular issues, receive advice about handling the “trouble” students, develop his understanding of pedagogical issues, and learn about professional development opportunities instead of having been forced to learn on his own through trial and error.
At the outset of this project, I thought I knew what I meant by “community” and “online community.” However, as I considered an increasing amount of research and related writings on the topic, I became less sure. Certainly, I have been a part of face-to-face communities and I have also actively participated in online communities. My experiences in both face-to-face and online communities have been diverse with positive and negative experiences in both; I do not see one type of community as working in a contrary fashion to the other. Online communities offer opportunities that may not be available in other formats and face-to-face communities can offer opportunities for close contact with other people. However, many authors do not share my views and many argue vehemently about the impacts of different types of communities.

In this chapter, I offer numerous descriptions of communities, introduce the origins of online communities, discuss changing notions of online communities, and explore my developing understanding of online communities through a description of the term “online community.” Next, I share one view of educational communities that is representative of many contemporary assumptions and examine the relationships among businesses and online communities. Following this, I present the background to the data analysis and the nature of the literature on this topic. In the subsequent discussion of the process of conceptual development of this methodology, I explore the roots of three relevant constructs: situated learning, communities of practice, and networks of practice.

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Authors use different terms to describe communities in which the primary form of communication is through the Internet. These terms include “online community,” “virtual community,” “Internet community,” and “Web-based community.” Though there are differences among the ways authors use these terms, the basic similarity is that the community primarily exists in an online format. Throughout this dissertation, I will use the term “online community” even though I recognize that various authors use different terms.
Then, I shift the discussion to an exploration of the role of power, offering an example from an online community of practice. Also, I address themes that emerged from the data analysis: spatial and temporal aspects of online communities, social interactions online, and the benefits of participating in online communities. Additionally, I relate the data analysis to the possibility of developing online communities of museum educators and teachers. Similar to chapter 4, this is a long chapter, thus I am providing an outline below.

I. Descriptions of Communities
   a. Historical Review of Community Concept

II. Origins of Online Communities
   a. PLATO
   b. WELL

III. Changing Notions of Online Communities
   a. Description of Terms
      i. Description of Online Communities from the Literature
         1. Use of “Online Community”
         2. My View of Online Communities

IV. One View of Educational communities

V. Businesses and Online Communities
   a. Interactivity
   b. Focus
   c. Cohesion

VI. Background to the Analysis

VII. Nature of the Literature

VIII. Conceptual Development
   a. Situated Learning
      i. Communities of Practice
      ii. Networks of Practice

IX. Power
   a. Controlling the Community
   b. Participation in Online Communities
   c. Impetus for Community Formation
   d. Power and Communities of Practice

X. Spatial and Temporal Themes
   a. Relationship to Communication Possibilities

XI. Increased Social Interactions Online

XII. Implications for Museum Web Sites
   a. Existing Practices with Online Museum Communities
b. Structure of an Online Community of Practice  
c. WikiWikiWeb (Wiki)  
d. Purpose of Online Community  

XIII. Conclusions

It was quite difficult to locate research articles that address online communities involving museum educators and teachers. Because I was unable to locate research relating to the experiences of museum educators in online communities, I posted the following questions to a museum education listserv (talk@museum-ed.org) on May 11, 2004.

What do you think an online community is?  
How is this similar to or different from a face-to-face community?  
Do you feel that the museum ed listserv constitutes an online community? Why or why not?  
If this is a community, how does someone become a member of this community?  
What does she/he need to do to stay a member of the community?  
What do you think you get out of your involvement with this listserv?

With these questions, I intentionally addressed issues of involvement and membership because I am curious about the members’ thoughts on the ease with which individuals can join an online community. Throughout the chapter, I intersperse responses to these questions from the museum education online community as well as anecdotes related to teacher community and entries from my research journal.¹¹

¹¹ There is a great deal of literature related to online communities. Because the focus of this dissertation is on educational uses of these communities, I intentionally focused on research dealing with online educational communities. A study by the Pew Internet and American Life project found that the most common types of online communities Americans were involved with were religious, sports-affiliated, local community groups, and local charitable organizations (Pew Internet and American Life project, 2001). Though some of the usage patterns translate across types of communities, I did not explore non-educational communities.
Descriptions of Communities

The word community has lost its meaning. From the prevalence of terms such as “communities of learners,” “discourse communities,” and “epistemic communities” to “school community,” “teacher community,” or “communities of practice,” it is clear that community has become an obligatory appendage to every educational innovation. Yet aside from linguistic kinship, it is not clear what features, if any, are shared across terms. This confusion is the most blatant in the ubiquitous virtual community where, by paying a fee or typing a password, anyone who clicks on a web site automatically becomes a “member” of the community. (Grossman, Wineburg, & Woolworth, 2001, p. 942)

I agree with the above assertion that the word “community” is used so often in contemporary educational literature that it has lost its meaning. In addition, the concept of online communities benefiting students, teachers, and parents is so widespread that it has extended beyond educational literature into mainstream publications. However, before exploring the intricacies of understandings of online communities, it is beneficial to look at how these descriptions build on previously existing understandings of face-to-face communities. An extensive review of the development of the concept of “community” with its implications is beyond the scope of this dissertation. However, I will offer a brief discussion of some relevant descriptions that are applicable to the current research.

Historical Review of Community Concept

In a review of scholarly literature on the concept of community, George Hillery (1955) found 94 different explanations of the concept. Beyond the fact that all communities involved people, there was no clear agreement among the descriptions of community. However, among all the disparate descriptions, he found three common factors: communities involve social interactions, communities have unifying interests or ties, and communities are based in geographic areas. Hillery found that the spatial
aspects of communities were the most frequently cited in the definitions he analyzed and he deems spatial aspects to be the most important of the three factors. He raises the possibility that someday humans will be able to develop communities that transcend geographical limitations.

Spatial aspects are also quite important in Marcia Effrat’s (1974) research on communities. She utilizes two criteria to define communities: the geographic areas and the endurance of formalized structures. To Effrat, the spatial aspect is of paramount importance. She explains her view that being within a certain physical area is enough to constitute the use of the term “community” with regard to a group of people in a particular area.

In his research on electronic communities, Tharon Howard (1997) relates the concept to many previous studies of communities. Howard cites the work of Michael Taylor (1982) who, like Hillery, delineates aspects that communities have in common. Taylor believes that communities share certain ideals and principles, the members communicate in direct and multiple ways, and there is a degree of reciprocity among the members. In analyzing Taylor’s work, Howard points out that reciprocity is quite important within community literature and there is an implicit assumption that members of the community will participate in ways that work toward securing the larger goals of the group. Additionally, Howard investigates Taylor’s assertion that group communication should be direct and comes to the conclusion that while not specifically mentioning spatial issues, they are implied in Taylor’s work. Howard offers the example that when considering the community of academics all over the world, Taylor believes that this group is not as much of a community as other face-to-face communities. From
this, Howard infers that though Taylor does not overtly focus on spatial issues as part of
his description of community, he does use geographic region as an important measure of
community. Additionally, Howard points out that both Hillery and Taylor use the idea of
a village as the consummate example of a community.

Clay Shirkey (2003) notes some features of groups that W.R. Bion documented
from his research on groups during the 1950s. He explains his belief that, “humans are
fundamentally individual, and also fundamentally social” at the same time. Shirkey notes

So there’s this very complicated moment of a group coming together, where
enough individuals, for whatever reason, sort of agree that something worthwhile
is happening, and the decision they make at that moment is: This is good and
must be protected. And at that moment, even if it’s subconscious, you start
getting group effects. And the effects that we’ve seen come up over and over and
over again in online communities. (2003, p. 4)

Shirkey continues his discussion with numerous examples of group behavior including
veneration of a sacred “text” at the center of the community, creating of formal structure
within the members, and identification of those who might threaten the community. He
explains that Bion identified these group traits with his research on face-to-face
communities and Shirkey believes that they relate to the development of online
communities. Additionally, Shirkey emphasizes that the social aspects of online
communities and the technological aspects of these communities cannot be separated.

Dewey (1916) uses other criteria when describing communities and he mentions
the lack of geographic proximity with regard to communities of artisans, or “members of
the professional learned class scattered over the face of the earth. For they have aims in
common, and the activity of each member is directly modified by knowledge of what
others are doing” (p. 21). To reiterate what I mention in chapter one, Dewey also writes,
Persons do not become a society by living in physical proximity, any more than a man ceases to be socially influenced by being so many feet or miles removed from others. A book or letter may institute a more intimate association between human beings separated thousands of miles from each other than exists between dwellers under the same roof. Individuals do not even compose a social group because they all work for a common end. The parts of a machine work with a maximum of cooperativeness for a common result, but they do not form a community. If, however, they were all cognizant of the common end and all interested in it so that they regulated their specific activity in view of it, then they would form a community. But this would involve communication. Each would have to know what the other was about and would have to have some way of keeping the other informed as to his own purpose and progress. Consensus demands communication. (p. 5)

It is clear from this brief review of community descriptions, that there is no widely accepted concise definition or description of a community. Numerous authors, including John Dewey (1916) have noted the difficulty of ascribing a fixed and finite description or definition to a community (Fine, Weis, Weseen, & Wong, 2002; Hillery, 1955; Howard, 1997).

Origins of Online Communities

Is this a community? I think it is. There are a lot of names that I recognize from the listserv and without ever having met them or without ever having visited their museum/gallery, I have an understanding of the world in which they live. Also, we all have a common agenda -- how to create the best programs in our museums. This common shared objective makes us an united community.

Sometimes they solve an issue, sometimes they raise an idea that I hadn't thought of, sometimes they make me think of my job in a different way -- always they remind me that what I'm doing is part of a larger whole with thousands of people across North America working towards the same goal. (Response to my questions posed to the Museum Education Online Community, May 11, 2004)

The path from group of individuals to community is not easy to describe; there are many ways to build communities, both on- and off-line. There are numerous stories of online communities developing among groups of computer users throughout the United
States between the 1960s-1980s. Two examples that illustrate different origins are Programmed Logic for Automatic Teaching Operations (PLATO) and the Whole Earth ‘Lectronic Link (WELL).

PLATO

In his article on the development of the PLATO online community, David Woolley (1994) traces the history of online communities back to the 1960s. The original PLATO system was designed for Computer Based Instruction and soon, computer scientists at the University of Illinois began to use the system to share information regarding computer bugs in their programs. Initially, individuals could send an electronic message to report problems, however they had no way of knowing if others encountered the same problem or how they fixed it. The users expressed frustration with the system and one programmer wrote a code that allowed users to access information sent by others, enabling them to follow their initial problem posting to see if others commented on it or if others experienced the same situation. Shortly thereafter, individual users began writing computer code to add elements to the system that allowed them to share more information and to communicate with each other through their computers. These interactions were created around the goal of improving the PLATO system, and thus impact their teaching practices. Woolley presents the history of PLATO as a series of necessities and desires followed by inventions to meet the needs and wants of the users of the system. It is important to note that the people involved in the development of this community were actively constructing both the social interactions as well as the computer technologies that enabled them to communicate. Thus, the members constructed the
community and the members had the power and the skills to change the nature of the community as their needs changed.

WELL

The WELL, founded in 1985, by Stewart Brand and Larry Brilliant began with an online interaction among readers and writers of a literary journal, *Whole Earth Review*. The WELL originated with a purpose to serve an audience of literary enthusiasts who may or may not be employed in the field. The WELL started with ten different discussion topics relating to literature facilitated by individuals and managed via conferencing software. From its early days, the WELL was quite popular and its participation rates increased rapidly. Currently, there are hundreds of topics, WELL enthusiasts facilitate the discussions, and they often involve authors or experts communicating with individuals interested in the topic or work under discussion. Some topics revolve around contemporary books, though other topics are not literary. Members of the community pay for the privilege to participate in the discussions that cover a wide range of issues and non-members can view portions of the community at inkwell.vue. Through inkwell.vue, I participated in this online community for a short time and was involved in a discussion about a contemporary book. Notably, the WELL is so popular that often authors of contemporary books agree to participate in the discussions of their books.

The WELL is a for-profit venture that is currently owned by Salon.com and listed on the NASDAQ. The WELL continues to thrive today and is widely recognized as an early and a seminal (or *the* seminal) online community (Figallo, 1998; Harner, 2001; Kim, 2000; Rheingold, 1993). A few authors and participants in the WELL documented
the interactions of this virtual community in well known texts including Howard Rheingold's *The virtual community* (1993), John Seabrook's *Deeper: My two year adventure in cyberspace* (1997), and Katie Hafner's *The Well: A story of love, death, and real life in the seminal online community* (2001). Perhaps the best description comes from the WELL’s web site:

The WELL is an online gathering place like no other -- remarkably uninhibited, intelligent, and iconoclastic. For more than seventeen years, it's been a literate watering hole for thinkers from all walks of life, be they artists, journalists, programmers, educators or activists. These WELL members return to The WELL, often daily, to engage in discussion, swap information, express their convictions and greet their friends in online forums known as WELL Conferences.

The WELL is distinguished by its non-anonymous participants, and by uncommon policies. The service does not sell subscriber data to marketers, nor place ads within passworded areas. This unique gathering place is both greatly valued and directly supported by WELL subscribers. (http://www.well.com/about.html)

Unlike PLATO, the members of the WELL do not necessarily have the power or the ability to change anything about their online interactions. Members of the WELL are from a variety of backgrounds with no clearly stated unifying factors, other than interest in participating in the online community. Though they do not explicitly have the ability or the access to add to or to change the technological structure underlying the community, the moderators value feedback and make changes to the community related to user feedback (Rheingold, 1993). Researchers and WELL participants documented the in-person interactions that grew out of the WELL (Harner, 2001; Kim, 2000; Rheingold, 1993). Through their online interactions, the initial users discovered that many of them lived in California and they began setting up face-to-face meetings for everyone interested. Even though the community is now world wide, small groups still form to
meet in person in their geographic area (Harner, 2001). The examples of PLATO and the WELL represent different ways that early online communities have come to exist, how they meet the needs of their members, and how they change as the needs of the members change.

Changing Notions of Online Communities

When I began this project, I read broadly on the topic, however the majority of the literature I closely examined is from the last five years. Because of reading the literature back to some of the first online communities, I see changes, over time, in how authors understand, describe, and define online communities. These descriptions changed over time as people have become more accustomed to online interactions, as the technology has changed, and as the social interactions among members develop. In 1993, Howard Rheingold published *The Virtual Community: Homesteading on the Electronic Frontier*, which tells the story of his experiences in one of the earliest online communities, the WELL. This book is widely cited as the first publication to use the term “virtual community.” Rheingold characterizes virtual communities as social entities that develop because of individuals participating in open dialogue, often sharing emotions, over time and thus forming personal connections. One idea that I feel is representative of early descriptions comes from Edward Valuskas (1996) and includes the following, “A collection of individuals who use computers, software, and other means to discuss common interests transcendentally outside of time and space” (¶ 2). In his text on the development of online communities, Chuck Figallo (1998) explains that his definition of the term developed from his own experiences as a member of the WELL. He believes that as more and more people participate in online communities, individuals use their
personal experiences as a reference point for developing their own understandings. His understanding includes the following four characteristics:

- The member feels part of a larger social whole.
- There’s an interwoven web of relationships between members.
- There’s an ongoing exchange between members of commonly valued things.
- Relationships between members last through time, creating shared histories. (p. 15)

Unlike Valuskas’ description, Figallo focuses on the interactions and relationships between and among the members and ignores the hardware that enables the communication and relationships. A more recent definition comes from the web site wordIQ.com:

A virtual community is a group whose members are connected by means of information technologies, typically the Internet. Similar terms include online community and mediated community. Today, "virtual community" is loosely used and interpreted to indicate a variety of social groups connected in some ways by the Internet. It does not necessarily mean that there is a strong bond among the members. The membership turnover rate could be high. This is in line with the liberal use of the term community. (wordIQ.com, 2004)

These three examples provide insight into how the concept of online community has developed in the last few years. Early descriptions were enthusiastic and seemed to readily accept that online interactions were forming communities. More recent descriptions recognize the differences between online and in-person communities and emphasize the human interactions inherent in an online community (Figallo, 1998; wordIQ.com, 2004). Additionally, as is shown in the wordIQ.com definition, the word “community” may now be accompanied by caveats and qualifiers and has extended definitions. This is due, in my opinion, to greater experience with these technologies, time to explore the potential uses, an extension of the term, and a critical examination that followed the initial unbridled enthusiasm. As Larry Cuban (1986, 2001) describes,
new technologies are often greeted by societies with great claims of potential benefits. After living with the new technology for a time, people come to temper their expectations and often reduce, qualify, or dismiss their initial expectations. The fervor that surrounded initial online communities is now tempered and this may lead to more realistic expectations and to the development of practices that integrate online and in-person community involvement in a variety of ways. Additionally, this is an opportune time to conduct research on the educational uses of online communities because several have existed for numerous years and there is a sufficient body of knowledge to assess various trends in the development of these communities.

Description of Terms

In preliminary research for her dissertation, Melissa conducted focus groups with teachers who use the Ohio Statehouse as a destination for their field trips. The focus groups were the first time that the teachers interacted with teachers from other schools who used Statehouse fieldtrips as part of their curriculum. Melissa’s initial trepidation about all the possible mishaps with a focus group was completely unfounded. She was surprised by the amount of enthusiasm the teachers showed when discussing her questions. In fact, on several occasions, the teachers were so excited to discuss how they used the Statehouse resources with their students, that they completely strayed off the topic of the particular question. Instead of discussing the questions Melissa posed, the teachers engaged each other with questions about how and why they integrated Statehouse curriculum, lesson plans, and experiences into the proficiency goals for their students. The teachers were so enthusiastic about these exchanges, and asked Melissa when they would meet again. She raised the notion of continuing the dialogue online and the teachers reacted quite positively.

After the focus group ended, Melissa reflected on the teachers and their interactions. None of the teachers had the requirement to take their students on field trips to the Statehouse, yet they were highly motivated teachers and chose to participate in field trips. Certainly, it would be easier for them to keep their students at school and not bother with permission slips, securing a bus, worrying about bag lunches, locating enough chaperones, etc. Additionally, all the teachers seemed thrilled with the chance to offer suggestions to other teachers and to learn from them about what they do in their own classroom. Issues that concerned the teachers included the lack of continuity among the tour guides, the relationship
between the content of the tour and their curriculum, the relationship between the
tours and the proficiency test, and the fact that teachers could not communicate
with the tour guide before the actual field trip.

The project at the center of this anecdote did not come to fruition and the
Statehouse does not currently have an online community for teachers. However, if the
project had continued, could a group of teachers sharing information through an online
format develop into an online community of practice? Does the use of resources from
museums and cultural institutions constitute enough of a shared interest to help a group of
individuals develop strong bonds and become a community?

My working understanding of “community” and “online community” changed
numerous times throughout this study process and my thinking about online communities
changed as well. These changes are reflective of the variety of literature and lack of
consensus on the topic of developing communities of teachers online. The continued
development of technology and the possible human interactions that these technologies
foster will expand the opportunities for individuals to interact through the Internet.

*Descriptions of Online Communities from the Literature*

Throughout the literature on online communities, few authors actually describe
and clarify the types of interaction and groups that they believe constitute online
community. In fact, I found situations ranging from occasional email exchanges and
listservs to sustained video and textual interactions described by researchers as
constituting communities (Dowling, 1996; Moore & Barab, 2002; Poole, 2001; Yap,
1994, 1997). An interesting early finding from my analysis of articles was that the
authors who wrote about face-to-face communities tended to offer longer descriptions
with more details of the types of human interactions to which they refer. This contrasts
with the authors writing about online communities who tended to offer superficial
descriptions of what constituted a community, if they mentioned it at all.

Karen Hsu’s (2004) work focuses on a group of art teachers involved in a distance
education master’s degree program. This developing program, in its second year, is
mainly online, though the participants meet each summer for an intense week-long series
of courses. One stated goal of this master’s degree program is to help develop a sense of
community among the participants. In the article, Hsu offers many examples of different
online interactions, some related to course objectives and some social, among the
students in this program. She notes how the different instructors create different tones for
social interactions throughout their courses. Also, she quotes many postings from the
students that demonstrate their personal and professional experiences with their fellow
learners and indicate the strong bonds that have developed among the group members.
These quotations and Hsu’s explanations explore the nature of this group of learners and
attest to the importance they place on their interactions with the others in this group.
Perhaps beyond the scope of this article, Hsu does not address what a virtual community
is or how it is similar to or different from face-to-face communities or other learning
environments.

Pamela Grossman, Samuel Wineburg, and Stephen Woolworth (2001), express
their concern with regard to the frequent lack of explanation of the term “community” in
the following:

We recognize that virtual environments offer possibilities for communities that
are just now being explored by many researchers. We object, however to the
loose use of “community” that accompanies many new technological innovations.
Consider the description of a new on-line partnership between university scholars
and high school students that claims that it will use email to create “common
intellectual community among the different institutions” (“Schools & Scholars Bridges the Divide,” 2000, p. 2). This claim is treated as self-evident without any specification of what community means (beyond participation on a joint listserv), how it will be evaluated, and how project coordinators will know if they have succeeded or failed in “creating community.” (p. 1001)

Their description is one of many that illustrates the facile way with which authors use the terms “community” and specifically “online community.” It also reflects a lack of consideration about the differences between groups of people who interact in a variety of ways and the concept of “community.” Simply sending and receiving messages through a listserv may constitute a community to some authors, but they do not describe in detail the participation that develops and maintains the community. For me, this raises questions including: Can someone be a member of the community if s/he receives the emails from the listserv, but does not respond to them? How can people move their listserv from a group sending and receiving electronic messages to a community or a community of practice? Why has building community become such a popular goal among educators? What underlying values does this reflect? Many researchers write about the various ways that people interact online including sharing information, making friends, building relationships, asking questions, and many other ways. However, what these interactions constitute is not widely accepted.

*Uses of “Online Community.”*

Because of the extremely wide range in ideas and concepts among the authors, I am unable to offer a description of the way the term “online community” is used throughout the literature. It seems as if virtually every usage has unique features with some offering no explanation of the term and others giving detailed explanations of the nuances of a specific type of community and how it relates to the larger research project.
The range includes articles such as Ana Ramirez Carr’s (2002) research entitled *Pre-Testing to Predict Participation in Online Communities* in which she conducted quantitative analyses of professors’ abilities with certain technological skills and builds her findings on their results of these tests. Though the implications of her work deal with online communities, she offers no explanation whatsoever of the terms “online community” or “participation.” Another example is from the work of Nancy Gilbert and Marcy Driscoll (2002) in their article entitled *Collaborative Knowledge Building: A Case Study*. Their research focused on knowledge-building communities and they discuss this concept of community in detail as well as explaining how a particular technology is intended to help develop this community. Additionally, they explore the participants’ views of the development of the knowledge building community.

*My View of Online Communities.*

Instead, of attempting a vast generalization of what is obviously a wide range of concepts relating to online communities, I will describe my developing views of online communities and some of their benefits. Drawing heavily from the work of John Dewey (1916), Edward Valuskas (1996), the WELL, talk@museum-ed.net, as well as numerous other authors and my personal experiences, I developed the following understanding of online communities:

An online community is a group of people who come together around a common interest or need and their communication is primarily mediated through the Internet and various technologies. The majority of their communication is text-based, though some communities allow image, audio, and video sharing. Different from face-to-face communities, participants in online communities can choose to enter or leave the community and participate or not participate without needing to explain or justify their decisions.
A potential benefit of online communities is that individuals can interact with others toward achieving a mutual goal when and where they have the time and access and when they perceive that it will benefit them. Unlike face-to-face communities, people who are not available at a certain time or place are not excluded from participation. A drawback is that membership in the group is continually shifting which may lead to a somewhat unstable basis for the community.

Online communities have a variety of potential benefits to offer educators and students at all levels. Through interacting online with peers, teachers can develop an understanding of challenges in the classroom – both pedagogical and behavioral. An online community offers many possibilities that are specific to art teachers and museums. Because schools often have only one art teacher, she or he may struggle to find ways to implement the curriculum or to handle the myriad of classroom management issues inherent in an extremely dynamic setting. Through online communities, art teachers can consult with other art teachers in their district, throughout the country, or around the world to learn how others deal with the same challenges.

There is a great deal of disparity among authors as to the range of online communities. However, humans can interact in a variety of ways while they are physically distant. Whether these interactions constitute a community or something else, is beyond the scope of this research. I believe that online interactions can professionally benefit teachers and offer opportunities that they cannot find in their schools or through professional development opportunities available through their districts. Embedded in my statement are numerous threads relating to my personal experiences, my research on this topic, and my understandings of the experiences of others.

Participating in online communities should not substitute for in-person contact with humans, but can provide opportunities not possible in any other way. A comment that I have heard numerous times relating to online communities is, “If you build it, they will come.” This statement was always followed by an expression of disappointment that the online community did not meet its intended goals in terms of participation and did not
function as a community. To me, this initial statement is premised on the notion that communities online exist outside of a group need, common interest, or sense of zeitgeist. It also harkens to the idea that the need one person perceives is inherently perceived by others in the group. Also, the comment does not address why people choose to participate in communities or what they have in common with the others in the community. In fact, a commercial site relating to developing online communities (thefullcircle.com) actively promotes these ideas. This site presents developing an online community as a formulaic process that can be undertaken by an individual acting on a personal idea or viewpoint, with clearly defined linear stages. Additionally, the development of the community is not a linear process, but an organic growth cycle that may include expansions as well as declines in group membership and participation (Figallo, 1998; Rheingold, 1993). One person may start an online community, but they are more likely to flourish when many members of the group recognize their mutual interests and commonalities. If the members of a particular group do not share a commitment to the issue at the center of the community, then they will be unlikely to participate. In this way, the development of online communities is similar to the evolution of in-person communities.

Sometimes I am more candid than I perhaps should be but one of the things I love about the listserv is the ability to be lazy. I can read all of the emails and get great information from other people but I can choose whether or not I want to be involved. In a face-to-face community the give and take of communication is much more expected and demanded. People start to think you're weird if all you do is listen in on communications but never participate.

However, with as busy as I am (and most likely all museum educators who are part of this listserv), I can get great information and listen to discussions at my leisure, when I have a spare moment, and can be completely lazy about participating or can choose to participate if I want. (Response to my questions
The lack of in-person contact in an online community can be both an asset as well as a drawback to these communities, clearly this museum educator sees it as an asset. Individuals choose to participate completely on their own terms, though others may pressure an individual to participate more often or more fully. Through the Internet, time and space are less crucial limitations for community interactions. However, individuals must have access to the technological infrastructure to allow their participation. Additionally, I believe the ease with which people can join online communities also makes it easier for them to leave the communities. This may lead to a degree of instability and it may also lead to many individuals rotating through different roles within the community. Because online communities consist of individuals who have developed a degree of comfort with Internet technologies, they may be willing to try different forms of online interaction with little resistance. The very aspects of online communities that allow a wide variety of individuals to participate when and how they are able to also allow individuals to easily leave, thus creating a shifting basis of the community. The previous section is my working understanding and I will add to it throughout this chapter to reflect changes that take place in my understanding during the research process.

One View of Educational Communities

On my way to the 2004 NAEA convention in Denver, I glanced through the airline magazine and found that the table of contents listed a story entitled, “Online Educational Communities.” Since my presentation later that day was on that exact topic, I immediately located that story. As I read it, I grew frustrated with the article and the underlying assumptions of the author as he described “educational communities.” The
premise of Chuck Kapelke’s (2004) article is that by using the Internet, teachers can post homework information, grades, assignments, etc. for parents and students to read and that this constituted an educational community. He also mentions companies that market software designed to help school districts monitor student progress and implies that this is related to forming online communities.

The article focused on increased access to information and increased opportunities for different stakeholders to share information regarding the goal of student success in school. To the author, this clearly constituted an online educational community, but I remain unconvinced because the Internet was merely used to improve communication between parents and a teacher, between students and a teacher, or between students. The communication described was mainly between individuals, rather than among a group of people working towards a mutually agreed upon goal or area of interest. This type of information sharing and communication can certainly help keep parents informed and help students succeed in school, however it is much more similar to a series of parent-teacher or student-teacher conferences than it is to forming an educational community. Additionally, the author conflates the use of statistics to monitor progress, the use of technological resources to develop curriculum, and the use of online drill and practice exercises with the development of educational communities.

A notable aspect of this article is that it mentions different companies that market software to track students and relates the services they provide to the No Child Left Behind legislation. The requirements of this legislation prompted many school districts to purchase or develop software to monitor student progress. Kapelke explains that schools purchased the software to meet the legal needs, “…but schools that have
successfully implemented online communities are reaping unexpected benefits” (p. 34). However, he does not explain how a school goes from implementing commercially produced software to developing an online community among students, teachers, parents, and administrators. Additionally, he does not differentiate between what it means to track students and to form an online community. I reject this implicit conflation of information sharing and the development of a community, however it is representative of many popular opinions on the topic.

**Businesses and Online Communities**

The link between commercial entities and online communities surprised me when I began this research. Not only do commercial enterprises create software for educational online communities, they are also active in forming a variety of online communities. Cliff Figallo (1998) notes this trend in business web sites to create a community section. He describes three different continua that relate to online communities: interactivity, focus, and cohesion. Though I explain each of the three, I focus on interactivity because it is the most relevant to the articles I examined and to the concept of communities of practice online.

*Interactivity*

To explain the interactivity in various online communities, Figallo (1998) develops three metaphors, depending upon the types of contact fostered by the community. They include shrines, theatres, and cafés. Shrines involve users visiting the community to learn from the content posted. There is little contact among users; most contact is between the community members and the creator of the content. Examples of shrines include sites devoted to a particular celebrity, a sports team, or a political group.
The visitors all share an affinity for the celebrity, team, or party and they may leave their own “offerings” to share with other visitors in the form of photographs or messages. The group of users do not interact directly with one another, but may visit the site frequently to learn more about their shared interest through reading the information posted by the official creator of content for the web site. Theatres involve a group of people coming together around a certain object or event. Community members can access the content provided by the official areas of the site, or they can choose to interact with other members of the community through other areas of the site. There are discussions among community members relating to the object or event that serves as the center of the community. Often, the focus of the discussions will change and stray to topics away from the initial focus of the community. Examples of theatres include web sites devoted to specific hobbies or museums. The sites include areas where users can exchange information and build relationships with other community members. Cafés exist solely because of the interaction among the members of the community; without this interaction and exchange of ideas, there would not be a community. The members of these communities choose to participate and find their participation fills a social need. Also, because communication is the emphasis, users often contribute suggestions or actually write computer code that improves the technological infrastructure that allows different types of communication online. The WELL is an example of a café-style online community.

Focus

In describing the three types of focus for online communities, Figallo uses the metaphor of shops, bazaars, and malls. He describes shops as communities in which
members have a strong interest in a subject that is important to all the members. An example of a shop is an online community devoted to a particular disease. Bazaars are online communities which are not focused on a specific topic and often involve play and experimentation instead of relationship building. Figallo provides the example of a bazaar community as the content consortium. Malls are online communities that contain specific, organized areas for people to communicate around a specific topic of interest to them. The WELL is an example of a mall.

Cohesion

Within the category of cohesion, Figallo organizes the types of online communities into the following: loners, associates, and families. As the name implies, communities inhabited by loners do not focus on relationships. This may be due to limited technological capabilities for supporting interactions, or because the site is a shrine. Associates interact at varying levels depending upon many factors including the perceived benefits the members get from their participation. Figallo believes that most online communities are associateships and many begin because of their common interest in the information available through the online community. Families are the most cohesive types of online communities and the members may already know each other before using the Internet to mediate their communication. Figallo offers the example of when the Grateful Dead enthusiasts began using the WELL. Though they were newcomers to the WELL, many of these people already knew each other and already had a close bond through their affinity for the band. Figallo characterizes families as being both interactive and focused.
Background to the Analysis

Many of the analytic processes I mentioned in the previous chapter also apply to the literature relating to online teacher community. I used virtually the same process and created iterations of analytic categories, though some of the categories are different. In addition, I again used a set of inclusion/exclusion criteria. The criteria include date of publication, type of community involved, relevance to classroom settings, and use of technology to mediate communication. I made a concerted effort to analyze articles relating to online communities involving a museum collection or museum education personnel because the overarching goal of this research is to develop a body of knowledge for museum educators to use when making educational museum web sites for use in public schools. However, I was not able to locate many articles relating to museum practice. Because literature related to online educational communities often did not provide historical details, I included background literature on the history of educational communities. Additionally, I included articles written by companies that develop online communities because of their immense popularity and because many online educational communities use software developed by commercial entities. I found it necessary to include this information beyond the initial scope of the literature because the literature related to online educational communities often did not include background details. For instance, few articles address the history of online communities, the types of software that make these communities possible, and often did not relate the concept to previous work.

In general, the articles written about commercial community-building software operate from the premise that individuals can develop online communities, that emailing
or receiving listserv messages constitutes a community, and that teachers benefit from this type of communication. The final set of categories that I used to analyze the articles is: Author, Title, Journal, Publication Date, Audience, Methodology, Methods, Paradigm, Place Self, Bias Identification, Assumptions, Silences, Role of Power, Goal of Research, Goal of Community Project, Impact of Research on Researched, Description of Community, Development of Community, Identity Issues, Community Activities/Reasons for Existing, What does it Mean to Participate?, Subject, Grade Levels, Themes, Common Phrases, General Description, Findings, Source of Funding.

Nature of the Literature

There is an extensive amount of literature on communities as well as a vast body that addresses online communities. Within these areas, I focused on the literature relevant to educational communities and specifically ones designated for teacher participation. I found two main types of literature on communities of teachers; one area is descriptive in nature and seeks to explain the origins, current state, and future of online communities. This may be especially useful for those who plan to build an online community. The other portion of the literature is research-based and looks at the effects of participating in an online community. This area considers what benefits teachers may attain as well as how online communities can function within the larger notion of schooling. Much research has been conducted on incorporating an online aspect into college courses. The results of these studies are mixed, with some finding more effects
of community development than others\textsuperscript{12}. For instance, Melissa Poole (2001) documented that many of the students in the cohorts she studied developed friendships during the online and face-to-face portions of their classes. Her descriptions included friendships among small groups within the larger group and she explained that these students worked together outside of their assigned projects. Karen Hsu (2004) explains the ways that the teachers (who were also students in an online degree program) grew to rely on one another for support in their teaching. Their interactions over a two-year period developed from required course postings to discussions about their teaching on a day when most of them were out of school due to snow.

I found the use of the term “online community” when relating to a class requirement troubling. In some instances, classes may develop into communities, however, not all classes are inherently communities. Is it part of community development when students are required to post their reactions to readings or comments on class discussion online? This is merely an extension of class activities beyond the traditional boundaries of time and space. Though the students have a common need, the situation is different than if the impetus for the development of the community setting came from the students. Thus, I am differentiating between online interactions in which the participants choose to participate and online interactions in which the participants are required to participate as part of a course requirement. A community may result from either situation, but I am far more skeptical of situations in which participation is

\textsuperscript{12} This is a difficult claim to substantiate because I was unable to locate studies that followed students beyond their experiences in the required portions of the course. However, this may be an important area to research if interested in exploring if online educational communities can maintain themselves once the required courses have ended.
mandatory. Though all classes have the possibility to become communities, not all classes function as communities. Examples of this situation from the literature include articles on the development of communities of practice among preservice and inservice teachers (Barab, MaKinster, Moore, & Cunningham, 2001; Moore & Barab, 2002; Poole, 2001).

Conceptual Development

Last week Dr. Daniel asked me to write a one-page explanation of my methodology and what I am doing with this research. It sounded easy. It hasn’t been. But, it has made me reflect on exactly what I am doing and how I could describe it. Two metaphors have come to mind: raveling and teasing. If the body of published material in English existing in the research community can be represented as a piece of fabric, then I believe I am raveling the edges, and occasionally pulling a thread from the center. In doing so, I am exploring the individual threads that make up this larger piece of fabric and seeking to understand both them and the larger piece of fabric at the same time. Or, perhaps, I am teasing apart dominant notions of computer usage in the classroom. By this, I mean separating the stories from their context and looking critically at what is encompassed in each of the stories and how they work together to form a whole. (Excerpt from Research Journal, June 22, 2004)

As I read the literature related to online communities of teachers, several ideas continually emerged, including situated learning, communities of practice, and networks of practice (Barab, et. al, 2001; Hung & Chen, 2001, 2002; Moore & Barab, 2002; Nichani & Hung, 2002; Poole, 2001; Sherry, Bohlin, Chiero & Harris, 2003). To better understand the reasoning behind the impetus for building online communities of teachers, I decided to follow these ideas to deepen my understanding of the roots of online communities of teachers. Additionally, when seeking to understand contemporary implementation of these theories, it is crucial to investigate the theoretical basis of the push for developing communities of teachers, both in person and online.
Situated Learning

The idea of situated learning comes from the work of Jean Lave and Etienne Wenger (1991) and grew out of their research in learning environments. They conducted qualitative research and studied existing reports of a variety of different learning situations including Yucatec midwives, meat cutters, and nondrinking alcoholics. From their research, they developed theories about how people learn through social interactions, based upon apprenticeships, outside of school settings. Lave and Wenger intentionally researched learning outside school settings because they wanted to look at aspects of learning that were not necessarily influenced by the culture of formal schooling. They explain their rationale in the following

More importantly, the organization of schooling as an educational form is predicated on claims that knowledge can be decontextualized, and yet schools themselves as social institutions and as places of learning constitute very specific contexts. Thus, analysis of school learning as situated requires a multilayered view of how knowing and learning are part of social practice – a major project in its own right. Last, but not least, pervasive claims concerning the sources of the effectiveness of schooling (in teaching, in the specialization of schooling in changing persons, in the specialization of schooling in changing persons, in the special mode of inculcation for which school are known) stand in contradiction with the situated perspective we have adopted. (p. 40)

Lave and Wenger gathered stories of different types of apprenticeships for a variety of learning situations. Though some apprenticeships were specific, with a formal declaration of intent to participate in a certain career, others were implicit with a young woman beginning the process of midwifery through a family legacy in the field. They develop the concept of “legitimate peripheral participation” based upon their findings from the study of different types of apprenticeships. Lave and Wenger believe that at the core of legitimate peripheral participation is the social interaction between members of a
community. They write, “Legitimate peripheral participation is proposed as a descriptor of engagement in social practice that entails learning as an integral constituent” (p. 35). In their discussion of this concept, issues of power arise with the periphery presented as both a site of empowerment and as a site of disempowerment. It is empowering when individuals at the periphery have the potential to increase their participation in the community and disempowering when individuals at the periphery are kept from increasing their participation in the community. Lave and Wenger do not believe that there is a single core to a community or that individuals acquire skills in a linear fashion that moves them to the center. They use the term “full participation” to indicate that peripheral participation may develop into another form of community membership. Lave and Wenger argue that partial and peripheral participation are connected to the community and are dynamic positions from which a newcomer may begin to practice full participation.

At the heart of situated learning is the idea that the dynamic social interactions with others in the community of practice help those on the periphery learn the actual skills necessary for full participation in the community. Additionally, Lave and Wenger believe that learning is contextual, it requires participation, and the context of learners involves the social group. Unlike previous theories that posited learning as an individual act, Lave and Wenger believe that learning occurs within a participation framework and the social interactions impact both the newcomer and the experienced master. They term the group associated with this type of social learning a community of practice. As noted by many authors, the concept of communities of practice is now widespread within
teacher development and inservice training (Grossman, Wineburg & Woolworth, 2001; Hsu, 2004; Moore & Barab, 2002; Poole, 2001).

**Communities of Practice**

Central to the concept of situated learning is the community of practice, for without this community of practitioners, it would be difficult to learn through social interactions. In explaining how a community of practice functions, Lave and Wenger state that while participants are learning, there is not a great deal of direct instruction. Instead, it is the function of the community that creates the learning opportunities. They write

> Learning activity appears to have a characteristic pattern. There are strong goals for learning because learners, as peripheral participants, can develop a view of what the whole enterprise is about, and what there is to be learned. Learning itself is an improvised practice: A learning curriculum unfolds in opportunities for engagement in practice. It is not specified as a set of dictates for proper practice. (1991, p. 93)

In a later book, Wenger (1998) explains that communities of practice define themselves along three specific areas: the focus of the group, how the members of the group work together, and what the group has produced. He emphasizes that the relationships among group members as well as the shared knowledge and activity contribute to a feeling of shared identity. Numerous educational researchers believe that the community of practice concept has vast applications for implementation in public schools (Barab, MaKinster, Moore, & Cunningham, 2001; Hung & Chen, 2001; Hung & Chen, 2002; Moore & Barab, 2002; Poole, 2001; Trentin, 2001). Additionally, many of these authors believe that communities of practice can develop through the use of the Internet and that this can benefit teachers. In *The Social Life of Information*, John Seely Brown and Paul
Duguid (2000) explore the possibility of communities of practice that do not meet face-to-face; they use the term networks of practice to refer to these entities.

Networks of Practice

In their discussion of learning that takes place within communities, Brown and Duguid highlight three principles they believe apply: learning is motivated by demands, learning is social, and learning forms identities. Because of these aspects of learning, strong group bonds may develop among people who learn together. Many groups of people engaged in the same practice will never have the opportunity to participate in the shared factors of a group on a daily basis. To differentiate these communities from communities of practice, Brown and Duguid refer to them as networks of practice.

Within a network of practice, the members have common knowledge, may utilize Internet (or other) communication tools to connect to each other, and often share information among the members. One benefit of a network of practice is that its reach can be tremendously broad, impacting practitioners around the world. Brown and Duguid believe, however, that there is often little reciprocity within networks of practice, they do not often take action, and they do not often produce knowledge. An example they offer of a network of practice is the “25,000 reps working for Xerox” (p. 142). Brown and Duguid explain that these 25,000 people share common employment and could easily exchange information about their similar employment. In comparing networks of practice to communities of practice, they write

By contrast, there is relatively little reciprocity across such networks; that is, network members don’t interact with one another directly to any significant degree. When reach dominates reciprocity like this, it produces very loosely coupled systems. Collectively, such social systems don’t take action and produce little knowledge. They can, though, share information relating to the members’
common practices quite efficiently. (p. 142)

Maish Nichani and David Hung (2002) explored the question, *Can a community of practice exist online?* In doing so, they examined the type of interactions that take place in an online community versus a face-to-face community. Additionally, they challenge the notion that the success of commercial online communities serves as a good model for developing online educational communities of practice. They argue that online communities, which they refer to as networks of practice, may lack the depth of social experiences that are possible in a face-to-face community of practice. Nichani and Hung discuss Brown and Duguid’s (2000) distinction between learning *about* and learning *to be*. Learning *about* involves the development of a factual base of knowledge and they conclude that online communities often bring about this type of learning. However, face-to-face communities involve learning *to be* through the close, ongoing interaction with others in a social environment. In their explanation of the differences between networks of practice and communities of practice, they emphasize the loose connections among people in networks of practice as contrasted against the closer bonds that form among members in a community of practice.

**Power**

In explaining the role of communication in forming a community, Dewey (1916) writes, “The communication which insures participation in a common understanding is one which secures similar emotional and intellectual dispositions-like ways of responding to expectations and requirements” (p. 4). In this statement, Dewey emphasizes the importance of community participation as well as the level of shared expectations among
the members of a community. Communities offer opportunities for many individuals to participate in the activities that relate to the shared interests of the members.

Controlling the Community

The role of power in communities online was not overtly addressed in any of the articles I analyzed. There are, however, some interesting underlying issues that emerged as I investigated who is in control of an online community. The early situations I discussed present a stark contrast to the current state of many online communities because the early users of PLATO were also involved with writing the computer codes that made the system function and the users of the WELL contributed suggestions that were implemented by the community. The Full Circle web site is one popular commercial entity devoted to building online communities. The technology they market enables any user or group of users to easily implement an online community consisting of pre-determined fixed options for online interactions among a group of people. Although this is a business, the premise is quite similar to the research on educational online communities in that the members of the community will interact socially around a specific topic of interest to the group of people. However, the members of the community do not have the power to change the programming basis that regulates the communication among group members, and thus controls the type of social interactions that are possible. The Full Circle provides the service that sets up and controls the online community. For instance, if a community member wanted to introduce real-time video or

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13 Howard Rheingold (1993) explains an early problem that users had with regard to the speed of their communications. Because of the cost, the WELL could not afford to purchase the new machines required to improve communications. Members of the WELL raised this issue in their discussions, mailed contributions to the WELL, and raised all the needed money to change the nature of their communication infrastructure.
audio interactions to the online community, she/he does not have the freedom to add this capability to the existing online community as controlled by Full Circle. Certainly, there are contemporary online communities of educators who do have the technical expertise to alter the community and whose community is set up to support interaction and changes by community members. However, based upon the research I analyzed, this is not the situation for the majority of teachers interacting in online communities. This shift in power from the group, as a collective, to the individual or commercial entity who sets up and/or monitors the community is a crucial difference between past online communities and contemporary online communities. This marks a difference between face-to-face communities and online communities because members in face-to-face communities often have the ability to work toward changing aspects of their community. Though billions of people now have access to networked communications systems, the majority of the people do not know how to or are not permitted to develop or change the computer codes that mediate the communication infrastructure. The rise of commercial entities that create software to enable online communities has allowed many more people to access these tools. However, because these communities are built around commercial products or other computer codes that users are not able to access, the participants do not necessarily have the power to change the community or to take on a leadership roll.

*Participation in Online Communities*

Another issue related to power is why individuals participate in online communities. Whereas some of the situations I encountered in the research were premised on individuals participating by choice (Dowling, 1996; Hung & Chen, 2002; Lawyer-Brook & Sherry, 1997; Sherry, 2000; Yap, 1994, 1997), in other situations,
individuals were required to participate as part of a course (Duemer, Fontenot, Gumfory, Kallus, Larsen, Schafer, & Shaw, 2002; Gilbert & Driscoll, 2002; Poole, 2001). As presented in the articles, none of the authors questions the role that power plays in participation in the community being developed. However, as I reread the articles and reflected on the ones that require community participation as a percent of a student’s grade, it seems less like community building and more like a school assignment.

One in particular, Melissa Poole’s (2001) Developing Online Communities of Practice in Preservice Teacher Education, is premised on the theoretical notions of developing a community of practice. She studied the development of cohorts of preservice teachers (PSTs) enrolled in a series of teacher preparation classes at the University of Missouri-Columbia. In this longitudinal study, she analyzed interview transcripts, postings on class discussion boards, and field notes from observing the face-to-face class meetings. She identifies the markers of community that she believes developed during this study as shared experiences, shared responsibility, shared identity, social time, entrance and exit rituals, developing meaningful relationships, and participation. Through her discussion, she notes that some of the relationships developed between two members of the group, not among the entire group. Additionally, she notes the lack of participation beyond the required tasks and that the Journal space for online interactions was only used to complete assignments. Some of the students did not complete any of the online community-building assignments.

Her research is reflective of other studies that involve online community participation as a requirement (Duemer, Fontenot, Gumfory, Kallus, Larsen, Schafer, & Shaw, 2002; Gilbert & Driscoll, 2002). Certainly, a group of students can develop into a
community, however self-selection is an important factor when developing from a group to a community. When students are required to post a certain number of assignments for a certain grade, they are likely to do exactly that. Thus, students being told that they will participate in an online community of practice that has implications beyond their time in the course, may not be successful. Though grounded on a substantial theoretical base related to developing communities and communities of practice in education (Grossman, Wineburg, & Woolworth, 2001; Lave & Wenger, 1991; Wenger, 1998) and based around the notion of working to reduce teacher isolation, the students in this study were required to participate in exchange for their grade.

_Impetus for Community Formation_

One reason that the situation Poole presents did not develop into a full community is the power imbalance. Students were told that their online participation was worth a portion of their grade. Therefore, they did not self-select to be in this community, the professor chose this for them. In her discussion of the results, Poole begins by asking, “Were these PSTs successful in building learning communities?” This is intriguing because the impetus for developing the learning community did not come from within the group of students, it came from the professor, the College of Education, and the National Science Foundation, through a grant. Therefore, those other than the students, and those in positions of power wanted to forge the less powerful groups of students into online communities. However, when analyzing the data, she shifts the power roles and addresses the question, “Were these PSTs successful in building learning communities?” as if to indicate that the students were responsible for building their own community. Certainly, there are many reasons why these cohorts of preservice teachers did not
become close-knit communities of practice and Poole mentions issues with the physical space, the lack of opportunity for students to express opinions in class, and the timing of the introduction of the online community. Returning to Brown and Duguid’s (2000) principles of learning, the experiences of these groups did not relate to the idea that learning is motivated by demands. The students participated because it was a requirement; they did not necessarily perceive that they had needs or interests that could be met through their interactions online with other students.

**Power and Communities of Practice**

Another power issue related to the concept of developing online communities of practice is that the students were in a cohort of preservice teachers. Central to the concept of communities of practice is the idea that those on the periphery learn through their social interactions with full participants. In this situation, there were no masters, everyone was on the periphery, and there was no one to guide the students to full participation. Without the presence and participation of those actively engaged in the practice and without anywhere to “go,” all the students were “stuck” on the periphery. Even though it appears that the power of all participants was equal, their power was also quite low. Had the preservice teachers been placed in school settings working alongside teachers and used the Internet to connect with other preservice teachers as well as inservice teachers, the situation might have developed into one that fostered full participation.

Poole’s (2001) research addresses important concepts of online community development and raises important questions about how and why communities of practice develop. Power affects social relationships in ever-changing and far-reaching ways. The
uneven results Poole observed with regard to forming the online communities of practice relate not only to the physical, temporal, and spatial issues, but also to the power dynamics at work in the decision to create online communities of practice as well as the interactions between and among the students.

After exploring a variety of types of communities, I chose to focus this research and the implications for museum educators and teachers on communities of practice. In expanding upon my previous definition of online communities and in limiting it to relate to communities of practice, I wrote the following:

Power is at work in online communities as well as face-to-face communities, however the forms it takes may differ. Though a face-to-face community may have leaders who are in control, these duties are often ones that could be performed by many or all of the members. Within an online community, the knowledge and the access to lead the group may be restricted to one or a few members. In some instance, when using commercial software to run the community, there may be no way for a member to change the social interactions of the group. Additionally, power must be flexible and shared among group members. The flexibility of power is important to help those on the periphery move to full participation.

There are other implications of power in communities, both online and face-to-face. One of these relates to the reasons why individuals participate in communities, if it is completely their choice, if they are required to do so, or for some other possible reason. Communities that involve self-selection and allow members to participate (not require them to participate) are more likely to thrive than those where a person in a position of power requires others to participate. Additionally, members are more likely to participate when they feel that they are gaining something through their interactions with other members of the community.

Spatial and Temporal Themes

Frequently mentioned in explanations of online communities is the concept that they allow people to connect with others outside the limits of space and time (Duemer, et. al., 2002; Figallo, 1998; Horrigan, 2001; Lawyer-Brook & Sherry, 1997; Moore & Barab,
Also, it [participating in the museum education community] can be done at any time of day or night. Normally the work day flies by and when other people have left for home, I can still respond to their comments (even from another time zone). Response to my questions posed to the Museum Education Online Community, May 11, 2004

The other thing I love about the list serv is that I am one of the few Museum Educators in my region. This allows me to be part of a community that I don't have geographically. It is wonderful to hear people discuss the same concerns and problems that I have and great to see all of the responses. Sometime when I'm working on a problem about how to make a certain exhibit tie in with the curriculum or work for teachers in the area, I think I understand how teachers in the Great Depression or in rural schools must have felt when they were isolated. The listserv really helps to deal with this isolation because out there in cyberspace is someone who knows exactly what I'm going through. (Response to my questions posed to the Museum Education Online Community, May 11, 2004)

In these responses, the participants in the museum education community address numerous points about their involvement that relate to other issues raised by those conducting research on the topic. Teachers and museum educators report feelings of isolation and researchers posit that there is not a developed culture for sharing educational strategies among teachers. (Barab, et. al, 2001; Moore & Barab, 2002; Poole, 2001; Yap, 1994, 1997). Because of these factors, teachers and museum educators are often on their own to develop their own practice and create resources and programs to meet their needs (Eisner & Dobbs, 1986; Moore & Barab, 2002; Newson & Silver, 1978).

Due to the numerous synchronous and asynchronous communication tools available through the Internet, groups of people can share ideas, information, and experiences with others who may or may not be in their physical or temporal proximity. Many researchers report positive results that impact teaching practice from these types of
experiences (Barab, et. al, 2001; Moore & Barab, 2002; Poole, 2001; Yap, 1994, 1997). Obviously, the ability to work outside of the limits of time and space enables a far greater number of people to interact with each other than is possible in face-to-face communities. Additionally, as one of the respondents to the museum education questions indicated, when people live in isolation from others in their field, it is not possible to have a community of practice in a face-to-face setting. The responses above indicate how some museum educators value the opportunity to ask and answer questions of their peers in a text-based medium. However, much more than email is possible with the Internet.

One compelling example of an online community that takes advantage of the possibilities of the Internet outside of time and space is the Inquiry Learning Forum (ILF) as described by Sasha Barab, James MaKinster, Julie Moore and Donald Cunningham (2001). The members of this free online community are preservice and inservice secondary math and science teachers in Indiana as well as university faculty members. The basis for the ILF is meaningful sustained professional development that follows a community of practice approach, and encourages, “teachers working together to share, improve, reflect, and create inquiry-based, learner-centered classrooms” (Moore & Barab, 2002, p. 45). Through the audio and video technologies supported by the Internet, teachers post video clips of their own teaching for others to review, reflect upon, critique, and offer suggestions. Working within the same state guidelines, teachers in various parts of Indiana are able to learn from the practice of others without having to be physically present in a particular school at a designated time. Though it may be better to have observations regularly conducted in-person by another teacher in the same subject area, this is often not a reality in public schooling. Thus, this use of the Internet promotes
interaction among professionals in ways that are difficult without the use of the technology.

These aspects of the Internet seem obvious and some may not view them as a compelling reason for the success of online communities. When considering the demands on professional educators and the isolation within which many of them work, the Internet offers ways to reach others in similar situations. However, when considering the wide-spread impact of the Internet on the fundamental ways that humans communicate, the ideas of temporal and spatial disconnect are creating changes in social interactions among people.

Relationship to Communication Possibilities

After thinking about Dr. Daniel’s questions regarding this methodology for about a week, the best metaphor I can come up with for the methodology is the idea of raveling a piece of fabric….The raveling idea is applicable because I feel that I am working at the edges of the larger discourse on educational technology and the two edges that I chose to work on are critical thinking with the Internet and online communities of teachers. At the same time that I am investigating particular threads of these modes of thought, I am also following the threads to see where else they lead. By closely examining them and then pursuing where else they lead, I am able to understand not just the current issues, but also the surrounding areas that relate.

Additionally, by raveling the fabric, I am leaving it in a state where it can be readily changed again by another person, or a machine. When a piece of raveled fabric is washed, it may emerge in quite a different state, often the edges are further altered or the entire piece may be destroyed with only threads remaining. These threads could be discarded or reworked into another form. If I represent theory as a piece of fabric and formalized education as a washing machine, this idea of washing a raveled piece of fabric explains how theories can change or possibly break down when used in a school context. Instead of merely discarding the threads, they could be re-used or woven into a new fabric.

(Excerpt from Research Journal June 26, 2004)

When considering these aspects of raveling, they particularly relate to the issue of spatial and temporal separations among members of a community. As I ravel this issue, I am
following the threads into related areas of discourse that impact the original issue. One area that relates is the way the Internet functions as a communication medium, thus impacting the types of socialization that are possible through its use. In describing the concept of communication through the Internet, Clay Shirkey (2003) explains the radical departure from previous communication patterns that the Internet has brought. Whereas previous technologies usually supported one pattern of communication, the Internet supports multiple at the same time. Telephones and telegraphs operated on the premise of two-way communication from one location to another location. Radio, television, film, newspaper, and the printing press all supported one-direction outbound communication. Shirkey explains,

My definition [of social software] is fairly simple: It’s software that supports group interaction. I also want to emphasize, although that’s a fairly simple definition, how radical that pattern is. The Internet supports lots of communications patterns, principally point-to-point and two-way, one-to many outbound, and many-to many two-way. (¶2)

It is the multiplicity of communication tools that operate outside of time and space that mark the radical departure of the Internet from other communication tools. However, Shirkey points out that widespread social interactions through the Internet are only about ten years old. Therefore, the development of social groups and communities online is still in its early stages and it may be too early to generalize about the emerging themes. Shirkey believes that many of the themes related to the ways people connect online relate to earlier research on human interactions in groups.

Increased Social Interactions Online

*I keep reflecting upon my experiences in the two online communities that I have been the most active in – the museum education group and OrchidWeb, the American Orchid Society’s discussion group. Though the museum education*
group seems to be an online community of practice, the questions and answers are almost never of a personal nature. However, I recall a posting on the OrchidWeb discussion where someone indicated that she felt like she knew people, but did not know much about them beyond their interest in orchids. Thus began several days of biographies of the community members. Some were guarded in the details they revealed about themselves, while others shared personal details. One man shared his battle with cancer. For me, this participation changed the tenor of the group and gave me an insight into the lives of the people beyond their interest in bromeliads. The sharing of personal information on the museum ed list is primarily about successful and unsuccessful experiences related to work.

These are both communities of practice, however the socialization in the two groups is markedly different. Perhaps this is because the OrchidWeb members are mostly hobbyists and the museum ed members are professionals discussing their work practices. (Excerpt from Research Journal, July 4, 2004)

Not all research mentions the positive benefits of social interactions online. In a widely cited study, Robert Kraut (1998) found that individuals reported a correlation between feelings of isolation and time spent using the Internet. He indicates that the findings were unexpected because many people use the Internet to communicate with family and friends as well as to meet new people. Among the participants in his two-year study, as Internet usage increased, social activity (off-line) and happiness decreased while depression and loneliness increased. In a more recent study (2001), Kraut found different results; this time the users of the Internet had different experiences that seemed to relate to their tendencies toward introversion and extroversion. The Internet users who were introverts in the rest of their lives reported feelings of depression, while the Internet users who were extroverts used the technology to meet people, find out about events in their area, and promote their social life. Thus, they reported quite positive experiences with the Internet.
A recent study by the Pew Internet and the American Life project (2001) found results that seem to contradict Kraut’s early study. Their results indicate that people use the Internet to deepen their connections to their local community and the opportunities available to them there. This report cites the term “glocalization,” developed by Barry Wellman, to refer to the phenomenon that the Internet both increases the opportunities to connect to people in distant places while also connecting them to people and opportunities in their own communities.

Implications for Museum Web Sites

As I have described, there are numerous online communities that range from sporadic interactions through listservs to intense communication between and among members utilizing audio, video, text, images, etc. These communication tools offer many possibilities for museums to develop online communities of teachers in their local area and throughout the world. Online communities take many different forms, what I discuss is premised on the notion of building an online community of practice involving museum educators and teachers. Certainly, there are possibilities to build many different types of communities around a museum collection. I mention several briefly, but I focus the discussion on the notion of a community of practice.

The location of the museum educators and teachers on the periphery and in other roles in the community can be viewed multiple ways. For instance, one can view the museum educators as the full participants in the community with the teachers at the periphery or the teachers as the full participants and the museum educators at the periphery. Perhaps the teachers and museum educators with the most experience are the full participants in the community and those new to both professions are at the periphery.
Possibly, the museum educators who have experience working closely with teachers and the teachers who work closely with museum educators are the full participants and the museum educators and teachers who have not previously collaborated are at the periphery. This points out the idea that there are many formats the community of practice could take. However, I would caution against the example with either teachers or museum educators exclusively as the full participants because this may simply serve to reinforce some pre-conceived notions and power imbalances between the two groups of professionals (Liu, 1999, 2000; Newsom & Silver, 1975).

Existing Practices with Online Museum Communities

There are not many examples in the literature of thriving online communities based around museum collections and numerous authors point out the lack of research and the lack of these communities (Bowen, Houghton, & Bernier, 2003; Dowling, 2000; Durbin, 2004; Hazen, 2004). Sherwood Dowling’s (2000) article discusses various attempts at developing online communities through the National Museum of American Art (NMAA), specifically around teacher resources. One example he offers is the del Corazón! webzine, a bilingual community for teachers, students, and museum educators. Sections of the webzine include a discussion area, lesson plans, images of students and their work, video demonstrations of artmaking techniques, games, and a way for visitors to upload their own images. Dowling notes the restrictive policies of the Smithsonian with regard to allowing users to contribute content to the online community, thus users were not allowed to upload directly to the “live” web site. Museum personnel first vetted content submitted before posting it. Though this webzine is more interactive and is closer to a community than previously possible through the NMAA site, Dowling notes
that it is still representative of Figallo’s notion of an online community web site as a shrine.

The issue of user-created content is also central to the possibilities offered by Gail Durbin (2004) from the Victoria & Albert Museum (V&A). She provides several examples of how the V&A incorporates ideas from their visitors, submitted both online and in person, to their web sites. During one exhibit, visitors left comments about defining moments in their lives; museum personnel collected more than 50,000 comment cards and posted some of them online. For a different exhibition on designer Ossie Clark, the museum solicited email descriptions from the public about their experiences with the designer’s clothes. Durbin mentions that some museum personnel expressed fear about a potential deluge of email due to the fact that the V&A web site gets 3 million visits per year. This fear was unfounded because the museum received about 25 emails and no images. Museum personnel included numerous examples of these stories on their web site for the exhibit. Durbin notes, “It does not matter that contributions were few. Their quality was excellent and they bring vividly to life the excitement and emotion of wearing these clothes in a way simple museum labels could never have done” (2004, p. 2). To me, the inclusion of the voices of the community on the web site is an important first step toward developing an online community. Another example Durbin offers is in regard to the museum’s upcoming exhibition of fashion designer Vivienne Westwood. The V&A plans to launch a web site in advance of the exhibit and solicit questions through the web site for both Westwood and the curator to answer. They will select specific questions for Westwood and the curator to answer and will post them in the second phase of the web site. Durbin concludes her article with the following insights
When looking at museum Web sites, I find there is disappointingly little in the way of contributions from visitors. What is there is largely in the form of text with little variety of approach. It seems a pity that when museums are becoming themselves much more interactive, we are not using our Web sites to draw visitors into making real contributions. We are surrounded on the Web by commercial sites that have learnt the value of inviting this sort of participation. We should be leading, not following. (2004, p.4)

A tentative plan she describes for an upcoming exhibit may allow people to upload images, text, video, and audio to a moderated museum site. Though the examples Durbin provides are not necessarily indicative of a fully-formed community, they reflect an awareness of the importance of involving members of the public in the creation of content for a web site. Like Dowling, she notes the fear among museum personnel of allowing users to post content to a museum web site.

*Structure of the Online Community of Practice*

One aspect of the WELL that many note as a success is the ability of the members to follow the parts of the discussion that interest them (Figallo, 1998; Hafner, 2001; Rheingold, 1993). Because the community is so large, it is organized in sections devoted to certain topics. Thus, the members enter the areas of their choosing, ignoring the other areas and following their personal interests. This model would be useful for a museum seeking to build a large online community of teachers. As the community begins, it is likely unnecessary, but as the community grows, organizing it around certain topics of interest to the members would allow them to participate in the ways that work best for their individual needs and interests.

One specific area that may help museums address their relationship to school curriculum is through educational standards. Because the educational system in the United States uses standards at a number of levels (local, state, and national) it is
advantageous for the developers of online museum communities to be aware of and familiar with the guidelines that teachers must follow in their teaching. Depending upon the status of the guidelines in the region, organizing a discussion around them may be advantageous to the participants in the community and show them how the museum experiences, both in person and online, relate to their standards. Additionally, organizing an online community around themes represented in the museum collection would allow teachers to find connections themselves between the museum objects and their curriculum.

Wiki

WikiWikiWeb (Wiki)

Developed in 1995 by Ward Cunningham, Wiki is a technology that is part of the open source movement. The name “Wiki-wiki” comes from an “alliterative substitute for quick,” thereby naming these pages quick web (Cunningham, 2004). Wiki pages are web pages that can be edited by anyone who chooses to visit the site, or if the site is password protected, anyone who has the access can edit the content. The concept of Wiki is fundamentally different from traditional web sites in which someone creates the content and it is posted for others to view. Though they may email suggestions or comments to the web master, if an email is provided, visitors to the site may not actually contribute content or change existing content. Thus one person, or a group of people, creates the content and all the visitors to the site are consumers of the content. Through Wiki, anyone who visits the site may add to, edit, or delete the existing content.

There are numerous implications of the Wiki technology for building online communities of practice among teachers and museum educators. Instead of individuals posting questions to which others respond, through this technology, the online
community can collectively develop understandings that are continually are in a state of change. Depending upon the number of people editing the content at any time, this can be both a dynamic way to build a community understanding as well as an extremely frustrating effort with no one in charge. Wiki usually runs with a backup copy to guard against accidental deletions and many users often save pages to preserve the content at various times. On his Wiki web site, Ward Cunningham notes that inappropriate posts and content are usually removed almost immediately by other users, thus only those online at that time would be aware of them. Though I searched both Education Abstracts and ERIC, I was not able to locate any research articles documenting current educational uses of Wiki. An online community of museum educators and teachers might be an ideal way to begin educational experimentation with this technology. Additionally, using a technology, such as Wiki, may help break down some of the traditional power differential issues that have historically impacted museum educator – teacher relationships (Liu, 1999, 2000).

Purpose of Online Community

Susan Hazen (2004) writes about potential uses of the Internet to develop online communities around museum resources. She writes about the social interactions that are possible online and notes, “Unlike the professionally structured intranets, these Web-based activities perhaps fall into the same category as a hobby – an activity you are prepared to invest in because it fulfils a social or cultural need, not because you have to” (p. 7). She continues to explain her perspectives about the possibilities for the Internet in the following
The invisible crossing of national or cultural borders of virtual communities opens up new opportunities for memory institutions. Through Web-based discussions around the (digital) artefact, i.e. photographs, audio files or short movies and narratives, new threads are woven around the collections giving voice to new interpretations of the objects. (2004, p.7)

Hazen describes how the community can come together online around a certain reading of an object and she cites Stanley Fish’s idea of an interpretive community. She argues that a virtual community can change the traditional roles of museums and visitors with visitors becoming empowered through sharing, and potentially accepting, the interpretations of others, not merely those of museum professionals. Additionally, a virtual community has the unique opportunity to collect digital artifacts as well as stories and interpretations from members of the community and visitors to the web site. In this sense, a virtual community can serve as a virtual museum that collects stories and interpretations of the community members.

Conclusions

Since the earliest days of online communities, they have changed significantly from small gatherings of similar people to world-wide networks that can connect countless people around topics of interest. There are many emerging trends involving online communities that work toward developing different types of communities. It is important to note the role of businesses and commercial entities in the creation of contemporary online educational communities. Numerous authors note the ease with which the term “online community” is used to describe a variety of different interactions involving the Internet and social groups. Although a full review is beyond the scope of this dissertation, I explored the concepts of situated learning, communities of practice, and networks of practice. Power is at work within all communities and may have
different implications in online communities as compared to face-to-face communities. Benefits of participating in an online community include the ability to interact with others outside of the constraints of space and time as well as the opportunity for increased social interactions. Numerous possibilities exist for building online communities around museum objects and museum web sites. Some museums have tried different methods of involving their audience in developing content for the web site; usually this takes the form of submitting ideas through email. Another alternative, which may enable teachers and museum educators to create educational content together, is through the Wiki technology. Certainly in its experimental stage, this technology allows for the collaborative development of the content of a web page. Online communities may exist for many reasons including the development of collective knowledge relating to artworks and objects in a museum collection. Through developing online communities around their collections, museums have the potential to involve teachers, museum educators, and other visitors in building collective understandings of the objects and of educational goals.
CHAPTER 6

CONCLUSIONS

The purpose of this research was to develop a deeper understanding of the literature related to two topics involving using the Internet in K-12 classrooms. Through a meta-analysis of the literature on developing critical thinking skills and building online communities of teachers, I was able to create suggestions for museum educators to implement when developing educational museum web sites. I discuss these suggestions in detail at the end of chapters 4 and 5 and reiterate them briefly at the end of this chapter. This topic is quite important for the field of museum education because it sits at the crux of two intersecting trends: developing online museum resources and the increasing use of the Internet in public schools.

Overview of the Project

This dissertation is a meta-analysis of published research reports and anecdotal accounts of Internet usage in public school classrooms around two specific topics: using the Internet to build students’ critical thinking skills and using the Internet to develop online communities of teachers. I selected these areas because they both relate to common claims about the educational benefits of the Internet as well as potential uses of the Internet to build connections between schools and museums. I utilized concepts from four different methodologies in this research, literature review, content analysis, discourse analysis, and meta-analysis. I named the combination of these Critical Content
Meta-Analysis and worked with this as my methodology. From this research, I
developed suggestions for museum educators to utilize when creating educational
museum web sites intended for use by students or teachers.

During the research and dissertation writing processes, my views on using the
Internet in public school classrooms changed quite a bit. Not only did my methodology
evolve during the research process, but my understanding of critical thinking and online
communities also shifted. At the beginning, I believed that my research would lead to
some substantial findings through a meta-analysis of the literature on these topics.
Though my findings are significant, they also point out some serious gaps in the literature
and other areas of research that need to be addressed. Additionally, the research and
knowledge bases around the topics of using the Internet for developing critical thinking
skills and building online communities are not sufficiently developed. As museums are
increasingly pushed to strengthen their educational offerings and as teachers are
encouraged to utilize the Internet, there needs to be an overlap in the educational research
involving these opportunities for learning. Included throughout the dissertation are
entries from my research journal that reflect my changing thoughts on the methodology
and my views on the topic.

Significance of this Research

On January 29, 2004, a member of the online museum education community
posed the following questions to the group:

How do teachers use the Internet? How do teachers use your museum's
website? Do you have any feedback from teachers who use your website?

I am looking for any research and/or evaluation you may know of in teacher
use of websites. We are looking to reorganize our teacher resources on our
website, but need more information to do so.

Her postings indicate a disconnect between the realm of teachers working in public schools and museum educators. This is certainly not a new statement as many others noted the lack of communication, power imbalance, and different goals among teachers and museum educators (Eisner & Dobbs, 1986; Liu, 1999; Liu, 2000; Newsom & Silver, 1978; Stone, 1992). However, what is new is the medium of the Internet and its potential uses in schools and museums. Often, museum educators are in the position of creating resources for use in public schools, but they many not be aware of the needs of teachers. Because museums are increasingly creating programs for teachers and school students, it is crucial for museum educators to know about the realities of classroom teaching and the experiences of students and teachers.

Another posting to the museum education community indicated that the online resources created specifically for teachers were not being used as much as the museum had hoped. The posting does not indicate if the museum educators who created the materials consulted teachers or the local or state curriculum framework before developing the web site. Scott Sayre and Kris Wetterlund (2002) note the importance of teachers having access to searchable databases of online museum content to help them select the relevant topics for their lessons. Teachers preferred to use museum web sites to research on their own for lesson plans or to have students work individually or in groups in a computer lab to explore particular parts of web sites. Because museum educators do not have the time to read and organize the findings from educational research, university
researchers should help build this theoretical and research-oriented bridge between education and museum education.

This research begins to fill the gap noted in the postings to the museum education online community. By investigating two specific areas of Internet usage, developing critical thinking skills and building online communities, I have begun to build a knowledge base for museum educators to refer to when designing educational web sites. Additionally, my work establishes suggestions for museum educators based upon theories from education that are different from the theories underlying traditional museum practice.

Critical Thinking

The importance of developing critical thinking skills in K-12 school students is cited throughout educational literature. Using the Internet to improve students’ critical thinking abilities is one of the newest developments in the critical thinking movement that first emerged in the 1950s. The major findings within the body of research on teaching critical thinking through using the Internet include the following. There is not a widely recognized understanding of what critical thinking is. In fact, the term “critical thinking” is used so frequently and often without sufficient, or any, descriptors that it is often up to the reader to infer from the context what types of thinking the author deems to be sufficiently critical. Some authors use the terms “higher-order thinking” or “thinking for understanding” almost interchangeable with “critical thinking.” Additionally, the majority of the literature operates on the premise that teaching students to be skeptical of the information they locate online is critical thinking. Numerous authors encourage students to check multiple sources, and if they are in concert, to believe the information
contained within these sites. The majority of the articles does not address the reasons for
the existence of divergent information or validate the experiences of “others” whose
stories may conflict with the dominant cultural narratives. The authors who write about
teaching critical thinking skills with the Internet rarely identify their biases and do not
explore negative effects of these uses of the Internet. Other areas of silence include the
digital divide and how students could create content for the Internet, rather than merely
consume it. Two emerging uses of the Internet to promote critical thinking are
WebQuests and blogs. Working with WebQuests and blogs promotes thinking that is
more critical than simply deciding if the information on a web site is believable. Through
investigating open-ended problems, critiques of other information on the Internet, and
working with conflicting and contradictory information, students can learn about their
own thinking while they are thinking.

Implications for Museum Web Sites

To translate these findings into suggestions for museum educators to utilize when
planning educational web sites, I developed numerous ideas. Online activities should
focus around objects or ideas of controversy and should include multiple perspectives on
the object or concept. Instead of merely reinforcing dominant cultural narratives, web
sites can help students easily access information about alternate ideas and different ways
of knowing. Through hyper-connective thinking, students learn about the relationships
between the underlying ideas and concepts. Additionally, students should have a means
to record their thought process as they are engaged with using the Internet. Another way
to promote critical thinking is through the concept of ReCognizing artworks in which
students not only address the history of the object, but how the meaning(s) change over
time, how the object may be viewed today, and how the context can affect the multiple possible meanings of the artwork.

Building Online Communities of Teachers

Similar to the literature on critical thinking, there is no widespread agreement among the authors who write about communities and online communities about the use of these terms. From their development in the 1960s, online communities now thrive in many different forms and utilize a variety of communication tools. As these communities have expanded and are increasingly prevalent, the descriptions offered by authors have become increasingly complex over time and include caveats and qualifiers. The concept of online communities has grown to the point where businesses thrive creating the software that facilitates the virtual interactions at the heart of online communities. Not only do businesses promote online communities, but they are also quite active in promoting online educational communities. As I worked through the analysis, I explored other related topics including situated learning, communities of practice, and networks of practice. Throughout the meta-analysis, I continually investigated issues of power at work in the online communities. One important aspect of power is embedded in who has access to change the technological infrastructure that is the base of the online community. Additionally related to power is the issue of why individuals participate in the community; do they perceive a need that can be met through their participation or are they required to participate? Frequently cited as a benefit of participation in an online community is the fact that the communication takes place outside of the limitations of space and time. Though many people report greater feelings of connections to a social network through the Internet, other research presents differing findings. One theory
posits that the development of Internet communications and online communities is still ongoing, thus it is far too early to make generalizations and perhaps individuals will experience different phenomena through their personal experiences online.

**Implications for Museum Web Sites**

The most relevant example from this research for developing online communities of museum educators and teachers is the notion of an online community of practice. This could be structured as one section of a larger educational museum web site with several different areas. Allowing participants to choose and easily access the areas of the discussion that are relevant for them is essential. It is important to have a mix of teachers and museum educators as peripheral participants and as full participants. Additionally, instead of having the policies related to who can post to the community dominated by institutional fear of inappropriate content, it is important to allow the community members access to post information and to allow the community as a group to censure any inappropriate content.

The content of the discussion ought to revolve around concepts of interest to the participants and not necessarily be dictated by a moderator. Allowing community members the option to create the content and direct the future of the community is of paramount importance. Also, community members need to have a variety of different methods of sharing information. This may take the form of an online discussion supported with a space to share images, audio, video, or text files. No matter the format, ensuring a way to allow new users easy access to begin their legitimate peripheral participation is essential. Building collecting knowledge online through Wiki or
collecting personal narratives online may benefit the community members in ways that are difficult, or impossible, without the use of the Internet.

Limitations of this Study

As with all studies, many factors limited my ability to understand the implications of using the Internet in public schools to build critical thinking skills in students and to develop online communities of teachers and museum educators. This study is based upon previously published research and is, therefore, inherently limited to reflect uses of the Internet that are available in published formats. In chapter 1, I noted the bias of published reports to show positive results, this may have influenced my findings significantly. This potential could be amplified because the results of this research build on the results of previous research. As I am an English speaker, I was only able to analyze research reports in English. Thus, the vast majority of the literature I analyzed is reflective of situations in North America and Western Europe. Certainly, there are other uses of the Internet that take place in schools and museums throughout the world, but they are not reflected in this research.

In previous chapters, I discuss some of the complexities with the use of the terms “critical thinking,” “higher-order thinking,” and “thinking for understanding.” Other terminology, with nuanced meanings relevant to this study, includes “community,” “online community,” “virtual community,” “community of learners,” and many others. Because library database systems are organized with keyword searches, the terms I used affected the articles I was able to locate, and thus analyze. The terms I used when searching are explained in chapters 4 and 5.
As the only researcher involved in this process, I conducted all aspects of the meta-analysis of the literature. My biases, explained in detail in chapter 3 and mentioned throughout, obviously impacted the results of this research as well as the lenses through which I continually viewed the data. To provide the reader with additional insights into my biases, I include excerpts from my research journal throughout the dissertation, and especially in the data analysis sections.

Additionally, I focused the meta-analysis on literature that deals with school settings. As Lave and Wenger (1991) explain, there is a great deal to know about learning that takes places outside of school settings. Perhaps there are many compelling uses of the Internet for developing critical thinking skills and building communities that I did not explore because they are not addressed in the literature focused on education.

Suggestions for Future Study

From the results of this study, it is obvious that more research needs to be conducted on the effects of using the Internet in public school classrooms to build critical thinking skills and to develop online communities of teachers. However, before beginning research studies, it is advantageous for researchers to explore and explain the implications of the terminology they choose to use. Careful explorations of the terms “critical thinking” and “online community” will allow researchers and readers to understand the types of thinking and community that the research projects explore. Also related to this, a detailed exploration of different types of critical thinking and online communities could offer multiple perspectives and greater understanding of the topics.

Close collaborations between university professors, public school teachers, and preservice teachers may provide an excellent way to learn more about the ways
individuals engaged in teaching move from legitimate peripheral participation to full participation in online communities of practice. Additionally, studies should focus on existing successful online educational communities, for instance Museum Ed Net. Because this community developed out of an expressed need among museum educators to connect with their peers and because of its long-sustained communication and relevant discussion of issues, it is a notable example of how an online community of practice can function.

Numerous museum education programs now turn to groups of teachers in their local area for advice, suggestions, or to test ideas on them. These groups, often called Teacher Advisory Boards, consist of individuals engaged in similar practice who profess a commitment to their teaching as well as to museum resources. Their dedication to taking students on field trips and to participating in events to improve educational resources in museum is impressive. Studying a group of these dedicated teachers who choose to use their time for the benefit of other educators would yield important insights into highly motivated teachers. The implications of this research would be useful for preservice teacher preparation programs as well as museum educators and may allow some insight into how institutes of higher education and museums can encourage the continued development of professional educators.

A longitudinal research project that could grow out of this research would be to work with a preservice teacher cohort where use of an online community is not merely a requirement, but is a way to meet their needs. Following their use of the online community as they move from university coursework, to pre-student teaching, to student teaching, and beyond to their professional career, could yield important insights into
developing lasting community bonds. In this case, it would be crucial to find ways to make the community relevant to the participants and not merely function for the purpose of a research study.

Another research implication from this study is to closely investigate the content and structure of education museum web sites developed for school audiences. In addition to understanding what common content is, it would be valuable to learn how teachers use the specific resources within their classrooms. This research could offer the developers of content on museum web sites suggestions of actual implementation practices. Although some studies of this type exist, they tend to look broadly across a wide range of museums and teachers. Studying a small group of teachers who use specific museum web sites on a regular basis would provide a different type of understanding about the importance of museum education web sites.

As Wiki is a relatively new technology that has not been widely investigated by researchers for educational implications, studying a group of teachers and museum educators who use this technology to collaboratively develop ideas will yield information about a potential use of the Internet. Utilizing this technology may allow close collaboration and the development of curriculum to meet both the goals of teachers and museum educators. Conducting a study that includes both interview with users as well as a textual analysis of the resulting documents would offer insights into the human experiences as well as the texts that were developed.

A final area related to this study that is worthy of significant further research is the issue of identity as related to an online community of practice or a network of practice of educators. Though much is written about identity and group/community identity, I
was unable to locate research specific to the development of identities of art teachers through their use of an online community. This may lead art education, as a field, to understand how practicing teachers understand themselves and their use of an online community.

Closing Thoughts

Though I have a background in qualitative research, my initial thoughts were to work through this process in a clear direction. However, during the process of conducting this research, I became increasingly aware of my belief in the importance of critical pedagogy. The findings I present in this dissertation relate to contemporary notions of critical thinking and to critical pedagogy. Through learning more about and understanding the differing motivations of people when creating objects, curating exhibits, or posting information online, students may become aware of the reasons for the existence of conflicting ideas of truth. I strongly believe that in order to change society for the better, education must engage students in questioning societal structures and how the power system reinforces the power of a few while subjugating many. As I worked through this dissertation research, I came to see more possibilities for using the Internet to promote critical pedagogy and to use it as a tool for social change.

The emerging findings of the meta-analysis affected both the methodology and the direction of this research as I worked on the project. I was surprised by how much the process ended up following the direction of the early results. Now, as the research concludes, I believe that following the emerging areas of the research strengthened both the theoretical basis of this research as well as the suggestions that I developed for museum educators to implement in museum web sites. To me, both the process and the
product of this research are quite important and have implications beyond this study.

When researchers explore and share their personal research process, it enables the reader to understand more of the background of the findings and gives the reader another tool to see if the findings are transferable to her/his unique situation.
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