MIDDLE SCHOOL STUDENTS IN VIRTUAL LEARNING ENVIRONMENTS

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This ethnographic study examined middle school students engaged in a virtual learning environment used in concert with face-to-face instruction in order to complete a collaborative research project. Thirty-eight students from three eighth grade classes participated in this study where data were collected through observation of student work within the virtual learning environment, an online survey, and focus group sessions with students involved in the project.

Results indicated students found the virtual learning environment to be valuable as a platform to complete a collaborative research assignment because of portability, ease of use, and organization. Embedded resources within the environment were helpful because of the convenience. Other people, including peers and teachers, were the preferred source of help when problems navigating the environment or finding information arose. Students communicated within the virtual learning environment as a social outlet, a way to check in, and a means to offer content related comments.

Ideally the study’s findings will give insight into student experiences in a virtual learning environment in order to help educators design more effective learning experiences and incorporate useful supports within such environments.
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CHAPTER I
INTRODUCTION

Background of Study

As technology continues to advance, educators are increasingly incorporating tools into instruction that utilize the Internet to meet educational goals. The digital age is fostering major developments and shifts in educational opportunities for students, including the explosion of online learning. Online learning, the use of the Internet to facilitate education, has taken a variety of forms as access to information and communication technology has continued to develop. From entirely virtual schools to distance education classes to blended learning experiences to using the web as a way to enhance classroom instruction, contemporary students have a range of exposure to online learning experiences. To some extent the possibilities made available through technological advances are helping drive the changes. As projects and learning opportunities unfold, questions arise about how the student support infrastructure adapts to these changes and how tools should be utilized to best meet the needs of students. One such arena is library and information services. As virtual learning environments continue to evolve and develop, there is a need to examine the use of such environments in order to offer library and information services that are responsive to the needs of users engaged in online learning.

This study examines middle school students using a virtual learning environment while completing a curricular assignment, exploring the information seeking and communication behavior of these students within the environment. For the purposes of this research, the virtual learning environment takes the form of a wiki. A wiki is a website that allows users to create and edit content without requiring any knowledge of coding language. Anyone part of the community of users of a wiki can edit the work (Farkas, 2005). The intent of the research was to examine
how the participating students used information to help complete a curricular assignment within the wiki, the helps utilized for research and the completion of the project, and the ways students utilized communication tools within the virtual learning environment.

Lessons from the Field

As a practitioner in a brick-and-mortar school library, I have seen that content is increasingly migrating online, and educators are expecting students to visit the online classroom resources in order to complete coursework. Frequently teachers are striving to extend their classrooms by utilizing online tools to enhance and expand instruction. Many school districts are incorporating content managements systems with classroom courses and frequently using tools such as blogs, wikis, and web pages. Students are being asked to use virtual learning environments to complete coursework, work collaboratively, and complete research projects. It was this phenomenon that I wished to study, specifically examining students’ information seeking behavior in these online classroom environments and exploring if providing supports for information is perceived as helpful and utilized by students in their actual practice in these learning environments.

Many school libraries have created a web presence in order to extend service beyond the physical space and the school day. At the school where I am a practitioner, the virtual library takes the form of the school library web site as an extension of the physical space offering anytime, anywhere access to resources and services. When students are faced with the task of doing homework, it usually occurs outside of the school day during hours when the physical library is closed and unavailable. Having a web presence for the library allows students access to resources at anytime and anyplace. However, finding the best place to connect students with information and library services in the online environment that matches student information
behavior is necessary to promote use. The question of reaching students most effectively and determining the perception of the helpfulness of services to students is important in knowing where to invest time, resources, and the expansion of services.

Having experimented with bringing emerging technologies with embedded social communication tools in projects with content-area teachers, I have observed the ways students function within virtual learning environments. Wikis have seemed to be particularly flexible platforms for students to gain access to content, create their own online spaces, and work with other students. However, I wanted accrue more information from students about their experiences working on a project within such an environment as a way to give me insight into building more effective and engaging learning experiences and offering library support in the future.

Defining Online Learning and Virtual Learning Environments

Distance learning is a formal educational experience where students and instructors are separated by time and/or place. Distance education has the characteristics of being institution-based, using interactive telecommunications and connecting learners, resources, and instructors regardless of physical location (Cavanaugh, 2001; Schlosser & Simonson, 2002). As technology has advanced, many of the innovations being incorporated into distance learning are also being blended or integrated into more traditional learning designs.

Online learning is often seen as a subset of distance education. It is a term used commonly and interchangeably with a number of other terms such as elearning and virtual learning. Online learning is the “use of the Internet to access learning materials; to interact with the content, instructor, and other learners; and to obtain support during the learning process, in order to acquire knowledge, to construct personal meaning, and to grow from the learning
experience” (Ally, 2008, p.17). For the purpose of this research Ally’s conception of online learning is used.

This research is focused on exploring behavior where students are asked to use a web-based environment as a vehicle for their work and learning. There are multiple terms used to describe such environments; the two most prevalent are online learning environment and virtual learning environment. Dringus and Terrell (1999) define an online learning environment (OLE) as:

a distinct, pedagogically meaningful and comprehensive online learning environment by which learners and faculty can participate in the learning and instructional process at anytime and any place. OLEs manifest a variety of technical tools that support instructional delivery and communication in online formats. In addition, dynamic delivery structures are embedded to enhance the instructional, learning, and communication processes taking place. (p. 58)

In order to avoid confusion with the notion that online learning is an exclusively web-based learning experience and as this research uses the web environment to enhance and extend face-to-face learning, the term virtual learning environment is used within this paper. Virtual learning environment is also the terminology that is often used within the body of international research and practice.

The virtual learning environment is the online space that is constructed for learning to occur. Virtual learning environments have been defined as “computer-based environments that are relatively open systems, allowing interactions and knowledge sharing with other participants and instructors and providing access to a wide range of resources” (Wilson, 1996, p. 8). Dillenbourg, Schneider, and Synteta (2002) designate the following characteristics of a virtual learning environment to define the make-up of such an environment:

• A virtual learning environment is a designed information space
• A virtual learning environment is a social space: educational interactions occur in the environment, turning spaces into places
• The virtual space is explicitly represented: the representation of this information/social space can vary from text to 3D immersive worlds
• Students are not only active, but also actors: they co-construct the virtual space
• Virtual learning environments are not restricted to distance education: they also enrich classroom activities
• Virtual learning environments integrate heterogeneous technologies and multiple pedagogical approaches
• Most virtual environments overlap with physical environments (p. 3-4)

Development and Learning

Middle school students are at a unique stage in their cognitive and social development. They are leaving childhood and entering adolescence. Youth, particularly during the middle school years, go through extraordinary changes physically, cognitively, and emotionally. According to Piaget’s stages of cognitive development, at the onset of adolescence through adulthood people are in the formal operational stage. This stage of development posits that individuals are able to think in the abstract and have the ability to solve problems using hypothetical thinking and reasoning (Piaget, 1952). Middle school students are able to engage in metacognitive thinking, reflecting on how they think and learn. In addition to individual cognitive development, social interactions are critical for early adolescents. According to Erikson (1963), one of the central struggles of adolescence is the experimentation with and the establishment of identity. Interpersonal relationships and social groups are an important part of this process as well.
Cooperative learning is a method frequently used in education based on social constructivism theory with the belief that students can gain knowledge and build skills from working together. Vygotsky (1978) offers the idea that learning has social and cultural components. The zone of proximal development is a key part of Vygotsky’s theory which supposes that in this range between what a person can do and the individual’s potential is the area where a great deal of learning can take place. When in this zone, tasks often require learners to have the assistance of peers or adults in order to achieve. The virtual learning environment offers venues for students to express themselves and establish their virtual identities while working collaboratively with other students in order to complete a learning task.

Virtual Libraries

Several metatrends have been identified in the area of technology likely to impact teaching and learning based on the findings of The Horizon Report, an annual report released by the New Media Consortium and the EDUCAUSE Learning Initiative, from the last five years. The three identified trends are the collective sharing and generation of knowledge, connecting people through the network, and moving the computer into three dimensions (New Media Consortium, 2008). Tools that allow for the ability to socially share and generate content continue to emerge, and the increasing availability of connecting to electronic networks gives flexibility and mobility to access. These trends have implications for libraries attempting to reach and be available for users anytime, anyplace, and in virtual environments.

Library services attempt to cross boundaries for users and find ways of providing service both in a face-to-face environment and in a virtual space. Libraries often cross these boundaries by creating a web presence to provide an online place for users to connect to resources and services, often mirroring or extending what is provided in a physical library. Resources are
available to users around the clock, offering the opportunity for library resources and often library staff to be a constant presence in the information environment. Virtual libraries are constructed for a specific purpose to meet the information needs of a particular community of users (Saracevic, 2000). Traditional school libraries often have virtual library counterparts that provide access to electronic information and extend access to resources beyond the school day. Gunn (2002) asserts that school libraries can and should exist in both a physical and virtual space and that the two different library presences serve a different range of information needs of student users. School virtual libraries often include access to subscription databases, collections of web-based resources, pathfinders, library catalogs, library blogs, information fluency instructional tools, and links to virtual reference services. Doing a content analysis of school library web sites in 1996, 1999, and 2002, Clyde (2004) noted that school library websites were functioning as “electronic information gateways” (p. 166). As Ryder and Wilson (1996) point out, there is a need for librarians within the virtual library in order to provide scaffolding and instruction to users.

Conducting a study on high school students’ use of a virtual library, Fitzgerald and Calloway (2002) found that after students used the virtual library for research on a regular basis, they continued to use it and found it valuable for other projects. They also observed that research experience was limited despite a history of use of the Internet, and that efforts need to be made by librarians to be pro-active in educating users. Active involvement by library media specialists in infusing information fluency instruction in concert with teachers will help make the use of virtual libraries a habit of mind for students.

Gunn (2002) cautions that simply having the virtual library available is not enough to impact learning. “They [virtual libraries] have the ability to transform the relationship between
learners and resources, facilitating both formal and informal learning. With careful design and the support of skilled information professionals, virtual libraries can provide powerful environments for student learning” (sect. 6). Including virtual library use in course design and teacher requirements is important in influencing student interaction with resources. Students need to be supported in using available tools and information sources in order to be successful in their distance education courses as well as become effective 21st century learners.

Much more research on library services for online and distance learners has been done within the academic library serving college and university students. Online learners often have specific needs and expectations of the academic library. Over the course of a year, a series of four interviews with distance education students in a graduate program were conducted. Kazmer (2002) wrote about the findings from the study that were salient to libraries and determined the things distance education students most want from the library are responsiveness, single contact points, training, and support. When distance learners do have information needs that must be met, often the principle of least effort guides the choice of information source. Lui and Yang (2004) surveyed 194 distance education graduate students and found these students had a strong preference for easy and fast information retrieval. Field of study and motivation for using information had high correlation with the choice of information source. In a study conducted by ProQuest about student use of electronic library resources, it was found that although students recognized the value of using library materials and research databases, there were major barriers to success in utilization of these materials. The researchers found that if library instruction was given to the students and students had a chance to work with a librarian, students were more likely to use and benefit from databases. This isn’t the case if students are left to seek out library information of their own accord. The study also found that professor recommendations of
resources had a tremendous influence. The key to moving students beyond an awareness of the quality of library materials to actually utilizing materials is to increase simplicity and positive user experiences (Law, 2008).

Despite the time and effort invested in creating library web sites, there is evidence that generally the use of these sites has decreased over the last several years. According to comparisons between results of OCLC studies conducted in 2005 and 2007, visits to library web sites has decreased by users in the general public in Canada, the UK, and the US with 30% of respondents reporting visiting a library website during a 2005 survey and 20% of respondents reporting visiting a library website during 2007 survey while during this same time period 71% of the people surveyed reporting using an Internet search engine during 2005, while this number rose to 90% in 2007 (OCLC, 2007).

The acceptance of digital libraries by distance education students was studied by Hong, Thong, Wong, and Tam (2001), who determined that the technology acceptance model (TAM) is appropriate to use to understand the intention of nontraditional students’ use of the digital library. If students perceive that the digital library will be useful and easy to use, they are more likely to use the resource. While much is invested in virtual resources and digital libraries, little research has been done to determine the extent of use of these resources by patrons. Hong et al. call for an increased user focus in the area of digital library use by distance education students. Moreover, TAM has proved a robust model for predicting the intent of students to adopt eLearning. Ndubisi (2006) found that perceived usefulness, ease of use, and attitude, the components of TAM, were factors for predicting the intention to adopt eLearning.
Communication and Collaboration

Increasingly, a variety of communication channels are being used in order to connect, communicate, and collaborate across distance. A variety of studies from the Pew Internet and American Life have explored Internet use, mobile phones, and texting among Americans. While 73% of the American adult population reports using Internet or email as of May 2008 (Pew Internet & American Life Survey, 2008), over 90% of 12-17 year olds are online. Email is losing ground among this group as a method of communication, while text messaging is on the rise (Lenhart, Ling, Campbell, & Purcell, 2010). However, many of the modes of communication that students use in their daily lives are off-limits within schools as many schools limit access to cell phones, social networking sites, and email.

Having students work in groups to accomplish academic tasks is a frequently used teaching strategy. Collaborative learning is “an instructional method in which students work in a groups toward a common goal” (Gokhale, 1995, p. 1). Cooperative learning is a subset of collaborative learning. Within cooperative learning, students work on a structured activity in small groups, where individuals have discreet tasks but the whole group is also accountable for a task (Thirteen Ed Online, 2004). Johnson and Johnson (1994) identify the leadership and structure put in place by the teacher as an essential part of successful cooperative learning, requiring management that ensures there are expectations of individual responsibility that are critical for the group to meet its common goal. When virtual learning environments are used, tools to allow for communication within those environments to allow for tasks to be completely any time from anywhere are often incorporated. These tools allow group members to connect and collaborate beyond their face-to-face interactions in the virtual environment.
Research Questions

This research will help fill a gap about the experiences of middle school students engaging in virtual learning environments and their use of information, helps, and communication. This research study examines youth information seeking behavior in a virtual learning environment that is part of the formal educational context. Students were observed while completing an assignment using a course wiki. As students engaged in the process of completing this assignment, data were collected in order to capture student information behavior within the context of authentic learning activities and environment. After the experience, data were collected from students asking them to reflect on their experiences.

The research questions are:

1. How do middle school students describe their experiences using a virtual learning environment for course related work?

2. In what ways do middle school students utilize material resources while participating in a virtual learning environment?

3. In what ways do students utilize human resources while participating in a virtual learning environment?

4. How do middle school students use digital tools for communication and cooperative work when a virtual learning environment is used in concert with face-to-face interaction?

An ethnographic methodology was used in this research, seeking to use observations of student activity and insights from students about their experiences to capture a picture of the students as they used the virtual learning environment during their course work.
Significance of the Research

This research aims to provide additional insight into the information seeking behavior of students engaged in virtual learning environments. As online learning continues to expand and web-based resources and environments are increasing utilized within education, information about student behavior within these environments will provide direction for educators devising such learning experiences in the future. The results of the research will help educators design more supportive learning environments that meet the needs of learners within those environments. Many educational organizations including the International Society for Technology Education (ISTE) are calling for a more meaningful and responsive use of technology in education to address the building of 21st Century Skills within students and argue that technology must be integrated into education. ISTE’s call to action includes the following three expectations for use of technology within the classroom: “Use technology comprehensively to develop proficiency in 21st century skills. Use technology comprehensively to support innovative teaching and learning. Use technology comprehensively to create robust education support systems” (SETDA, 2007, p. 3). Indeed as models of traditional education change, the incorporation of virtual learning environments will continue to grow. This research will provide insight into the student support systems and communication tools that may be of use when designing and adopting such environments.
CHAPTER II
EXPANDING THE LITERATURE FOUNDATION

This literature review includes sections devoted to information seeking behavior, virtual learning environments and online learning, virtual libraries, and communication during cooperative work. Each section helps to position the purpose of the study, which is to examine middle school students’ information seeking behavior in virtual learning environments and the use of material and human resources, including the school library and librarian, which provide assistance, referred to in this work as helps, to students working on cognitive tasks in a virtual learning environment. The section on information behavior examines the practices of youth with a focus on research done with youth and electronic information. The section on virtual learning environments and online learning explores current practice and research involving such environments as well as the experience of users within these learning situations. The section on virtual libraries examines web-based library services. Finally, a section on the social nature of information seeking and electronic communication explores youth behavior particularly in the context of academic and cooperative work.

Information Behavior

Information behavior is complex and driven by a wide range of situations that lead to the need for information. In their review of the literature regarding conceptual frameworks for examining information behavior, Pettigrew, Fidel, and Bruce (2001) define information behavior as the “study of how people need, seek, give, and use information in different contexts, including the workplace and everyday living” (p. 44). This definition implies that the seeking process is a part of the larger construct of information behavior. Wilson (1999) shares this assumption, as is evidenced by his nested model that demonstrates the relationship between information behavior
and information seeking-behavior. The model illustrates his understanding that search behavior is a subset of seeking behavior, which in turn is a subset of the larger concept of information behavior. Wilson goes further to posit that all of this fits into human communication behavior. Searching for and the acquisition of new information can alter the state of an individual’s information behavior. Humans are at some level always open to seeking information to fold into their mental constructs of the world.

The user-centered revolution in information behavior studies began more than twenty-five years ago when an alternative research model emerged to focus on the behavior and processes of the users rather than the system-centered approach that had been the central research model in the field (Dervin & Nilan, 1986; Nahl, 1996). Several factors contributed to the paradigm shift, including the lack of guidance for practitioners from the research and the need for sound theory in the field (Dervin & Nilan, 1986). An increasing awareness of the need to examine the user and create systems that fit user behaviors developed to take the place of the emphasis in looking at how users operated within existing systems. The situational and complex nature of information seeking is taken into account when the emphasis is on the user. This paradigm tends to be constructivist, asserting that through interaction with information people build meaning.

Kuhlthau (2004) looked not only at the process of seeking information, but also at the affective impact of this state in the information search process (ISP) model. Within the ISP, information is actively sought and meaning is constructed. Kuhlthau took a broader look at the stages individuals go through while engaged in the information seeking process. The ISP model includes cognitive, physical, and affective areas of activity and posits that all three areas are part of each stage of the search process that includes initiation, selection, exploration, formulation,
collection, and presentation. The accompanying feelings, thoughts, and actions experienced within each stage are an integrated part of the information search process. During the process people experience uncertainty and, depending on where they are in the process, the uncertainty may cause them distress both cognitively and emotionally. Kuhlthau’s ISP theory was developed and tested in studies on both adults and high school students. Awareness of the intellectual and emotional states that people go through can help in the design of supports for those in the search process.

*Making Choices in Information Behavior*

The amount of information that exists is enormous and growing daily. Users experience overload when dealing with web information (Agosto, 2002). Ultimately, though, people make selections about what information to utilize and, in the face of large quantities of information, individuals adopt strategies and mental processes to cope. With more and more information to sift through and less processing time, simpler and less reliable rules are employed for making information decisions (Case, 2002). Within the context of information-seeking behavior there are decision-making processes at play. The process of making information choices is important in the construction of meaning.

Information seekers are confronted with the decision about what is “good enough.” Harris (2005) coined the good enough principle regarding users’ decisions to settle for information that acceptably meets an information need, although it may fall short of the best information that could be found and utilized. Simon (1979) used the term “satisficing” to describe users attempts to simplify information decisions by creating practical boundaries for themselves. People of all ages rarely take steps to verify web-based information (Flanagin & Metzger, 2000). The information behavior of individuals is guided by the principle of least effort.
(Poole, 1985; Zipf, 1949). People will put the least effort possible in to getting their information results. It is a way to minimize costs of effort, whether perceived or actual, and to work expediently. Poole argues that the principles of least effort and pain avoidance are combined to guide human behavior in information systems. People seek to minimize effort to avoid fatigue and pain in order to avoid discomfort. When making decisions about information, people generally choose what they believe to be good enough without taking much action to verify information found on the web.

**Youth Information Seeking Behavior**

The Information Search Process (ISP) mentioned earlier has had a significant impact on the understanding of youth information seeking behavior. Kuhlthau’s work (1991; 2004) has had a tremendous impact on information literacy instruction and approaches used often in school libraries. Bilal’s (2000; 2001; 2002) frequently cited studies of children’s use of Yahooligans are built using a model which examines the cognitive, physical, and affective processes of seventh graders using an Internet search engine. The language that she uses to frame her investigation mirrors the domains established by Kuhlthau’s earlier work. Looking at research models like the Big 6 (Eisenberg & Berkowitz, 1990), the influence of the ISP model research being applied to practice within schools is apparent.

Kuhlthau's studies all focused on information seeking situations grounded in the physical library. Byron (1999) tested ISP in the context of virtual learning environments, replicating Kuhlthau's time series studies with college students involved in distance learning situations. Byron found that the Information Search Process held up in the virtual environment. Using computers and virtual tools had no impact on the information seeking process for the students involved, the same affective and cognitive stages were experienced.
Youth Information Seeking Behavior in Digital Environments

Youth information behavior studies looking at the use of electronic information and digital environments began to emerge in the 1980s. The trend in the early part of this time window focused on concerns about the effectiveness of youth in using systems and technologies, rather than an effort to deeply examine the information needs of youth (Cool, 2004). More general models of youth information behavior in electronic environments emerged later. This echoes the paradigm shift found in the larger research of the field of information behavior where there was movement from the systems-oriented perspective in research to the emergence of an alternative user-focused research perspective. The goal of the user-centered push being to get a better understanding of the process of seeking information in response to a problem or information need. Bernier (2007) argues that research in youth information seeking behavior has moved from examining what is being learned to how youth are learning in information environments.

The pervasiveness of technology and the Internet has had a significant impact on youth information-seeking behavior. Adolescents demonstrate a strong preference for electronic sources of information. Teen use of the Internet has continued to broaden, as they are online more often and use it for more things from social networking to recreation to research (Lenhart, Madden, & Hitlin, 2005). The frequency of Internet use by teens ages 12-17 continues to rise with 93% reporting being Internet users in 2009, up from 87% in 2004 (Pew Internet & American Life Project Surveys, 2009). High school students turn first to the Internet for research with convenience being the most important factor for information use (Tenopir, 2003). In a study of middle school students using print and electronic sources to find specific information, students reported putting more trust in the multimedia information and believing that information
delivered using video and sound was more reliable than print (Small & Ferreira, 1994). Not only do students prefer the Internet to print, they perceive information found electronically to be more trustworthy.

The Internet is becoming increasingly utilized and viewed by students and their parents as vital to completing school projects. In a survey done in 2000, 71% of students reported using the Internet as the primary source of information for their last major project (Lenhart, Simon, & Graziano, 2001). Adolescents feel they are expert users of the Internet for research (Tenopir, 2003). Research, however, has demonstrated serious questions about the efficacy of this group of users (Bilal, 2000; Fidel et al., 1999; Shenton & Dixon, 2004). Users have access to an incredible amount of information from a large range of sources in a variety of formats via the Internet. Teen users tend to be format agnostic (Abram & Luther, 2004). To adolescents information is information is information regardless of the source be it a journal article, personal website, blog post, or email message. Generally, teen users do not distinguish between formats or sources of information. Valenza (2006) points out that while youth and teens have been heralded as gurus when it comes to using technology, they can benefit from instruction and assistance when it comes to finding and using information online. Despite feelings of ability in searching and using electronic information, students exhibit gaps in their techniques and skill. This is further supported by a study of high school students who, despite actual ability level, felt that they were good users of web-based systems and felt little need to learn new skills or techniques (Fidel et al., 1999). The lack of recognition of the need for skill development by less proficient users has serious ramifications for user education initiatives.

Several studies have tried to catalog and categorize the types of needs teens have that they turn to the Internet to meet. Teens turn to the Internet for course-related activities, current
lifestyles, future plans, relationships, health, and general information (Latrobe & Havener, 1997). Advice, personal information, affective support, empathetic understanding, support for skill development, school-related, consumer information, self-development, and verificational information were on the list of information needs compiled by Shenton and Dixon (2004). There are several overlapping areas in these two lists. It is clear that youth are turning to the Internet to seek information for a wide range of needs important in their lives. Sefton-Green (2004) conducted a literature review about informal learning with technology that found much of youth learning in the areas of information and communication technologies occurs outside of school and argued that a shift is required to better capitalize on the insights gained from this area of research. A new digital divide has been identified between in-school and out-of-school learning, a widening gap between young people’s life outside school and what is allowed within educational systems (Buckingham, 2007).

The majority of information seeking studies regarding youth has been conducted in school contexts. There are considerable information uses in everyday life context. The everyday life information seeking (ELIS) framework was created by Savolainen (1995). Using that context, Agosto and Hughes-Hassell (2006) found that teens identified friends and family as their primary and preferred information sources. Teens had negative views of libraries and books as sources for everyday information, preferring telephone, television, school, and Internet as sources of information. This preference of peers as an information source is prevalent (Latrobe & Havener, 1997; Shenton & Dixon, 2003).

In a meta-analysis of studies of youth information seeking behavior, Dresang (2005a) uses the lens of the Radical Change Theory as a way to examine studies in the area. The Radical Change Theory posits that technology has influenced the way that people know and experience
information seeking in the digital age and is focused on three areas: interactivity, connectivity, and access. The qualities of the digital world and the physical world in terms of information behavior are beginning to merge. Users control the way that they interact with information, which can be nonlinear and nonsequential in the digital environment, taking on a new level of complexity. Connectivity asserts that information seeking is a social activity and can be enriched through community. The issue of access addresses the process of identifying and breaking down barriers to information. Radical change is used to describe information resources as well as information behaviors, particularly in the way that these things are impacted by the digital age.

Dresang (2005b) suggests that it may be time to explore new possibilities for youth information seeking models in the digital environment. Many studies have indicated that the skills of youth in seeking and using information in the digital environment are lacking in some respect (Bilal, 2000; Fidel et al., 1999; Shenton & Dixon, 2004). Dresang identifies two trends she considers worth further exploration. First, the preference youth have demonstrated for browsing while searching (Large, 2004). Second, the greater levels of success youth have experienced when information seeking tasks are self-generated rather than imposed (Bilal, 2002). Dresang argues that perhaps instead of continuing to focus on adult-defined deficiencies of youth information seeking in digital environments, looking at preferred youth behavior may guide researchers to new areas of studying and understanding youth information behavior in the digital environment. This may also help lead to the development of more effective virtual learning environments.

Patterns of Youth Information Seeking

Users tend to stick with the same search strategy and practice regardless of information need. In fact, information habits are developed early. A study of the online behavior of college
students showed that they were unsure about using library and database resources. These students also utilized the information seeking habits that they developed before arriving at college (Jones & Madden, 2002). Information behavior that is established during adolescence may have a long lasting impact on users. This makes the need to study, understand, and impact youth information seeking behavior even more important as early habits may have life-long ramifications.

Seeking behavior can vary depending on the type of query. Queries can be imposed, coming from an external source, or self-generated, developed by an individual internally. Generally there are higher levels of motivation associated with self-imposed queries as they originate from personal interest and information needs. Using the library media center as a location, Gross (1999) conducted a study to quantify number and types of queries by students. It was found that as students progressed through school, the number of self-generated queries dropped and the numbers of imposed queries increased. Imposed queries also are heavily reliant on communication and understanding of the information need between the imposer and the seeker. In each stage of the process, it is possible for the query to be mutated, making communication leading to mutual understanding critical for the query to be resolved in a manner that is satisfying. The process has an affective component as well, as the process is almost certainly impacted by the feelings people, both imposer and seeker, have for each other.

Adolescents tend to rush through online information, regardless of external time factors. This hinders the capability to think critically about the information an individual encounters. Students tend to move rapidly between sites, skimming text and using graphics for clues about content. There is a strong desire on the part of students to find information sufficient to meet the need as quickly and with as little effort possible, using shortcuts, scanning, using few sources,
and using the most-accessible, convenient information first (Shenton & Dixon, 2004). Agosto (2002) tested young people’s web-based decision-making using Simon’s theories of bounded rationality and satisficing and found that some adolescents quit the process before even finding information that would satisfice. Students move quickly with web information, looking only briefly at a screen and seldom reading beyond the first screen (Fidel et al., 1999). With students spending little time with any one set of search results or source of information, it makes it nearly impossible to carefully evaluate any of the information that is encountered or give accuracy and authority any thought at all.

Information Seeking Failure and Lessons for Instruction

Looking at a spectrum of youth from elementary school through high school, Shenton (2007) examined the causes of youth information-seeking failure. Shenton asserts that of concern are psychological factors of youth. Inefficiency often led to frustration about results of searching, which in turn seemed to lead to the premature end of the information seeking regardless if the initial need had gone unmet. Bilal (2000; 2001) in her studies of youth using Yahooligans! saw fairly high failure rates when students were working within the system. A heavy preference for browsing was observed. Bilal went on to look at ways the design of a search site could better support young users by taking their demonstrated behavior into account in the design and features of the online search sites. When students do self-directed searching, they tend to be more successful in finding information to satisfy their need (Bilal, 2002).

Applying competence theory to information seeking situations suggests that the way to raise competence is through instruction and skill building (Gross, 2005). In a review of studies dealing with searching behaviors of school children in electronic environments, Chen (2003) points out problems with mechanics of using the system, developing effective searches, and
rapid navigation that skips an evaluative process. One way to help equip students with the necessary skills for functioning more effectively in an electronic environment is to embed information literacy skills within the curriculum.

Online Learning and Virtual Learning Environments

Most tweens and teens are immersed in technology as it is a large part of their daily lives. Studying the everyday life behavior of teens in virtual environments suggests ways that schools could leverage engagement and communities in such environments for learning. Through studying students involved in the Quest Atlantis virtual environment, Dodge et al. (2008) gained insight into the nature of learning and meaning in the digital age. The researchers found young people engaged in building communities in both the virtual and physical worlds. The ties that young people were able to make with each other and with technology were major parts of their lives. The lessons that the researchers took from the study included thinking about the application of their findings for schools. “Educators should endeavor to better understand and utilize the potential of modern media and technologies for the cultivations of self” (p. 247).

Education is increasingly using virtual options to enhance and extend opportunities for students. During the 2009-2010 school year, over two million pre-k- 12 students in the United States were involved in some form of online schooling (Ambient Insight, 2009). There is a recognition that as the efforts in virtual schooling continue to expand, student support services also need to be in place. However, these supports seem to have lagged behind the development of educational offerings, particularly in the area of online courses and virtual schools that do not have a face-to-face component. The Teacher Education Goes Into Virtual School (TEGIVS) project at Iowa State University includes qualifications for counselors involved in working with virtual school students (Davis & Roblyer, 2005). Library services, almost entirely left out of the
discussion of offerings of online learning as online courses and virtual schools were just beginning, are now starting to be considered in ways they weren’t previously. In its annual report about the virtual high school offerings of the sixteen member states of the Southern Regional Education Board, fourteen had statewide virtual high schools running during the 2006-2007 school year. Seven states reported providing services for students that include information literacy skills and nine states reported there was access to digital library resources for students (Southern Regional Education Board, 2007). This data was from the third year of the survey and was the first year that questions about digital libraries and information literacy were included. Other attempts are being made to quantify library services within virtual schools. In a survey of online high schools, questions were asked about library services, staffing, and access to resources. Unfortunately the response size was extremely small, leaving large questions remaining about the extent of services and resources available. Twelve online schools responded to the survey and of them eight had no library service. Only two responded that the school had a librarian: one half time and one full time (Cavanaugh & Cavanaugh, 2007). At the present time there is certainly an incomplete picture about the extent of library services and support for students engaged in online learning through virtual schools. While less problematic in schools with a face-to-face library program, there is still an issue of how to move services online to support students beyond the school day and in virtual learning environments that supplement and extend traditional instruction.

Creating learning opportunities that utilize technology and harness some of the new capabilities of technological tools is largely dependent on teachers incorporating the practice into their teaching and curriculum. Teacher dispositions have been used to predict technology use in teaching. The amount of technology training, time spent working beyond the contractual
workday, and having an openness to change are the best predictors of technology use within the K-12 classroom (Vannatta & Fordham, 2004). Technology use and the expectation of technology integration into classroom instruction continues to grow. Access and use of digital media in the classrooms is on the rise. In 2009, 76% of K-12 educators surveyed reported using digital media in instruction, up from 69% of respondents in the previous year (Grunwald & PBS, 2009).

Hanafin and Land (1997) define areas of consideration when constructing a technology-enhanced student-centered learning environment: psychological, pedagogical, technological, cultural, and pragmatic. Balancing the areas of consideration in the design of the learning environment can lead to a stronger, more robust learning environment. The researchers assert that technological developments allow for the opportunity for students to take a more active role in constructing learning environments and take more control over their own learning. With careful considerations of design and learning experiences, these environments can support cognition and higher order thinking skills for students.

Clark, Jamison, and Sprague (2005) call for more research on the impact of online learning environments on middle school students. The researchers studied the impact of using an online learning environment on student perceptions about school. The results were mixed, finding certain items – mostly computer related – had a positive effect. The study found a negative effect on liking school and learning new things after the experience in the online learning environment. However, this research took place at the very end of the school year, so it was unclear if some of the changes of attitudes between the pre and the post experience data collection were due to the impact of the final days of school as the timing for the data collection.
Cognitive Work Analysis

Virtual learning environments are online spaces intentionally designed to provide room for and facilitate learning. The idea that the design for computer-based work environments should be developed through examining the behaviors of users is the premise behind cognitive work analysis (CWA). CWA is an approach that takes a broad look at a complex system with an eye on understanding the current situation and also using data about information behavior to improve system design. It is grounded in the theoretical foundations of adaptive control systems and Gibson’s ecological psychology (Pettigrew, Fidel, & Bruce, 2001). Complex systems have a level of interactivity among the components that need to be controlled in order for the system to meet its purpose (Burns & Vicente, 2001). Initially CWA was developed during the 1960s in the area of Cognitive Systems Engineering as a way for system designers to understand the interaction between work domains and users (Fidel & Pejtersen, 2004). As CWA is a framework for looking at system design it is used across many disciplines, including information science. It attempts to link the cognitive, human side of information behavior and the system side, making the two sides more cohesive so that systems are designed to work in a manner that is a better fit with human information behavior.

Because information behavior can be so incredibly complex and there is little chance that someone using the CWA framework could consider all individual information behavior processes in designing a system, CWA is focused on work rather than the individual user. To reflect this perspective of a work-centered approach, people interacting with systems within CWA are considered actors rather than users. Fidel and Pejtersen (2005) describe the domains of actors’ information behavior that need to be understood in order to construct effective systems using the CWA approach, which include the work done by actors, information behavior, context
of the work, and the reasons for the actions of individual workers. CWA takes a broad look at
information behavior situated within a particular work context with a focus on examining tasks,
the work environment, and the attributes of people who perform the work-related tasks.

The most effective way to analyze cognitive work is through the constraints that shape
information behavior. The types of analyses that are considered within CWA include: analysis of
user characteristics, activity analysis, work-domain analysis, and organizational analysis (Center
for Human-Information Interaction, 2004). The work environment effects information behavior,
and the decisions an actor makes happen within the environmental constraints. The personal
characteristics and the social organization impact information behavior. The tasks an actor
undertakes also play an important role. All of these factors must be taken into account when
examining the complex system.

The structure of the framework allows it to work with any theory, model, or method
(Fidel & Pejtersen, 2004). CWA is not a prescriptive set of steps; instead, it is a framework that
allows an in-depth examination of information behavior, context, and systems. It is up to the
researcher to chose what is an appropriate way to study the targeted phenomenon. Each study
using CWA is situation specific. However, looking at multiple studies can inform more general
questions of system design. With the expansion of virtual learning environments, looking at the
behavior of those working within the environment can help inform future design of such
environments.

The types of results that reveal the depth of information needed to examine information
behavior of actors are usually qualitative in nature and result in narratives that don’t translate
well to the engineering type of data used for system design. It is more difficult to move beyond
the descriptive and toward the work of actual design. A study of existing literature shows a
pattern of this as well. More work in the area of CWA has been done in data-collection than in modeling techniques for actual system design. The process of modeling attempts to abstract from the details derived in narrative to move to a description that gives direction to design (Burns & Vicente, 2001). System design requires not just a report of observed behavior but also the ability to foresee behavioral patterns in changing situations (Fidel & Pejtersen, 2004).

Library information systems fall within the realm of the types of systems that can be examined using the CWA framework. The BookHouse project was designed using CWA principles in order to test the framework and explore issues surrounding information retrieval. Rasmussen, Pejtersen, and Goodstein (1994) used the framework in the BookHouse project to design a fiction retrieval system. The end result of the BookHouse project is a representational metaphor that gives structure to the data about books that makes strong mental connections for the actor using the activities of the actor within the physical environment in the digital information system. In terms of library systems this project addressed a fairly narrow scope, but had an amazing level of complexity of data gathered and design considerations. In projects like BookHouse, CWA has proven very effective in creating systems that meet needs of actors. However, there are very few examples of full CWA projects because of the large investments in effort, resources, time, and requirements for system design know-how. Although there are studies in multiple disciplines that use the philosophy and techniques as a way to frame research.

CWA has been used in a study of the web searching of high school students (Fidel et al., 1999). The study examines high school students using the web to complete homework. Fidel argues that information seeking behavior must be incorporated into system design. Field study processes were used to collect data, including observations, think alouds with searching, interviews, and focus groups. Based on observations and conversations with high school students
using the web to complete assignments, the researchers listed system changes that would better match the students’ information behaviors. Actors may have a difficult time articulating what improvements could be made to an existing system to make it more aligned with their own mental processes of information behavior. Fidel documented that searchers made use of landmarks, aids to online navigation, during their searching and that these landmarks could change during the course of a search. She makes the suggestion that there be a way to have the landmark accessible by a single click within the search screen. She goes on to suggest that scaffolding, spelling helps and other knowledge tools, and graphic cues aligned with content would aid actors.

Although they don’t use the language of cognitive work analysis, other researchers have delved into information behavior and, after analyzing the data, have made recommendations for system design issues. Bilal (2000; 2001) makes a range of system design recommendations for Yahooligans! and, more generally, for Internet portals designed for children. After studying the information seeking behavior of seventh graders on a series of tasks, Bilal recommends that the system designers consider the needs of youth information seekers with special mentions of the need for online helps, support and options for error recovery particularly when no results are found, and more thorough examples and instructions on using the features of the environment. Marchionini (1989) examined the mental models of youth while using databases. Along with the results about the youth information behavior, some systems level thinking that included implications for system design were offered, which is very much aligned with the CWA approach. Despite not using the terminology of CWA, several studies of youth information seeking behavior have used findings to attempt to make recommendations for system design.
Physical and Virtual Libraries

Having a library web presence is currently common practice. In an effort to build on Clyde’s (2004) work to describe the state-of-the-art in school library websites, Valenza (2007) attempted to develop a taxonomy for exemplary school library website practice. Where Clyde looked at a range of school library websites chosen from a web-based compilation list of school library websites and found them to be uneven in terms of quality and features, Valenza attempted to identify sites viewed by a Delphi panel as exemplary models from which to examine school library web presence. Universal features were found to be OPACs, databases, search tools, reference, documentation, and contact information. Most of the sites examined also have links to other OPACS, news links, online book discussions, hours, staff information, instructions for remote access, links to reference tools, pathfinders, and mission statements. As a result of her work, Valenza calls for the necessity of teacher-librarians to be prepared to serve learners both face-to-face and online, calling this two pronged approach to library presence and service the ability to meet learners in “hybrid learning environments” (p.128). The study used the framework of the physical program elements of the school library from Information Power (AASL & AECT, 1998) as a way to organize the features of the school library web site. In addition to three categories in Information Power, learning and teaching, information access, and program administration, the category books and reading was added in this study as well. There was a greater emphasis within the websites on information access than on learning and teaching. Program administration was also not well developed in many of the websites.

Teens and Libraries

When teens do turn to libraries, the services that most attract teens to libraries are Internet access, volunteer opportunities, and school-related research (Bishop & Bauer, 2002). In a study
of teens utilizing chat reference for homework assistance, there was an identified communication gap between the librarians providing the chat assistance and the teens utilizing the service through a lack of establishing rapport, clarifying information needs, and a lack of effective service as referenced from performance guidelines established by the Reference and User Services Association. Teens were attempting to establish a rapport and more personal encounter and they were getting communication that was quite formulaic and not concerned if the help they were getting was what was needed or deemed helpful (Walter & Mediavilla, 2005). Although teens do sometimes turn to libraries in the course of their information seeking, often there is a communication style difference that causes a sense of separation between youth and the libraries.

School libraries have long been centers for building information skills. In addition to providing access to resources, offering information literacy and information fluency instruction are critical aspects of a school library program. According to the American Library Association, "to be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information" (1989, para 3). This overlaps with the idea of information fluency, with information fluency also emphasizing media and digital information. Callison (2003) defined information fluency as “the ability to analyze information needs and to move confidently among media, information, and computer literacy skills resulting in the effective application of a strategy or strategies that will best meet those needs” (p. 38). As students are faced with the ever-growing amount of information available in a wide range of formats, developing the ability to navigate through and use information in an effective and ethical way is critical. The American Association of School Librarians (2007) recognized the need for libraries to develop multiple types of literacies in
students, especially in the multimedia environment, and released guidelines for programs and learners in *Standards for the 21st Century Learner*.

**Embedded Librarians**

In an acknowledgement of the spread of online learning and the wide-ranging use of virtual learning environments, librarians have begun to utilize new strategies to meet learners and potential information service users on their own turf. At the university level, strides have been made to incorporate library services and information literacy instruction within distance education courses. Embedded librarians are working within course management systems (CMS) to provide reference services and instruction and deliver these services not only on an individual basis, but also through communication with the entire class (Markgraf, 2004; Giles, 2004). Buehler (2004) points out that CMS system designs do not take into account the need for student access to library services from the course pages within CMS. The librarian and faculty must work to add links to necessary library services within what are often self-contained sections of learning in online courses. Even something as simple as adding a library resource handout to a course's site with a CMS has an impact on connecting users with the library (Costello, Lenholt, & Stryker, 2004). Acknowledging the need to experiment with practice to reach users, particularly those learning from a distance, librarians are offering information literacy content through collaboration with faculty to merge information literacy instruction with course content (Buchanan, Luck, & Jones, 2002).

Quintana and Zhang (2004) argue that although digital libraries have supported information seeking, these digital libraries will be more supportive to learners if the digital library services are expanded to support more complex cognitive and metacognitive activities, such as information management, information analysis, and information synthesis, and go
beyond simply supporting information seeking. As a way to try to extend a digital library, an attempt was made to integrate scaffolds within the digital library, referring to it as a digital workspace. This program, called the Digital IdeaKeeper, was designed to assist middle school students engaged in the inquiry process. The software space was initially designed to work with science inquiry with an eye toward being able to expand to other types of digital libraries and information collections, providing users an integrated information environment that would support them throughout the entire process of locating and using information. The use of tools such as wikis as platforms for coursework and ways to embed media and other tools for research and information literacy assistance is an area where research is at the beginning stages, but offers a promising opportunity to open up new avenues for library instruction and services (Florea, 2008).

Often it is classroom teachers who are creating resources or guiding students to resources. Ensuring that teachers are aware of existing library resources helps to deliver useful resources to students. Recker, Dorward, and Nelson (2004) undertook an examination of teachers’ selection and use of items for instruction in digital information environments. Finding that the best way to study the process teachers go through to find and use digital learning resources is through in situ user studies, the researchers were able to get criteria for search and selection for their non-specialist users. This in turn helps inform the development of information services to meet the needs of those users.

**New Frontiers for Library Services**

Librarians continue to work to find ways to provide service in new digital information landscapes. As more and more learning and information activity is occurring online, many libraries are attempting to offer services in those environments. One such place is in Second Life,
a multi-user virtual environment (MUVE). While libraries and librarians are active in Second Life, it is an adult environment. However, there is a teen grid component to Second Life. Within the teen grid, a variety of spaces both for learning and recreation exist. Public libraries and educational institutions have been active in working with teens to populate this virtual world. One such example is Eye4You Alliance project led by the Alliance Library System in East Peoria, Illinois, and the Public Library of Charlotte and Mecklenburg County in Charlotte, North Carolina. This island includes a library space as well as a variety of programs and activities such as community building, book discussions, and technology programs, similar to the sorts of things that are available to teens in real world libraries. The island has approximately 1000 visitors daily (Czarnecki, 2007). Czarnecki argues that although activities may take a slightly different shape in Second Life, essentially the skills and lessons that participants come away with are meeting the same goals. The physical space and services are transforming into a virtual environment.

As social networking sites such as MySpace and Facebook are attracting increasing numbers of users, this is another avenue where librarians are attempting to meet their potential users in order to develop services, share information, and provide resources. Librarians at Penn State who experimented with Facebook tracked the means used for contacting the library with reference and research inquiries over the course of a semester. Facebook and email were the most prevalent, followed by in-person questions. While inquiry came from all types of users in most categories, the Facebook questions came exclusively from undergraduates (Mack et. al, 2007). However, being present in an environment is not enough to ensure connection with users. Several librarians have written arguing that an understanding of how patrons are using Facebook is essential in designing an effective online presence within the social networking site. “To really
connect with students on Facebook, you have to realize that most of them read information that Facebook puts in front of them, not what they seek out on their own” (Miller & Jensen, 2007, p. 18). More and more high schools and public libraries are adding Facebook pages as a way to connect to potential users who are active within the social networking site. As digital environments continue to emerge, many librarians will follow youth as they begin to navigate those new environments and develop ways to integrate new developments into their existing information landscapes.

Social Aspects of Information Seeking Behavior and Digital Communication

Theories of information seeking behavior have emerged where social groups play a role in dictating information behavior. Chatman’s Theory of Life in the Round (1999) posits that information seeking is a behavior that can be sanctioned and normed within a social group. Chatman built the theory from research done within a women’s prison. Life in the Round must occur in a small world where life is routine, predictable, and codes of collective behavior exist. The social norms of the group place limits on what is acceptable behavior, which includes information seeking behavior. The social group subscribes to a particular worldview, which helps to dictate for members of the group the constructs of what information is available and desirable to seek. Information behavior is specific to the context of that social world. This theory certainly has implications for middle school and high school students where peer group opinion is often paramount. While there is a struggle for individuality, acceptable behavior is generally determined by the confines of what is accepted by a particular social group and within the small world of the school. This may also apply to the virtual learning environment, particularly a virtual learning environment that has a closed, established set of users or is an extension of the face-to-face classroom.
This social nature of information seeking has been observed in youth in field observations in academic contexts as teens observed asked questions and gave advice during the course of searching (Fidel et al, 1999). It has also been observed in everyday life information seeking where people are the preferred source of information (Fisher et al., 2007; Hughes-Hassell & Agosto, 2007; Shenton & Dixon, 2004). Gross (2004) found that when students need things beyond teacher-generated materials for school, it is most common to be family members or known resources including friends to whom they turn for help.

Teens and tweens are actively involved in using online environments to communicate with others and engage in information behavior. According to the report *Creating and Connecting*, education is a frequently discussed topic in social networks. Education-related topics are conversational fodder for 59% of online students, with 50% talking about specific school work (National School Boards Association, 2007). These online conversations are happening on the students’ own time as a majority of school-districts block or do not permit the use of social networking sites during the school day.

In her dissertation exploring American teen’s behavior within networked publics, boyd (2008) examines the way technology has impacted teen practices regarding identity, peer socialization, and relationships with adults and society and the ways in which teens deal with new dynamics resulting with their involvement in networked publics. Being involved in social networking extends the teen construction of self into online and offline domains that are built on communications and representations of self and tied into peer networks.

In communicating in online environments or using electronic means, many choices are available. Users choose different communication channels for different types of interactions and different communication purposes. While texting has become the communication mode of choice
for teen peer-to-peer contact, teens rely more heavily on voice calling to contact their parents. Daily text messaging for American teens has gone from 38% of teens texting daily in February 2008 to 54% of teens texting daily in September 2009. Texting has surpassed face-to-face communication, email, voice calls, and instant messaging for this group in contacting peers. (Lenhart, Ling, Campell, & Purcell, 2010). boyd (2008) points out that teens are able to navigate choices about means of communication and make communication channel decisions based on the social dynamics, technical availability, person with whom they are trying to communicate, and personal preference. Teens use whichever one of the many communication tools at their disposal that makes the most sense in each situation.

The Digital Youth Project, a series of ethnographic studies of youth culture and new media, were conducted across the United States from 2005-2008 in an effort funded by the Annenberg Foundation. The results of all the studies were compiled in the resulting project book, *Hanging Out, Messing Around, and Geeking Out: Kids Living and Learning with New Media* (Ito et al., 2010). The study found that much of youth behavior online is relationship-driven. Hanging out is friendship driven where the online environment serves as a place for youth to be social with friends. Many youths spend a part of their time online messing around, gaming and exploring creation in the online environment. Geeking out is the use of online spaces to deeply explore interests and allow the opportunity to connect with multi-age interest-driven groups. While American teens are engaging in different types of behaviors online, interaction with others is a critical component to their online lives just as it is in their offline reality.

Summary

As the purpose of the study is to examine middle school students’ experiences within a virtual learning environment, the review of the literature has examined some of the research in
the areas of information seeking behavior, virtual learning environments, virtual libraries, and
digital communication in order to contribute to a better understanding of the study’s foundation.
CHAPTER III

METHODOLOGY

This study explored youth information seeking behavior and communication in a virtual learning environment while students were engaged in an academic assignment. Students were observed as they worked in a virtual learning environment as part of their content area work. Through observations of student activity in the virtual learning environment, student responses to an online survey administered at the end of the unit, and the feedback gathered in focus group interviews, data were analyzed and coded with emergent themes to determine student perceptions and experiences during the class project as well as their interaction with information resources and helps.

The study addressed the following research questions:

1. How do middle school students describe their experiences using a virtual learning environment for course related work?
2. In what ways do middle school students utilize material resources while participating in a virtual learning environment?
3. In what ways do students utilize help from other people while participating in a virtual learning environment?
4. How do middle school students use digital tools for communication and cooperative work when a virtual learning environment is used in concert with face-to-face interaction?

The methodology used to explore the research questions is the focus of this chapter. The chapter is organized into sections including research design, identification of participants, development of materials, data collection procedures, data analysis procedures, and limitations.
Research Design

This ethnographic study attempted to examine the experience of middle school students engaged in a virtual learning environment through observation and collecting data from the participants. Ethnography was derived originally from the field of anthropology. In ethnographic research a culture is observed in situ and information is solicited from participants of the culture. Many modern ethnographic researchers have adopted a truncated process, which involves a shorter amount of time in the field and eclectic data collection where the sets of data collected help to inform each other creating a holistic view of the culture being examined (Grbich, 2007). An approach of ethnography dedicated to exploring Internet interaction has been dubbed cyber ethnography, which explores relationships between people in virtual environments. Miller and Slater (2001) developed several guidelines for cyber ethnographic studies, including how people engage with each other on the Internet and how people engage with new media. When discussing the use of a mix of virtual and offline methods to do fieldwork observations and gather data in an ethnographic study, boyd (2008) argues for the idea of the value of conducting fieldwork in multiple spaces. “We do ourselves a disservice if we bound our fieldwork by spatial structures – physical or digital – when people move seamlessly between these spaces. Both mediated and unmediated fieldwork should have as their goal a rich understanding of the networks of people, objects, and practices” (boyd, 2008, p.53). The approach of this study was to gather data from participants both virtually and face-to-face in order to capture data.

Environment to be Studied

Dillenbourg, Schneider, and Synteta (2002) designate the following characteristics of a virtual learning environment to define the make-up of such an environment:

• A virtual learning environment is a designed information space
• A virtual learning environment is a social space: educational interactions occur in the environment, turning spaces into places
• The virtual space is explicitly represented: the representation of this information/social space can vary from text to 3D immersive worlds
• Students are not only active, but also actors: they co-construct the virtual space
• Virtual learning environments are not restricted to distance education: they also enrich classroom activities
• Virtual learning environments integrate heterogeneous technologies and multiple pedagogical approaches
• Most virtual environments overlap with physical environments (p. 3-4)

In this research a wiki was built and served as the virtual learning environment. A wiki meets the criteria outlined in Dillenbourg, Schneider, and Synteta’s characteristics of a virtual learning environment. The wiki is a designed information space. In the case of this research the basic structure of the wiki was established by the library media specialist and the teacher involved, and the students had the ability to design their group section of the wiki in the way of their choosing in order to best meet the needs of their group to complete the assignment. The purpose of using the wiki was to provide the platform for the opportunity for educational interactions and serve as a space for the construction of projects by students. There are built-in communication tools within the wiki, including discussion capability within each page of the wiki and email messaging. In fact, the very concept of a wiki is that of a collaborative space. Participants are able to build the virtual space and comment to each other within the very web-based pages that are being created. This information and social space can include text, images, and video, with the students working to design and construct their dedicated section of the
project wiki. In the case of this experience, the project wiki extends and enhances the face-to-face classroom activities. It allows for the workspace to be accessible around the clock and anywhere. Students can interact with each other and the technology as they work to complete the project designed for this information space. The wiki for this proposed research is an example of a virtual learning environment as it meets all the criteria of such an environment.

The wiki used by students in this project was created through Wikispaces (http://www.wikispaces.com), an online service that allows for the creation and hosting of wikis. It offers both visual and text editing capability along with the tools to attach and embed many types of media. Wikispaces offers no fee, advertising free wikis for use in K-12 education. With this level of access educators can get premium options such as having private or protected spaces. These different levels of access allow the capability of having closed or private communities of users. The teacher and librarian who designed this particular project chose to do a private wiki, meaning that only invited members were able to access the virtual learning environment and a login was required to gain access to the wiki pages created.

Identification of Participants

The sample is a purposeful, convenience sample based on the course assignment of the students and a collaborative teaching activity designed by the teacher and the school library media specialist. Noticing the struggles the students faced with a large, major research project, the classroom teacher and librarian worked together to build a foundational assignment designed to bolster student research skills and confidence in a gateway research experience before tackling a large research paper that is a culminating writing assignment completed during the spring of the eighth grade year at the school. The teacher and librarian collaborated on this foundational assignment for the first time during the 2007-2008 school year. Based on anecdotal data from the
teacher and librarian involved, this project built the skills of students and led to a better outcome and higher quality product for the formal research paper at the end of the year. The study examined students in this project during the second year it was used within the school. The project as well as the level of collaboration between the library media specialist and the classroom teacher in using a virtual learning environment for a research-based academic assignment made for an atmosphere that allowed student experiences for observation and study.

Conversations with the classroom teacher and the school librarian who collaborated and facilitated the student learning experience helped inform the design of the research tools used to collect data from the subjects. The students involved in this research faced the task of using the virtual learning environment as a platform for a cooperative research project. Within the context of a larger topic, students were expected to research and write papers on a sub-topic, help edit the work of their group members, and compile their work into one large, coherent exploration of their larger group topic. For example, one group had an overall topic of animals of the sea and individual students wrote about sea turtles, sea lions, stingrays, and sharks. The cooperative groups ranged in size from two to five members. While they worked on this project during the school day, they were also expected to work on the project outside of school in order to complete it by the deadline.

The students did pre-search using thin nonfiction books and rotated through stations with information. At the end of the time given for doing this initial exploration, the students in the classes ranked the six to eight available topics by interest. Most students got assigned a group with their first choice. The function of the group was mostly to act as support, giving guidance and feedback to the other members as most of the stages required work that was individual in nature.
Students participating in this research were eighth graders at a suburban Chicago middle school during the 2008-2009 school year. It is a high performing school where 91% of the students met or exceeded state standards on the Illinois state standardized testing done in 2007. The majority of the population (87%) of the school is white, with a small Asian, Hispanic, and Black population. The population of the school is fairly affluent, with 10% of the students fitting the low-income category (Northern Illinois University & Illinois State Board of Education, 2008). All students enrolled in the teacher’s three class sections doing the assignment involved were invited to participate in this research. Thirty-eight students who represented members of three different sections of eighth grade classes were participants in the research study. These students were observed in their interactions and creation of their space within the virtual learning environment. These students also were invited to take the survey at the end of the unit. The classroom teacher allowed students participating to complete the survey during course time, and thirty-one students took the survey. Finally, the teacher and librarian helped to identify and gather volunteers for students who were interested in talking about their experiences during the project using the virtual learning environment and willing to participate in the focus group interviews. Ten students participated in more in-depth group interviews about their experiences during the project. Pseudonyms are used for all these student participants when they are referred to in this work to maintain confidentiality.

Development of Materials

The virtual learning environment for the project being studied was developed by the library media specialist working at the research site with input from the classroom teacher. In addition to the face-to-face presence of the classroom teacher and the school library media specialist, information resources were embedded within the virtual learning environment. The
library media specialist put research resources into place. Virtual access to the library media specialist was provided. The library media specialist conducted instructional sessions in a face-to-face capacity as the students began the project. The library media specialist led two instructional sessions with the students involved. First, students were given instruction in use and design of the wiki. Students were asked to sign a wiki-use agreement, which was adapted from other existing such documents and has since been adopted by the research site. A copy of the agreement is available as Appendix A. The second session focused on research skills and available resources that were linked to the virtual learning environment. The library media specialist particularly emphasized the use of subscription databases and covered access and use of these resources within the session.

The intent of the research was to gather multiple points of data in order try to get a broad exposure to student experiences and behavior in the virtual learning environment. The plan was to do observation of the activity within the virtual learning environment and collect data from participants through group interviews and an online survey.

*Online Survey*

Dillman, Tortora, and Bowker (1999) outlined principles for the construction of web surveys with an eye on being respondent-friendly and effective. The principles included an inviting welcome screen with clear instructions, an easy question to start, visibility within a single browser window, avoiding trapping respondents by requiring answers before allowing them to move to other questions, and choosing question structures carefully.

When designing an online survey for research, Andrews, Nonnecke, and Preece (2003) outlined five components of design and implementation they argue are critical to successful web
surveys: survey design, subject privacy and confidentiality, sample and subject selection, survey piloting, and distribution and response management (p. 186).

Table 1

*Design Implementation Components and Project Implementation*

<table>
<thead>
<tr>
<th>Design and Implementation Components from Andrews, Nonnecke, and Preece (p. 186)</th>
<th>Ways Components Addressed in this Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Survey Design</td>
<td>A web-based survey product was used with designed templates.</td>
</tr>
<tr>
<td>2. Subject Privacy and Confidentiality</td>
<td>Both the students and their guardians gave informed consent for participation before the survey was administered. Individual students were not identified with responses. Pseudonyms were assigned to students for reporting purposes to maintain confidentiality.</td>
</tr>
<tr>
<td>3. Sample and Subject Selection</td>
<td>Respondents were not be random, but instead were part of a convenience sample of students involved in the learning experience.</td>
</tr>
<tr>
<td>4. Survey Piloting</td>
<td>Other students who have experience in similar virtual learning environment projects of the same age looked at the questions to determine if there were areas of confusion, problems with terminology, or problems with the functioning of the survey.</td>
</tr>
<tr>
<td>5. Distribution and Response Management</td>
<td>Survey was distributed to respondents within school in the context of the class where they completed the assignment. Students used the school’s computer lab to take the survey. All responses were collected via the database provided within the web-based survey product.</td>
</tr>
</tbody>
</table>

The survey contained closed and open-ended questions for student responses. Problems with the length and quality of open-ended response on written surveys have been documented;
however; Schaefer and Dillman (1998) found that in web-based surveys respondents tend to offer more detailed and longer responses to open-ended questions. The online survey tool, SurveyMonkey, was used to collect the data. A copy of the survey instrument is available as Appendix D.

Data Collection

The study required data to be collected regarding student experiences in a virtual learning environment during an academic project. The following procedures were used to collect the data:

1. The Institutional Review Board (IRB) at the University of North Texas granted approval to conduct this research involving human subjects (Appendix B).
2. The researcher provided the school involved in the study all necessary forms and materials including:
   a. Parental Consent Forms and Student Assent forms which were completed on behalf of each student participating in the study (Appendix C).
   b. Designated URL which was provided via message in the virtual learning environment to participants in order to access online survey.
      
      http://www.surveymonkey.com/s.aspx?sm=M75Y_2bu8_2bjLowWG3QzwaX_2bw_3d_3

3. Conversations were conducted with the school librarian and classroom teacher at the research site to clarify information about the project and plan implementation.
4. Researcher was granted access to the virtual learning environment.
5. Unobtrusive measures were used to observe the interactions in the virtual learning environment. Although students were aware that their work in the unit was part of a research study, I was not present physically and not noticeably in the virtual environment while they
worked on the project. The natural stream of behavior was not interrupted and students were able to proceed with the coursework. Research memos were created based on the observations.

6. Survey was administered to the participating students during their course time.

7. Focus group meetings were scheduled and students from the research participant group were recruited to participate. Students volunteered for these sessions. No incentive was advertised, but students were given a pen as they left the session. These group interviews were conducted in the school library and a classroom adjacent to the school library. The school librarian at the research site, providing a bridge to a familiar adult for participants, introduced me to the students. The interviews were recorded, and I took notes during the session as well. Each of the two sessions started with a statement about the purpose of the interviews. A standard introduction is a recommended technique for focus groups with young adults to make sure all receive the same information and that the ground rules for the experience are established (Gibson, 2007).

Data Analysis Procedures

Qualitative data analysis has been described as a process of “noticing, collecting, and thinking” (Seidel, 1998, p.1). A data analysis plan, presented below, was created to guide the interpretation of results from the observations of the virtual learning environment, the online survey results, and responses from the focus group sessions. Throughout the process of data collection analytic memos were written to encourage reflection and record the researcher’s thoughts during the process of collecting and analyzing data. The memos were created containing data about participants, phenomena, and process (Saldana, 2009).

The wiki system itself allows for the capture of data about usage and content, recording a history of all changes to the pages. As the project took place, I observed the students working on their project and contributing to their group pages within the virtual learning environment. The
wiki included RSS (known as either rich site summary or real simple syndication), a type of metadata that allows content and layout of a site to be separated. The content can then be subscribed to for delivery through an aggregator. When a source gets updated, the feed is delivered to an RSS reader, notifying subscribers of the new changes (Stephens, 2006). Through subscribing to the RSS feed available in the virtual learning environment, I received all the changes that were made to the various pages as well as entries on the discussion boards. These notifications included additions and deletions to each page within the virtual learning environment. However, the email exchanges between participants and their teachers were not publicly available. Any communication that took place using tools outside the system and face-to-face were also inaccessible to me.

The system logs information about changes to individual pages within the wiki. I observed while students were working to get a general sense of how the virtual learning environment was being used and how the project was progressing. Using one cooperative group from each class period, I was able to explore the group’s progress on the project as a whole. At the conclusion of the project, I was able to use the Wikispaces software to go through each one of the group pages to look at changes made to the page. Due to the group nature of the project and balancing the participants in the research study according to which students had submitted their assent and consent forms, there was one group in each class whose members had all agreed and had parental consent to be part of the study. I viewed each change made to all the pages within the group’s section of the wiki and recorded the type of change made at each instance. This resulted in the ability to see a pattern of the workflow between groups and the type of interactions among the group members. It also provided a helpful balance with the information collected from participants about their experiences in the survey and in the group interviews.
At the conclusion of the project an online survey was completed by the students participating in the study. Once collected, I did an initial reading of the responses that helped guide the question development for the focus group sessions. A much more in-depth and involved examination of the survey data followed. The survey included both closed and open-ended questions. The responses to the closed questions were examined first. The survey software allowed viewing of the results by frequency of response as well as percentage. The data gathered from the open-ended questions were read thoroughly and then coding of the data began. The coding process for the data was iterative and included first cycle and second cycle methods. Objectivist and heuristic codes were used. Objectivist codes are representations of the facts described in the data (Seidel, 1998). This type of coding is similar to assigning subject headings in that these objectivist codes are considered to take the place of the larger text, acting as a sort of surrogate for the text. Heuristic codes are flags to things within the data. During the initial coding of the data, a codebook was created. The codebook can be found in Appendix E. The frequency of codes was tallied and the codes and data were further examined for themes and instances of similar or overlapping codes. As the data were organized and coded, theme and categories began to emerge. Combining enumerative and thematic analysis allows for contextualization and provides different perspectives on the text (Grbich, 2007).

Ten students participated in focus group sessions about their experience in the project in order to capture additional in-depth information about the experience working on the project within the virtual learning environment. During the group interviews, I took descriptive notes as the guiding questions were used. In addition to an account of the discussion, the document also included reflection and questions for further exploration. Reflective notes were kept during the interview on the side of the note taking page. At the same time, an audio recording was made of
the sessions. At the conclusion of each group session, I wrote analytic memos to capture observations and thoughts about the conversation. Transcripts were created from voice recordings of the interviews. The transcripts were read and coded.

Since several types of data were collected in different forms, I analyzed each data set and then looked for themes and categories across the data sets. The frequency counts and percentages calculated with the data from the closed questions helped to corroborate the findings from the qualitative data. The data collected from the focus group helped to provide thicker descriptions to the responses from the survey questions. The aim of this being the different types of data collected would provide triangulation and paint a fuller picture of the behavior being examined. The process of triangulation is one of the ways to help validate findings in qualitative research (Cresswell, 2003).

In order to establish reliability, two coders examined the data gathered from the open-ended survey responses using the codebook that was developed and a measure of intercoder reliability was calculated. Intercoder reliability tests the extent of agreement between two independent coders on the coding of responses while recognizing the likelihood for agreement by chance and removing it. There is no wide-spread agreement about which intercoder measure is the best and should be standard (Lombard, Snyder-Duch, & Bracken, 2008). Cohen’s kappa (Cohen, 1960) was the measure selected as it is widely used in research to calculate levels of agreement (Bakeman, 2000). The assumption of this test is that coders work independently and that the nominal categories are mutually exclusive. The kappa statistic results in a value equal to or less than one, where one is complete agreement between the raters. A kappa statistic of .8 – 1 is considered high in agreement.
After a discussion about the codebook and how to apply the codes, the second coder went through each of the survey response questions and manually coded them. The entire set of responses was coded by both the researcher and the second coder. After both coders completed the coding, the kappa statistic was run. Table 2 reports on the kappa scores for each of the sets of responses for the open-ended survey questions.

Table 2

*Summary of Kappa Scores for Open-Ended Survey Questions*

<table>
<thead>
<tr>
<th>Question</th>
<th>Kappa Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 8: Describe how your group worked together to complete the project.</td>
<td>.81</td>
</tr>
<tr>
<td>Question 9: When you were confused about using the wiki how did you figure out your problem?</td>
<td>.94</td>
</tr>
<tr>
<td>Question 10: When you were confused about finding information how did you figure out your problem?</td>
<td>.91</td>
</tr>
<tr>
<td>Question 11: What helped you most when completing this project?</td>
<td>.82</td>
</tr>
<tr>
<td>Question 12: Do you use school library resource to help you on assignments? Why or why not? School library resources include library books, online databases, and the library website.</td>
<td></td>
</tr>
</tbody>
</table>

1 for yes or no responses to question

.93 for detailed responses about types of resources

*(table continues)*
Question 13: In this project, did it make a difference in your use of library resources that they were linked to and included in the project wiki?

| .82 for yes or no responses to question | .88 for detailed responses to the question |

Question 14: How did the involvement of the school librarian in the wiki project make a difference in your use of the school librarian or library resources?

Limitations

There were several limitations that should be acknowledged. This study took place at a specific location with specific educators who helped to design the virtual learning environment. It is not possible to generalize results to other academic settings or other ages of students. Limitations also arise from the sample size used in this study.

The researcher acted as observer-as-participant, where I had access to the private virtual learning environment and the members of the environment were aware of being observed within the confines of the study (Johnson & Turner, 2003). Possible problems include reactive effects such as the guinea pig effect, as the students involved in the study were aware that there is research of their learning environment, although this may be minimized as I was rarely present in the face-to-face setting and didn’t meet with students to lead the focus groups until after the majority of the project work had been completed.

Not all students within the class returned the consent and assent forms. This resulted in some interactions and responses within the virtual learning environment not being available for
capture and study, as the students participating in the collaborative work were not part of the investigation. Although a broad base of students were included, this had the potential to limit the capture of interactions between students in the environment during the course of the project. This also limited the number of groups available for observation and complete analysis of the project documents in the virtual learning environment.

A potential source of conflict can stem from the involvement of the investigator within the study. A risk exists of subjective bias due to involvement on a personal level to the topic under the study, as I am a practicing school librarian with experience collaborating with classroom teachers on projects using a wiki as a virtual learning environment. Collecting multiple types of data and recognizing the possibility of bias helps to assuage this risk.
CHAPTER IV
FINDINGS

This chapter presents findings resulting from the analysis of data collected during and after an eighth grade project using a virtual learning environment in concert with face-to-face instruction in a brick and mortar school. Beginning with an overview of the project description and participant demographics, the chapter then reports on the observations of student behavior while engaged in the virtual learning environment and student experiences using the virtual learning environment.

Project Description and Participant Demographics

Students were engaged in a research project that involved both individual and cooperative work. Students were to create and post the stages of the research projects within was a wiki where each group had a section of the virtual learning environment in which to construct, communicate, and collaborate. The wiki was built using Wikispaces and was created by the classroom teacher in concert with the school library media specialist.

The data for this study were collected in an eighth grade language arts classroom at a suburban Chicago middle school during the fall of 2008. Three sections of the class led by the same teacher participated in the project, with 38 students agreeing to participate in this research. These students completed the assent forms and parental consent was given. Participants shared insight about their experience within the curricular project in a survey. Thirty-one students completed the survey, which was administered during class time in a computer lab. Ten of the participants volunteered to meet with participate in one of two focus group interviews that were held at the school. After having a chance to look at the preliminary survey results, I was able to
probe for further insight and more rich description of the student experiences during these focus group interviews.

Observations from the Virtual Learning Environment

As the project took place, I observed the activities of the students involved in the research within the virtual learning environment. The wiki included RSS (known as either rich site summary or real simple syndication), a type of metadata that allows content and layout of a site to be separated and the content can then be subscribed to for delivery. When a source gets updated, the feed is delivered to an RSS reader, notifying subscribers of the new changes (Stephens, 2006). Through subscribing to the RSS feed available in the virtual learning environment, I received all the changes that were made to the various pages as well as entries on discussion boards. These notifications included additions and deletions to each page within the virtual learning environment. However, any exchanges using the messaging system within the wiki between participants and their teachers were not publicly available. Any communication that took place using tools outside the system and face-to-face were also inaccessible to me.

The wiki included the ability to trace each page’s history, making it possible to see a version of the page as it existed each time it was saved from its creation to the most recent iteration. In looking at the students who participated in the project, there was definitely a variation in the activity level in editing pages on the wiki. The average number of edits per student was 31.2; however, the number of edits ranged from a low of 10 edits for one student to a high of 72 edits for another student. The system also tracked the number of messages sent by each user. The wiki had a messaging system, which was essentially an internal email system for members of the wiki. Use of the email tool varied widely. The average was 2.3 messages sent per
student; however, 16 students sent no messages at all. The highest number of messages sent by any one student was 14.

Within the virtual learning environment, students also had the ability to personalize their space and profile. This was evidenced by choice of color and style on the page, but also in the ability to customize a profile through the selection of a profile picture. There were nine students who chose to do this, 24% of the research participants. The icon choices included animals, flowers, cars, pictures, cartoons, and sports team logos.

Due to the group nature of the student project and the need to focus exclusively on students who submitted their assent and consent forms to participate in the research, one group in each class was identified whose members had all agreed and had parental consent to be part of the study. The virtual spaces of these three groups were examined in depth and in their entirety. In the first class, the group focused on space and was comprised of five members, although one member of that group did not contribute at all to the group space or his individual page. In the second class, the group focused on native cultures and was comprised of three members. In the third class, the group focused on buildings and was comprised of two members.

As previously mentioned, students had the ability to personalize their profiles and add an image. In the first group three of the four participants chose to customize their user icons. A custom car, a dog, and a personalized button were chosen as icons attached to the user profiles of those three students. In the second group, two of the three members added images to their profiles, choosing a cartoon giraffe and a smiley face. In the third group, neither member customized the user profile by adding an icon. This is a higher rate of personalization than the general population of the research group.
Most of the activity on all the individual pages followed a similar pattern of development, which included the group involvement in building its space within the virtual learning environment, creation of the individual pages, and interaction among group members. This makes sense because the steps of the process were prescribed by the teacher, and all students had the same requirements for the project. However, the results and the amount of interaction seem to be dependent on the individual students involved within each group.

Each group had its own subspace within the virtual learning environment. It was the students to organize and design. Students had the ability to create their own pages within the virtual learning environment. Each group had a group page, which served as a sort of home page for the group’s collaborative work. On this group page, each individual member of the group had a link with his or her name that led to that individual’s page within the group space. Due to the nature of the wiki website that served as the virtual learning environment, each student needed a discreet space because simultaneous editing of a page did not work effectively. In order to ensure smooth use of the environment, the teacher and library media specialist designed the project with this in mind. Each group page also had a link to a page that was to house the group’s final product.

The three groups I studied added some additional information to their group home page. The group in the second class used the discussion tab on their main page. A discussion tab is available on each of the pages within the wiki and allows users to make comments in a threaded conversation that are accessible only from that individual page. The 19 messages added to the discussion tab were in 4 different strands. The content of the messages were for checking in, delegating work, and asking about how-to do something. The other two groups did not use the discussion tab to communicate, but both groups added content to their home page beyond the
individual links and group final project link. One group had a message stating, “OMG! our group…is AWESOME!”, and the other group had a brief series of postings that served as a discussion about the number of resources found as well as a list of citations and suggested transition between topics for that group’s final paper.

Once the links were set to the individual pages from the group main pages, the individual authors started to populate the individual pages with content. Each individual added an outline and a rough draft of his/her paper. While some students composed online which was evidenced by saves throughout the project, others pasted in or saved after creating the entire outline or rough draft. The other members of the group then visited the page to do peer editing, a process where students read and give feedback on the work of classmates. Each group member was required to do a peer edit for all the other members of the group as well as select one other student whose work to edit. The peer edits consisted of feedback about the draft. The types of feedback varied from grammatical and spelling correction suggestions to content clarification questions and suggestions. Almost all peer editors put a general comment on the bottom of the wiki page. The comment in some instances included a general suggestion for improvement and, in all but one case, ended with a positive comment that the author had done a good job.

The format for the edits was to use italics, bold, or a different color font, something to distinguish edits from the original text. The initials of the person leaving the comment also frequently followed the changes. Student editors used a mix of feedback types including correcting spelling, correcting grammar and usage, asking for further information or clarification, and giving suggestions about ways to improve or clarify content. Figure 1 depicts a portion of the peer editing work done on one of the essays from a student in the second class.
The Incans are known for their intricate stonework. Their stonework was so famous that kings from miles around would order sunken stone baths to be built into their castles. Slaves worked the baths by making grooves in the sides, and then pouring hot water into the grooves from another room. *(Maybe describe a little more. it was kinda hard to visualize.)* *(MH)* Each bath was made from individually cut stones. Other achievements that the Incans are credited for is the invention of the sundial, and the Quipu, a counting method that included tying knots in a string. *(what is that? it sounds really interesting, i'd like to know more.)* *(MH)*

Religion was very important in the lives of the Inca. Therefore, they believed that the temples in which they thanked their gods could not be any less beautiful. The Incas built pyramids with flat tops as their temples. One of the most famous temples known today is Machu Picchu. Machu Picchu was built at the end of the 15th century in Mesoamerica. Of its 143 granite buildings, about 80 were houses, houses.* *(Who got to live in the houses? was it the common people or the most respected people?)* *(MH)* the rest being ceremonial buildings such as temples *(Baquendano 19)*. Spanish conquistadors did not discover Machu Picchu until 1911.

**Figure 1. Peer Editing Excerpt 1.**

An example of part of an essay from one of the members of the group in the first class.

Highlighted sections are peer editing comments and questions made by another group member.

After the peer edits were completed, the original author of the page went back to respond to the suggested edits, making corrections and revising the individual essay. Of all the peer edits I saw, I only noticed three instances where someone made editorial changes on the page of another student involving actually deleting the text of the author of the essay and making a change. Two were correcting a misspelling and the other had to do with a student completing all the edit suggestions made by the peer editors on behalf of another student in his group.
The Incans are known for their intricate stonework. Their stonework was so famous that kings from miles around would order sunken stone baths to be built into their castles. Slaves worked the baths by making grooves in the sides, and then pouring sides of a rectangular tub. Then, the slaves would pour hot water into the grooves from another room. “Maybe describe a little more. It was kinda hard to visualize.”

The grooves resembled a pipe system. Each bath was made from individually cut stones. Other achievements that the Incans are credited for is the invention of the sundial and the quipu. (What is sundial) (LG) and the quipu, A quipu was a counting method that included tying knots in a string. (what is that? It sounds really interesting, I’d like to know more.)

Picture a stick with many strings hung from it. There were five strings: one string for each place value. Then, a number of knots would be made in their specific place value telling how many ones were in that place value. For example, the number 25 would be shown as five knots in the ones place, and two knots in the tens place. The sundial was a circular plate with a stick on it. The stick would cast a shadow on the plate, and the shadow fell in line with the hour. The Incas had very innovative ideas for their time.

Religion was very important in the lives of the Inca. Therefore, they believed that the temples in which they thanked their gods could not be any less beautiful. “You might want to say that the temples where they thanked their beautiful than the gods were gorgeous.”

The Incas built pyramids with flat tops as their temples. One of the most famous temples known today is Machu Picchu. Machu Picchu was built at the end of the 15th century in Mesoamerica. Of its 143 granite buildings, about 80 were houses. (Who got to live in the houses? Was it the common people or the most respected people?) The rest being ceremonial buildings such as temples (Baquenado 19). Spanish conquistadors did not discover Machu Picchu until 1911. (Do you know the name of the person who discovered Machu Picchu?)

Figure 2. Peer Editing Excerpt 2.

Darker highlights (in red) indicate deletions and lighter highlights (in green) indicate additions made by the author of the essay using some of the same sections as Figure 1.

Frequently when students added critical remarks within their editing process, they would add emoticons or language to soften what might be perceived as criticism. “I would only do one exclamation point. :-)” was the comment after a sentence where the author had exuberantly placed three exclamation points. Another student wrote while editing, “you’re kind of using the word ‘star’ a bit much. I know that’s what your project is about but having the word ‘star’ in a
sentence three times will eventually get annoying! (sorry if this was harsh-ish, I’m sleepy)”. Within the first group when a member had a rough draft that was underdeveloped, two group members posted editing comments about adding more information, although no suggestions were given about what to add. The general comments at the end of the piece included the sentiments “good start i can’t see anything wrong but write more please :P” and “write a little more :-D”.

The end results of the group work were quite varied, judging from what was posted on the final group project page for each group. The group from the second class had a completed final paper on their group paper page. All three of the members had their individual sections of the paper present, there was evidence at an attempt to combine the work into a cohesive whole with an introductory section, and a works cited document was included. The other two groups had parts of the work missing or incomplete, even though in the case of one group the missing individual pieces appeared elsewhere on the pages of the virtual learning environment. The group from the first class did not post anything on the group project submission page aside from a works cited document, the file bearing the name of one of the members of the group. The group from the third class did post a final paper, although it contained notes within the text about the incomplete work of two of the students in the group. One note mentioned a student who didn’t complete the individual edits done during the peer editing process, resulting in a section of the paper that still included editorial comments, and the other note was about a student who was still working on his individual draft. This particular student’s page stayed blank for the duration of the project, and the student did not do any peer editing for any of the other members of his group.

Being able to observe each individual change made to the virtual learning environment gave insight into the process of the task, but it also gave insight into the ways that the students
Student Experiences with the Class Project

One of the open-ended survey questions asked students to identify what was most helpful to them when completing the project. The things that were identified fall into three categories: virtual learning environment, resources, and other people. The virtual learning environment included the wiki and its perceived benefits for users including being portable, providing organization, and facilitating online communication. The resources included informational materials like research databases and books and also how-to guides for citing sources and using the wiki. Finally, other people mentioned as most helpful for completing the project included the teacher and members of the group with whom the respondent worked.

Table 3

*Components Most Helpful to Project Completion*

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>Resources</td>
<td>12</td>
</tr>
<tr>
<td>Other people</td>
<td>8</td>
</tr>
</tbody>
</table>

Student Experiences in the Virtual Learning Environment

The students involved in this research faced the task of using the virtual learning environment as a platform for a cooperative research project. As mentioned earlier in this chapter, the wiki had a common space for the classes with introductory and how-to type
information. Each cooperative group had their own section of the wiki space and the capability to create individual pages within the wiki. The editing tools within the wiki are similar to a word processing document, with the ability to add text and modify the typeface, size, and color. The pages within the wiki have the ability to house uploaded files, incorporate links, and embed multimedia content. In addition to changing the colors and formatting of text of the individual pages, I did see the use of links and uploaded word documents. Due to the nature of this assignment, I didn’t see the use of any multimedia content. To give students an orientation on how to use the wiki, a novel technology for all the students involved, an introductory session to demonstrate wiki use was given to the students by the school librarian. Additional helps were also incorporated within the virtual learning environment with a frequently asked questions and information page to handle recurring questions and necessary instructions. According to the classroom teacher, these helps were deemed to be effective.

The overall reaction to using the virtual learning environment as a platform for this class project was positive. As Annika said:

The wiki was really fun because it was very organized. And it made it like eco-friendly I guess because we didn’t have to print out all the stuff and we couldn’t lose anything. And you had access to everyone, so there wasn’t like the hassle of having to get together and peer edit or um do anything. You could just kind of go home and log into your page, so that was really nice.

In fact, in the first focus group students mentioned enjoying the environment more than the content work of the project itself.

Grace: I think, the wiki itself was really fun, but the project was kind of boring.
Naomi: Yeah, but, the wiki was awesome.

Students identified strengths of completing a group assignment using a virtual learning environment as the platform as portability, ease of use, and organization.
Portability

You didn’t need a jump drive or anything like that. It [your work] was always with you. – Becka

The portability of the project environment was mentioned in the survey and within the focus group interviews as a valuable feature of the virtual learning environment. Portability refers to the ability to access the environment any time and any place with Internet access. There was no need for an external storage device or transfer service to electronically send, save, or print the work in progress. Individually, several students found the ability to treat the wiki as an online storage space valuable. According to one survey response, “You could save what you were working on at school and when you get home you can just open what you were working on and keep working on it.” Students realized that the virtual learning environment could function as a sort of storage and posting place for information. The virtual learning environment was equated to a flashdrive as it had the capacity of containing data on the wiki as well as uploading files of varying types into the environment. The teacher reported that students were anxious to use the tool beyond the project and asked for permission to continue to use the space at least for its storage capacity.

During the focus group, Hannah reported that using the online environment removed obstacles she generally faced due to software issues. “I liked it cuz, on my computer I don’t have Word but here [at school] they only have Word. So I was able to just put my stuff there and go home and get on it.” This sentiment was echoed by Ian who reported problems with accessing Microsoft Word at home. Having the online writing environment removed that obstacle from his ability to write and work from multiple locations.

Students were able to collaborate in ways that had not been possible without using such an environment due to its portability. A student who was on vacation during the project was able
to contribute to her group from California, another student could still participate in the group work while home sick, and students who might not have been able to meet and communicate outside school about the project now had a means to do so incorporated into the environment in which they were working.

*Ease of Use*

But this is really easy because it was just very direct, and I’m also not that much of a computer genius but this somehow worked, so that was nice. – Celia

Students reported very few problems in using the wiki, with six students reporting they never or rarely experienced problems regarding wiki use. Bella said, “I thought that the wiki was, like everybody else said, REALLY easy to use. And even if you by chance did get lost in it, um it had instructions so that you could regain what you were doing.” The types of problems students mentioned experiencing included setting up a new page, adding content, saving, editing, and adding an attachment. Most of the students, regardless of their self-identified technology comfort level, identified the wiki as easy to use. At least they believed that in retrospect at the end of the project when the survey and focus group data were collected.

Self-identified technology efficacy was raised within the focus group by several students. Students who saw themselves as more techie and into computers relied on their own agency to click around and figure things out. Students who were more reluctant users of technology or not confident in their skills would ask for help, but also reported that they found the wiki fairly easy to navigate and use once they got oriented to how to do so. Francine said, “Well I’m not really good with computers either. But the wiki was like kind of different. And it helped me. Like I knew how to do stuff with the wiki.”

A component of this project was peer editing, where a student comments on the content of the work of another student for both ideas and mechanics in order to improve and polish each
individual’s work. Across the board, respondents reported preferring the peer editing process using the wiki platform. Students in both focus groups mentioned how working in the virtual learning environment streamlined the process of editing and peer editing work. Instead of having multiple paper copies of different versions of their papers, students were able to comment and make changes within the wiki. It was noted that the ability to edit within the virtual learning environment was a lot less cumbersome and a lot more eco-friendly. This exchange from focus group one discussed the perceived advantages of the peer editing process in the virtual learning environment:

Naomi: I liked how you could just type straight on it. And with editing, I liked how you could just like type and say maybe you should put a period here…
Grace: Your friend could get on.
Naomi: or something instead of having to write it all out, you could just type it.
Grace: Cuz like in seventh grade we’d print out papers that were on Word, then we’d have to give them to a friend to edit, and then we’d have to go retype them. But with wiki we can go on, our friends can go on whenever they want and peer edit it. And then we can just change the things right there, which makes it easier.
Hannah: And now, you don’t have to keep track of all those papers.
Several: Yea
Hannah: This was my first peer edit, this was my second peer edit.
Several: [Laughter]
Grace: I did that.
Naomi: Yea, that was not fun at all.
Hannah: I’m like, do we really need this huge stack of papers?

In addition to editing the work of others within their cooperative groups, students were required to edit the work of someone outside their group. Instead of turning to another person with a similar topic, all students in both focus groups reported selecting a friend’s work to peer edit on the basis of friendship rather than topic or content.
Organization

I loved having one place where you could talk to group members, find samples of assignments, type, etc. all in one spot!! – survey response

The organization afforded by the wiki and the fact that the environment offered a one-stop spot for the project was seen as an advantage by students. On the survey one student wrote, “It [the wiki] helped me get organized better instead of keeping all those papers and I might lose them it helped me organize that way I would not lose anything.” In a conversation with the classroom teacher, she mentioned that for one student the wiki gave him a chance to shine. With paper and pencil assignments, this individual student often did not submit work due to organizational issues; however, with the virtual learning environment that obstacle was removed and the student was quite successful within this particular project.

Enhancements to the Virtual Learning Environment

Although it wasn’t an area I had anticipated exploring, the students in the second focus group reflected on changes or enhancement desired within the virtual learning environment that would have made their experiences easier or would improve future projects using such an environment. They mentioned the usefulness of having a live chat, instant messaging type of tool, particularly as a way to get an insight into status and presence within the space of other group members. When students were working in the virtual learning environment outside school, it was difficult to know if someone was working on the same page at the same time. The same page cannot be edited at the simultaneously by more than one person without overwriting the changes, and the students thought this would be a solution to that particular obstacle as well as a way to provide synchronous communication about the project. This would be preferred over leaving a message or discussion post and have to check back at a later time. Several people mentioned gaffs in the email system, when some of their classmates would inadvertently send
emails to all project participants, making it seem as if this was a clunky sort of communication tool.

One person mentioned longing for better navigation, particularly a back button, within the wiki itself. It was up to the users to embed navigation, which I didn’t see any evidence of during my examination of the pages. There was a lot of clicking to drill down to get into an individual’s page. There wasn’t an expedient way to go directly between the pages of students in a particular group built in to the system. Getting back to the group’s page also required multiple clicks.

There were also several concerns about formatting of pages and text within the wiki. Students expressed frustrations with the inability to use the tab key within the wiki page and problems of the stability of the text colors, once they were changed it was difficult to change the color again at times. Students faced obstacles with browsers in order to edit the wiki, as earlier versions of the wiki software did not work in visual editing mode within Safari, the web browser that is part of the Apple operating system. The study site is an all Apple school. This has since changed with newer upgrades to the Wikispaces platform, adding the capability of visual editing across browsers including Safari.

Use of Material Resources

This basis of the student work in the virtual learning environment was to collaborate on a research paper. The teacher and library media specialist designed this assignment to give students a smaller-scale research project to learn the steps to writing a research paper in an environment where peer support and cooperation was available. The teacher and librarian sought to give students practice in order to lay the foundation for a large independent paper later in the year. Clearly, one of the absolute requirements for a research paper is resources and information.
As the entire project was hybrid in design, so was access to resources. Students were able to utilize print material as well as digital material. The resources were present in the face-to-face environment and incorporated within the virtual learning environments. Access to information sources and research databases were embedded within the virtual learning environment. Access to print information was available both within the classroom and the school library. The school library was incorporated into the project through access to resources and also through access to the school librarian. Thirty students reported using resources from the school library to complete this project, where school library resources were defined to include library books, online databases, and the school library website. Just one student reported not using any resources from the school library for the completion of the project. When asked about use of the school library resources generally to help on school assignments, 28 out of 30 total respondents reported using library resources with online databases and books being the most frequently mentioned resources. One respondent mentioned not finding sufficient print material in the school library and instead turning to the public library to meet informational needs for research projects.

Those students who did use books mentioned the fact that books were available in their classroom and that the school librarian was willing to check out the books to the teacher rather than individual students, reducing some obstacles and hesitations for individual students to be responsible for the materials. A few students reported that they did not use book sources due to confusion they faced in trying to navigate the library to locate the materials.

Me: Anybody else use the library at all for other things?
Grace: Oh, for books?!? Ohh…
Naomi: For the books…
Hannah: I was never very good at looking
Grace: I can’t, no [echoing the sentiment of not being good at looking for books]…it’s too hard.
Hannah: I find it too much time.
Grace: I know
Hannah: You can just go to dictionary.com or something.
Grace: You look through pages and…
Ian: Yeah, I didn’t use books either. It was all online.

Those who did use print resources found them quite valuable. Erika said, “I had two main books I chose. Um, and it was surprising how much information I found even from one page.”

*Embedded Resources*

The embedding of resources within the virtual learning environment made a difference for students, particularly in their use of subscription database resources. These resources are collections of content to which the library subscribes giving access to a range of periodicals, reference materials, and other information electronically. This is information that is generally either not available or not collected in a searchable way on the free web. Proprietary in nature, access to these types of resources requires a password and a paid subscription by a sponsoring institution. Students mentioned the database vendors EBSCO and GALE by name in their survey responses. Links to the databases from these vendors designed for middle school users were embedded within the wiki as were the passwords to access the databases. This was possible due to the private nature of the virtual learning environment. During an introductory research session led by the school librarian, students were shown how to use these resources and encouraged to try them in their research.

In the survey responses 22 students mentioned that having the links to research resources in the virtual learning environment made a difference to their use, 71% of the students in the research study. Six students responded that these links did not impact their use, and three said that they were not sure or it only slightly mattered. Those students who did say it made a
difference mentioned that having embedded resources made it easy to access information. Grace and Naomi both reported that the convenience of access was the primary reason they chose to use the databases as a source of information. There was recognition using the embedded resources led to information of the high quality, was a helpful feature, and aided in organization to have things all in one place. One respondent wrote, “Yes, the library resources provided in this link made a big difference because I found that the books and the online databases had TONS of great information.” There was recognition by another participant that using the embedded links provided easier access to information than surfing the free web, “It was a lot easier to find the websites, and some of the time if you didn’t use the links they [resources] were hard to find.”

Although in reading some of the responses to the question about the utility of the embedded links to resources, it seemed that some respondents were thinking more generally of library materials. One student volunteered, “yes, most of my information is from library books.” And the person that mentioned that the group was kept organized, it is unclear if it is the library resources or the virtual learning environment that were used. “It kept the group organized to have our resources all in one place. My group kept a list of works cited on our group page, which made it easy when we had to type it up at the end.”

When responding to how they found information during the project, students in the second focus group pointed to the helpfulness of linking to the databases.

Becka: It was really helpful cuz there was two databases on there [linked to the wiki]. So we could always click on those. And it gave you the password and the username on there, so you’d just type that in. And then you could just search whatever.
Annika: And it was just a link on the sidebar.
Becka: Yeah, it was really helpful too.
Celia: I think it was easy cuz you were online like at the same time so you could just like…
Annika: Have two windows open.
Celia: Yeah, click on a different window and just like copy or paste and read it. Or like you could post something on someone else’s page and they could like read it and get information if you found something.

This sentiment was echoed by the students in the first focus group who all mentioned at least trying the databases as a source of information for this project. Although she tried the databases and got some information, Celia reported turning to Google to seek most of her information. For other students, despite reporting finding quality information through the databases, they were not convinced they would use these types of information resources in the future.

Getting Help

Ask a group member, ‘Do you know how to do this?’ They all knew how. – Danielle

Overwhelmingly, students mentioned turning to other people as helps both for resolving problems in using the virtual learning environment and when encountering difficulties in finding information. As one respondent wrote, “I either asked my teacher, a friend or group member, or I just tried different things and figured it out myself.” Grace talked about feeling confused on the first day of research within the project and being confused and worried she was falling behind. When I asked how she figured out how to use the wiki, she said, “There’s this girl in my group who I’m not really friends with but she’s nice. So I mainly asked her and [teacher] and [librarian], and Naomi.” Within the virtual learning environment, the teacher and librarian were the most frequently mentioned source for help with other students also frequently utilized as sources to help solve difficulties. In conversations with the classroom teacher and school librarian, both mentioned observing that students relied heavily on each other as sources for help during the course of the project. Other helps mentioned included the instructions built into the wiki, notes that students took in the introductory section, and individual students just figuring things out through fiddling around. Becka talked about handling confusion and getting help:
Most likely, she [teacher] always had instructions tab on the wiki. So you could always click on that and it would give you like a step-by-step guide of how to like solve like those problems. Or like [the librarian], she came into our class and like explained how to do stuff and we took notes, so we could always go back and look at our notes if we forgot.

Another student echoed this practice of self-serving of using posted resources to try to solve problems, “When I first started using wikispace I was kind of confused on how to edit pages, how to save things, how to talk to someone via the wiki e-mail, etc. But then I found my way to the forums and saw that a lot of the other kids were having problems similar to mine also. So I read what they asked and Ms. Basic or Ms. Kirsch answered their questions.”

Table 4

Source of Help for Problems Using the Virtual Learning Environment

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
</tr>
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<tbody>
<tr>
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<td>Group members</td>
<td>6</td>
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<tr>
<td>Instructions on wiki</td>
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<tr>
<td>Friend</td>
<td>4</td>
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<tr>
<td>Other students or classmates</td>
<td>3</td>
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<tr>
<td>Self</td>
<td>3</td>
</tr>
<tr>
<td>Notes</td>
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</tr>
<tr>
<td>Asked someone</td>
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</table>

The teacher and librarian were seen as critical and safe sources for help. Within the focus groups, several students, particularly the overtly social students, reported the importance of access to friends as sources for help. Several of the students made clear distinctions about asking classmates and friends. And several people mentioned, particularly when dealing with initial
confusion about the project and using the wiki, that there was a level of hesitancy about asking
others who were not identified as friends or the hesitancy of the stigma of asking a question to
peers as a result of confusion. As Grace said, “If you weren’t great friends with everyone in your
group it was a little awkward. And you weren’t sure if you wanted to ask them questions.” She
went on to say, “But is you were with your friends, it actually helped to be with them cuz they
could help you out and you would feel good about it.” Grace was clearly more friendship driven
and social than the other three students in her focus group. However, all the girls in the focus
group reported feeling awkward talking to some of the people in their groups. Ian did not express
feeling awkward at all with his group.

When it came to needing help finding information, many of the helps that students
utilized overlapped with helps utilized for figuring out the virtual learning environment. A strong
preference for other people as resources was mentioned, including the teacher, librarian, group
members, and other students. Students also actively sought out additional resources either by
searching on their own or turning to the recommended resources. The instructions given in the
initial session were referred to at the time of need by one student.

Table 5

Source of Help for Problems Finding Information.

<table>
<thead>
<tr>
<th>Category</th>
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<tbody>
<tr>
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<tr>
<td>Group members</td>
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</tr>
<tr>
<td>Other students</td>
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</tr>
<tr>
<td>Other resources</td>
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</table>

(table continues)
Role of the School Librarian

Although the school librarian delivered two instructional sessions during the course of the project, only 42% of the study participants reported getting help from the school librarian during the project. Both of these sessions were given on consecutive days at the outset of the project. The first session consisted of instructions on how to use the wiki set up for the project and navigating the features of Wikispaces. The second session provided research instruction that was particularly focused on the use of the subscription databases that were embedded within the virtual learning environment. The final question on the open-response portion of the survey revolved around the involvement of the school librarian in the project and if that made a difference for the students. While twelve students mentioned that the librarian was helpful when it came to finding information and sources for the project, seven mentioned feeling that the presence of the librarian made was no difference in their project. The school librarian’s comfort with technology, particularly her experience with using wikis, was valued by a number of students. Again, portability was valued as students found the ability to gain access to the librarian from school or home.
Table 6  

*Ways the Involvement of the School Librarian Made a Difference in the Project*

<table>
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<tr>
<td>Not Involved/No difference</td>
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<tr>
<td>Use of resources</td>
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<tr>
<td>Ethical use</td>
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</table>

Communication and Collaboration  

We all communicated during the project well. I was sick for a few days, and so we talked through the wiki about the project. - survey response

Communication and collaboration were important components of the project. Students created individual content, but were expected to provide feedback to other students and work collaboratively to build an overall group project which compiled their individual work. In addition to the ability to edit each page within the environment, other communication tools available included a discussion tab on each page and a private messaging system that was essentially email within the virtual learning environment.

*Communication*

We talked in person every day, but we used the wiki even more to get our ideas across. The discussion tab, the email and the ability to edit each others’ papers especially were great. – survey response

When identifying the most helpful thing in completing the project, one student wrote, “Being able to communicate through messages on the wiki and not having to call everyone in my group helped me the most.” Communication was an important part of working together in this
project, and students mentioned forms of communication that ran the gamut including writing on wiki pages, messaging, face-to-face conversations, and email. These communication tools were used both in the face-to-face environment and when students were separated by distance. Several participants reported being separated from other group members while working in various locales within the school and turning to the electronic communication tools to talk. One respondent mentioned that her group experienced a communication breakdown and “things got confusing”. Several students emphasized the importance of talking to plan things out for the work of the project, “My group conversed about our topic, who does what, and what we would do when we get home, so we’d know when to go on the wiki.”

When asked about patterns of communication during the project, all students reported talking with members of their group in person. Twenty-five of the participating students reported communicating with other group members virtually about the assignment, using either email, the wiki, or some other type of electronic communication. In person communication was the preferred mode of communication between students and the teachers involved in the project. Twenty-nine participants reported talking to the teacher or librarian face-to-face about the project. The numbers dropped for virtual communication with the teacher or librarian during the project, with only 10 participants reporting communication with the staff members that way.
Some students and groups chose not to use virtual tools to communicate because they got most of their work done at school. Celia said:

My group was pretty good. We all kind of worked together. But sometimes I had to kind of like, I kinda had to…because they got off into all these different topics. I had to kind of get them in, like focused. And like in a controlled, nice way, you know. But otherwise I think our group worked really well. But we didn’t really…we didn’t really use…we didn’t really communicate on the wiki because like we got most things done in class so we were by each other, you know. We didn’t have to use it. But if we weren’t together I would have definitely used it.

The use of the virtual communication tools was dependent on the preferences of the group and the ways the members of the group negotiated working together. Members of the second focus group reported relying heavily on the various online communication tools during the project:

Becka: Well me, Annika, and Melissa, who’s not here, and we were all in a group together. We were probably the people who used it the most, I think. Cuz we always sent…like we had like 30 letters to each other. Cuz we thought it was like really helpful. And like if we didn’t talk and like sometimes me and Annika went to the library and
Melissa stayed back in the classroom, so it was easy like to talk through things and stuff. And like ask questions like, ‘Oh have you finished this?’ and ‘how many source cards do you have left?’ It was really helpful, I thought.

Annika: Yea, and then you could always just like leave someone a message. You didn’t have to like go through annoying phone calls back and forth because you just left a message and you knew that when they got on they would find it. And so because especially because Melissa has a really busy schedule like she’s always doing dance classes after school. And so she’d say, ‘Well, I can’t peer edit it now, but I’ll peer edit it like at 8:00 when I get back,’ and so I left her a message. I knew that she would get it just because…

Becka: And also, our group, we decided on a spot where we’d have our discussion questions cuz there’s a tab for discussion. We’re like we’re going to do it on our opening page, so we all now where to look for discussions. And that really helped cuz then we weren’t a billion different places like trying to find people’s questions that they had for us.

Several students mentioned one of the advantages of the ability to work and communicate within the virtual environment included removing them from potentially socially awkward situations. Focus group two was made up entirely of girls, and they mentioned that it was helpful not to have to worry about physically getting together outside school when transportation could be an issue. Beyond transportation issues, Annika said that there “wasn’t the awkwardness of like going to a guy’s house of having a guy come to your house. Like even though we’re in eighth grade, you know, there’s still that like, ‘I don’t want to go to your house to peer edit’ or whatever. Um, so, we could just do it online And that was nice.”

In a conversation about the project with the classroom teacher and the librarian, they mentioned that the level of student communication was very high within the wiki and exceeded the expectations of the staff members. The classroom teacher reported an increase in communication in the virtual learning environment in this round of the project, as opposed to the first time it was tried the previous year. However, this was attributed to the difference in student dynamics.
Students reported using communication tools within the virtual environment in multiple ways: as a social outlet, checking in, and for content related comments. The student reports of the types and purposes of electronic communication were supported by observations. Even though email communication was not seen, the comments posted on the wiki pages and discussion boards themselves showed these types of patterns. However, less of the social outlet type communication was seen than reported by students. It makes sense that this would be done more privately as this type of communication was discouraged by the teachers and not in line with the wiki use agreement that students had to sign at the outset of the project.

Social Outlet

After reporting that one of the features she really enjoyed was emailing friends within the virtual learning environment, Grace went on to say about the email tool, “In class it was kinda useless, cuz we could talk right there. But sometimes she [the teacher] wouldn’t want us to talk, so Naomi would be sitting right by me and I could be sending her an email. [Laughter].”

During my observations of student interactions within the virtual learning environment, I didn’t see much evidence of this behavior although students reported using communication tools for this purpose. It seems students relied on this as it was a channel of communication that was not able to be monitored by the teachers and could have some level of privacy. However, there was awareness by students that this type of communication was discouraged and disproved of by the teacher and librarian leading the project. Of the 38 students participating in this research study, 15 sent no messages through the wiki email system. The majority of students using the message feature sent three or less, with eight students sending more than four messages.
Checking In

Checking in was a way to touch base with other group members to information or progress, check on status, and offer encouragement. Students informed others about their own progress, checked in to confirm deadlines and asked questions, and inquired about how other groups members were moving in terms of progressing to meet assignment deadlines and goals. “We worked together by checking up on each other to see how we were doing and if we were doing something right or wrong.” Students used exchanges in the discussion tabs and wrote on the individual and group pages with this type of communication. Ian reported sending his group members email letting them know that he finished peer editing their work and that his work was ready to be edited.

Content Related Comments

Communication regarding the project content or the writing of individual students made up the bulk of the interactions between students in the virtual learning environment. The peer editing process was a large part of the interaction between group members and with other students in the project. Celia said of the comments put on her page by others:

I felt as thought like I was getting all these comments and I felt really good because like I’m not…they’re not…having comments aren’t like usually bad things. They can be really good things, you know? Some people might freak out about it, but I really like getting comments because it’s like they’re giving you suggestions on what the audience might want to ask or might want you to add. So that…I really liked it.

The peer editing process was one that students had used in the past and were accustomed to communicating in this format. However, most found the virtual learning environment afforded a better and smoother way to engage in peer editing.
As discussed earlier, students in the second focus group offered suggestions about possibilities for other types of communication that they would desire within the environment such as the capability to chat or instant message.

**Collaboration**

My group conversed about our topic, who does what, and what we would do when we get home, so we’d know when to go on the wiki. Then after we all completed our subtopic papers we thought of our transitions, introductions and conclusions for our group paper. – survey response

Although the majority of feedback about group function was either positive or neutral, several students within the focus group mentioned problems with group function as an issue. What seemed irksome to student respondents were group members who did not pull their weight or procrastinated. As Grace said, “There’s always a person in the group who slacks.” Because the work was tied together and deadlines had to be met, students who were out of communication with the rest of their group and students who posted their work at the last minute inconvenienced the other group members. This was unappreciated by members of the focus group. This exchange happened after I asked about tips that the students would give to people working in groups on future projects:

Naomi: Pull your weight
Grace: What’s that mean?
Naomi: Um. do what you have to do for the group.
Hannah: Yea, cuz it does get annoying when there is that one person.
Naomi: and contribute
Ian: Me and Hannah had a person in our group who didn’t post their rough draft until later in the night. So we had to go out of our way and edit that after we did everybody else’s.
Naomi: Yea, that’s what happened in my group. Somebody didn’t post theirs. So I didn’t get to edit theirs til really late at night.
Ian: I can understand Hannah’s. Hers wasn’t on there either, but she was in California so…
Me: She was in a whole different time zone.
Ian: Yea. But this other person was…they didn’t get it up until later. It was just kind of an inconvenience.

For those students who wanted to take on a leadership role or wanted to be sure the work was done on time, there was either pressure to lead or frustration at being tied to non-performing or underperforming members within the group.

Erika: My group was a little bit difficult because some of the people are…either have different ways of learning or they are just not really on top of things. So it was kind of hard for me to keep touch with them and to kind of have a
Becka: Nice ways of keeping them in…
Erika: Yea. I mean I like having everything in on time. Cuz I’m just that type of person. But, um…So it was kind of frustrating for me to see my group members not following up.

Danielle: For my group, um, Olivia was sick for like 2 weeks. And when we were putting everything on the one page and editing everyone’s, she hadn’t even written her 500-word essay thing. And then when she did write it and me and Shelly were posting it, it wasn’t in the like right format. It was just one big paragraph. So, like, she was never there and she wouldn’t really get on her computer cuz her wiki stopped working, like she couldn’t like log on.

While most of the reports of the collaboration within groups were generally positive, many of the students in the focus groups were able to recall an incident or group member who presented challenges in successfully or smoothly completing the project. From the responses, communication between group members was an important component of collaboration.

Summary

Students participating in the virtual learning environment had to learn to navigate the environment, develop their own portion of a research paper, and then work collaboratively to help each member of the group improve the individual pieces before putting the work into a cohesive whole. While there were certainly some challenges faced by students during the course of completing this assignment, students generally had positive experiences using the virtual
learning environment and found the wiki a useful tool in writing their research papers and working with their group, particularly in the area of peer editing.
CHAPTER V
DISCUSSION AND CONCLUSIONS

Online learning is increasingly being utilized in educational contexts. Even in face-to-face situations, aspects of online learning are being incorporated into course work as a way to supplement and extend educational opportunities. The purpose of this study was to explore student experiences and interactions within virtual learning environments while completing a curricular assignment.

Chapter I provided an introduction and background to the subject. Chapter II reviewed the relevant literature. Chapter III laid out the methodology used to address the purpose of the study. Chapter IV reported the findings resulting from the data analysis. This chapter presents a discussion of the results of the study, particularly in terms of the research questions. Later sections of the chapter explore the implications for practice and recommendations for further research.

Research Question 1

Research Question 1 asked: How do middle school students describe their experiences using a virtual learning environment for course related work? Through observations of student work and interactions, results from an online survey done at the conclusion of the student research project, and focus group sessions, data were collected about experiences using the virtual learning environment. Students identified three areas of strength in having a virtual learning environment available as a platform to complete a collaborative research project: portability, ease of use, and organization. Having the platform available, served to extend their time working on the project outside the school day. The students in the three groups I studied in depth all made changes to the wiki beyond their time at school.
Students were made aware of the utility of web-based work environments through their exposure to this project. There was an especially strong need and desire for the portability aspect of having a web-based environment. Some attempts to personalize the environment were made, but on a limited basis. Use of the virtual learning environment was almost exclusively for task-related use. There wasn’t much play or experimentation that was observed. This is in contrast to use of online spaces outside school where there is an emphasis in hanging out with friends, messing around and experimenting, and even geeking out to explore special interests (Ito et al., 2010).

Although guru status has been attributed to teens in regard to technology, much research has demonstrated that hasn’t proven the case, particularly in the areas of information access and use (Valenza, 2006). Several students, especially during the focus groups, mentioned their lack of technology prowess. However, the ease of use of the wiki seemed to help students with any apprehension about not being “techy”. Some students did have small problems in the beginning but a support infrastructure was in place to give them multiple avenues for help. Having a positive experience using technology and being successful in such an endeavor may have a positive impact on student beliefs of self-efficacy in the future. Self-efficacy beliefs influence how people feel, think, motivate themselves, and behave. A sense of efficacy can enhance accomplishment (Bandura, 1994).

Cognitive work analysis (CWA) examines the ways that users are engaging with work environments in order to design systems that better meet the needs of users to create more productive, responsive work environments (Fidel & Pejtersen, 2004; Pettigrew, Fidel, & Bruce, 2001). CWA takes a broad look at information behavior situated within a particular work context with a focus on examining tasks, the work environment, and the attributes of people who
perform the work-related tasks. As virtual learning environments are spaces intentionally designed for learning, these seem to be prime places for the application of CWA for system improvements. The needs and behavior of actors working in these work-centered environments, in this case the students engaged in the learning activity, can help determine future direction of the systems. In the case of this research, students in the focus groups made several recommendations about features they would like to see within the environment, including a chat feature and more stable aspects of the formatting. Gathering the experiences of those working within virtual learning environments is critical to help direct future design in order to continue to improve the environments as platforms for learning.

Research Question 2

Research Question 2 asked: In what ways do middle school students utilize material resources while participating in a virtual learning environment? Students in this project used a variety of resources to get information to write their research papers. Making access to research information easy and convenient was critical to use. Online research databases were linked within the virtual learning environment and books were available within the teacher’s classroom. Students demonstrated willingness to use resources that were made easily accessible. This seemed to hold true for electronic resources and print materials. Tenopir (2003) found that for high school students convenience was the most important factor for teen information use.

Students demonstrate a strong preference for commercial search engines over research databases. “Although academic resources are offered online, it may be that students have not been taught, or have not yet figured out, how to locate these resource” (Jones & Madden, 2002, p. 13). Some of the students within this project, despite giving the research databases a try, quickly turned back to commercial search engines to locate needed information.
Connecting students with research databases requires instruction, which includes insight into the types of information included within these resources. Teen users tend to be format agnostic, not distinguishing between sources of information (Abram & Luther, 2004). If it is information on the Internet it is information on the Internet, regardless of whether it is a journal article, personal website, blog post or tweet. While the embedding of resources positively impacted use and proved helpful to students within this assignment, it remains to be seen if students would turn to such resources in future work and how the skills developed in this project would transfer to the ability to access the resources independently from library websites.

Research Question 3

Research Question 3 asked: In what ways do students utilize human resources while participating in a virtual learning environment? When examining helps students used when facing confusion either using the virtual learning environment or finding information, other people were the most frequently used source. This echoes findings about the social nature of information seeking and the reliance placed on other people to help resolve questions and informational needs (Fisher et al., 2007; Hughes-Hassell & Agosto, 2007; Shenton & Dixon, 2004). The students in this study reported turning to the teacher and librarian, the adult faculty helping to lead this project, most often. Students also mentioned group members, friends, and classmates. In educational contexts, when moving beyond answers to teacher-generated questions, students rely heavily on family members and friends for help (Gross, 2004). For some students there was a distinction between asking friends and asking other students. Teens have an incredible preference for peers as an information source (Latrobe & Havener, 1997; Shenton & Dixon, 2003). Working in cooperative groups and creating situations where students need to work together to accomplish a task, builds in the support of peers as helps.
Students reported a variety of levels of impact on their work from the presence of school librarian as a resource in their project. The project was a collaborative effort by the classroom teacher and the librarian, with the librarian leading two instructional sessions at the beginning of the project. While some students reported that having the librarian involved made no difference, others reporting appreciating the help of the librarian and relied on her as a source of help because of her technology skills and ability to access informational resources. Even small attempts at embedding information resources within course management systems, another common form of virtual learning environments, impacts connecting students with the libraries (Buchanan, Luck, & Jones, 2002).

Research Question 4

Research Question 4 asked: How do middle school students use digital tools for communication and cooperative work when a virtual learning environment is used in concert with face-to-face interaction? The virtual learning environments used in this case gave users the ability to edit pages, use threaded discussions, and send email type messages. Having tools for communication within the virtual environment seemed to be valued and useful for most of the groups as they worked on their paper. Teens choose channels for communication based on several factors, linking various channels with types of content, situations, and people with whom they want to communicate. Teens must negotiate the channels and chose the best choice for their particular situation, often times these are social constructs (boyd, 2008, p. 114). There definitely was a preference for contacting the teachers for assistance face-to-face and during the confines of the school day. Students were much more likely to use the virtual communication tools to contact other group members. Friendship mattered when the students were communicating, especially at the outset of the project when people needed help. In small worlds, there are norms that define
behavior that are determined by the group culture (Chatman, 1999). Particularly in the landscape that faces contemporary teens with multiple tools and methods for contact, existing communication norms and standards for teens guide choices and behavior (Ito et al., 2010). In the virtual learning environment students used communication tools for task-related information, but there were also some off-task interactions. There were three types of communication identified: social outlet, checking in, and content related comment.

In this research, students were engaged in a class project that required them to create an individual research paper, but the individual work was part of a larger, cooperative project. Groups served to provide support, with group members helping each other navigate the environment and the project. In the end, groups needed to compile the works of all individual members in one cohesive project. The project was designed as a cooperative learning experience as defined by Johnson and Johnson (1994), where there was individual accountability within the construct of a larger group goal. Students reported valuing the help of others, but many students in the focus groups reported having to navigate problems with an individual member of the group contributing what was expected.

Implications for Practice

With the explosion of online learning, educators must continue to develop ways to support students in the virtual learning environments created as spaces for coursework and collaboration.

Information seeking habits develop early and users stick with the same search strategies and practice regardless of need (Jones, 2002). Creating awareness of different information sources and search techniques during youth builds skills and habits that will continue to serve people well as they age and continue on in education and in life. Embedding resources within the
learning environment clearly was a factor in student use of resources. On a wider scale, this lesson could be applied to other projects and research efforts being done in virtual learning environments. Even very minimal efforts at embedding resources within a course site have an impact in connecting users with the library (Costello, Lenholt, & Stryker, 2004). In situations where teachers and librarians become partners in collaboration to embed information skills and resources, access to and use of these resources by students grows (Buchanan, Luck, & Jones, 2002).

When students experienced confusion in finding information or using the virtual learning environment, the preferred source of help was another person. Allowing interaction between peers and with teachers should be built into learning design. Learning has a social component where working with others can support learners to grow and construct understanding (Vygostsky, 1978).

As much as other people are a preferred source of help for many of the students involved in this research, it was not the only source of assistance that was utilized by students engaged in the virtual learning environment. Incorporating access to help within the virtual learning environment through features such as frequently asked questions and discussion areas to post questions and offer answers is necessary, as some people used those resources to help navigate the project. Having an any time, any place learning environment requires access to help in some form that is always available for users.

When using a virtual learning environment to provide a platform for learning, the design of the online space should be considered to provide the most effective experience for users. Cognitive work analysis (CWA) is a framework that allows examination of information behavior, context, and systems. It examines the ways in which actors behave when using systems
for cognitive work in order to design more effective systems. System modeling attempts to abstract from details derived in narratives to move to a description that gives direction to design (Burns & Vincente, 2001). Making time to providing opportunities for student feedback in a variety of forms would help to build these narratives. Actors may have a difficult time articulating improvements to make it more aligned with their own mental processes (Fidel et al., 1999). CWA is complex, and one of the problems with CWA projects is that the narrative data are often gathered and recommendations made, but the modeling and implementation of the system design falls short. Incorporating those with technical know-how as partners in such efforts is necessary in order to move to the modeling stage, and this design and implementation loop must also continue as new environments and technologies emerge.

Aside from the environments being created for educational work, students are participants in a much larger world of online and mobile computing and communicating. Students frequently experience a disconnect between their digital lives in school and outside of it. Buckingham (2007) has identified a new digital divide emerging for students between in-school and out-of-school learning. There is a widening gap between tools that are used outside school and what is allowed within schools (Buckingham, 2007). Many schools shut down access to services or forbid devices that are heavily relied on for communication. As the Digital Youth Project argues, it is “…important to recognize the diverse genre conventions of youth new media literacy before developing educational programs in this space” (Ito et al., 2010, p. 344).

Limitations of the Study

As with any shiny new toy, the wiki was a new tool for students and held novelty. Since this was the first experience using a wiki and working in a virtual learning environment for most students, there was the experience of having a cool new toy with which to play. It remains to be
seen how more widespread use of a virtual learning environment might change student enjoyment and enthusiasm.

Access to the Internet and online services was available for students in this research study both in school and in their lives outside school. All participants had Internet access and a computer available to them regularly for at least for some amount of time outside school.

In this research, the site selected had in place a teacher and librarian with an active collaborative relationship. The librarian is an early adapter of technology in her professional life and seeks ways to incorporate new tools within her work environment. Due to her own skills and dispositions, the school librarian at this research site was well positioned to help lead this effort but it may not be possible to apply across people holding similar positions within schools. The research was not designed to explore the leadership of creating and leading the project, but instead, the student experiences within the project and learning environment.

Recommendations for Future Research

As with anything in life, seeking answers often leads to many more questions. This work is no exception. Several different directions of exploration emerge as a result of the outcomes of this research. This study focused on students engaging in a virtual learning environment for a single project in a single class used in conjunction with face-to-face interaction. How does prolonged access to a virtual learning environment impact class culture and communication? What is the impact of using a virtual learning environment on students? Is there a difference between a class that uses the environment and one that does not, in terms of student engagement, communication, quality of work, and/or student achievement?

The intersection of the user experiences within virtual learning environments and the design of such system provides much fodder for further exploration. An unexpected outcome of
this research was the emergence of user feedback for suggestions for system improvements. In what ways, can gathering student feedback about design issues be incorporated into experiences in virtual learning environments? And, more importantly, how can this feedback be used to improve virtual learning environments?

In terms of the use of resources for research, this project explored using embedded resources and access to the school librarian within the project environment both in a physical and virtual capacity. This seemed to be effective within this project. However, it raises an issue of scalability of this type of work, which would bear further investigation. From the user side, what is the extent of transfer when embedded resources are used within a learning experience to information seeking behavior outside the context of a particular assignment or class?

The tools and methods for communicating and connecting outside school are drastically different than what happens in school for contemporary youth. How does using a virtual learning environment in a formal educational context fit within student information or online ecology? How will mobile computing devices play a factor in virtual learning environments and access for students?

Final Thoughts

Students are more wired than ever before in their personal information ecologies, considering how to capitalize on this to engage learners and incorporate information skills are important considerations in designing educational environments and learning experiences. This study explored students engaged in a virtual learning environment by observing behavior and gathering data directly from students. Results of this research will help educators design more supportive learning environments that better meet needs of learners.
After looking at teen information seeking behavior, Valenza (2006) argues that teacher-librarians need to work toward making users smarter and making systems smarter. She calls for hybrid learning experiences with powerful face-to-face service and online presence. Studying user behavior and the usage of the systems themselves helps to identify areas for practitioners to direct efforts on both fronts. It is clear as educational work increasingly moves online, that adjustments to practice must be made. Jenny Levine, who writes a blog called The Shifted Librarian, has called to make the librarian more portable and shifted in order to better reach users, particularly youth users (Levine, 2004).

This research has begun to answer some questions about the experiences of middle school students in virtual learning environments. While many questions remain and new ones have emerged, the results of this research offers some advice for those working with students in virtual learning environments and provides insight into the behavior of youth while engaged in these emerging learning environments.
APPENDIX A

WIKI USE AGREEMENT
Non-fiction project Wiki Use Agreement

Purpose:
The purpose of class use of the wiki is to use technology to demonstrate understanding, to utilize knowledge from many students to increase knowledge of all, to give students greater access to class information, and to increase student use of technology for educational purposes.

Rules:
1. Everything on the wiki must be appropriate for school. Everything you create can and will be viewed by others. Treat this site as a place for learning, and a place to learn from each other. Do not say/write/do anything within this wiki site that you would not say/write/do at school.
2. When you are editing the wiki, you are changing the information that is published for all users to see. Treat the work of others with respect. You are allowed to edit your group’s page and your general class page only, but you may only do so if you are sure your own information is correct. Any defacing or sabotage of the wiki will not be tolerated.
3. Only information that is related to the assignment may be posted on the wiki.

Please keep these rules in mind. We are placing great faith in you and want this type of project to be available for students in the future. Every page on this site is monitored by your teachers. If anyone creates a problem, we will not be able to do assignments like this. We are excited about the project and know that you will exceed our expectations! Please report any technical difficulties concerning the wiki to a teacher immediately.

Violating the rules of the wiki may result in loss of wiki privileges and loss of project points.

Agreement: I agree to the purpose and rules for Non-fiction project wiki use. I promise to give my best effort, to write responsibly, and contribute appropriately when I edit the wiki.

Print Name & Class Period: __

Signature & Date: __

Wiki use agreement adapted from Flat Classroom Project Code of Ethics (http://flatclassroomproject.wikispaces.com/Code+of+Ethics) and Mrs. Murphy’s classroom wiki agreement (www.hoover.k12.al.us/sphs/Science/AMurphy/Webpage Documents/2006-2007/Wiki Agreement.pdf)
APPENDIX B

COPY OF IRB LETTER
September 17, 2008

Erin Wyatt
Department of Library and Information Science
University of North Texas

Re: Human Subjects Application No. 08294

Dear Ms. Wyatt:

As permitted by federal law and regulations governing the use of human subjects in research projects (45 CFR 46), the UNT Institutional Review Board has reviewed your proposed project titled "Middle School Students in Virtual Learning Environments: An Exploration of Information Behavior." The risks inherent in this research are minimal, and the potential benefits to the subject outweigh those risks. The submitted protocol is hereby approved for the use of human subjects in this study. Federal Policy 45 CFR 46.109(e) stipulates that IRB approval is for one year only, September 17, 2008 to September 16, 2009.

Enclosed is the consent document with stamped IRB approval. Please copy and use this form only for your study subjects.

It is your responsibility according to U.S. Department of Health and Human Services regulations to submit annual and terminal progress reports to the IRB for this project. Please mark your calendar accordingly. The IRB must also review this project prior to any modifications.

Please contact Shelia Bourns, Research Compliance Administrator, or Boyd Herndon, Director of Research Compliance, at extension 3940, if you wish to make changes or need additional information.

Sincerely,

Patricia L. Kamiński, Ph.D.
Chair
Institutional Review Board

PK: sb  
CC: Dr. Elizabeth Figa
APPENDIX C

INFORMED CONSENT AND ASSENT FORMS
University of North Texas Institutional Review Board
Research Consent Form for Parents

Title of Study: Middle School Students in Virtual Learning Environments: An Exploration of Information Behavior

Principal Investigator: Erin Drankwalter Wyatt, graduate student in the University of North Texas (UNT) Department of Interdisciplinary Ph.D. Program, School of Library and Information Science.

Before agreeing to your child’s participation in this research study, it is important that you read and understand the following explanation of the purpose and benefits of the study and how it will be conducted.

Purpose of the Study: You are being asked to allow your child to participate in a research study which involves exploring how your child uses information and library services while completing a research project using a wiki, a web site that allows users to create and edit content without requiring knowledge of coding language, created by the school librarian and language arts teacher.

Study Procedures: Your child will be asked to take an online survey which will take about 20 minutes of your child’s time after he/she has completed the class project. A few small groups of students will be asked to participate in a brief group interview to talk about the process of completing the research project within their group. In addition, the researcher will be able to observe student work within the wiki, the virtual learning environment being studied.

Foreseeable Risks: The researcher foresees no foreseeable risks to participants involved in this study. Participation is voluntary. Your student may stop participating in the study at any time and may decline to answer questions.

Benefits to the Subjects or Others: Participants may benefit from the time to reflect on the research project and process. The results of the study may also help teachers and school librarians to design more effective virtual learning environments for students in the future.

Procedures for Maintaining Confidentiality of Research Records: All reasonable measures will be taken to protect the confidentiality of your child’s records. The confidentiality of your child’s individual information will be maintained in any publications or presentations regarding this study.

Questions about the Study: If you have any questions about the study, you may contact Erin Wyatt at [redacted] or [redacted]. You may also contact Faculty Advisor, Dr. Elizabeth Figa of the University of North Texas, School of Library and Information Science, at [redacted] or [redacted].

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Page 1 of 2
Research Participants’ Rights: Your signature below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

- You understand the possible benefits and the potential risks and/or discomforts of the study.
- You understand that you do not have to allow your child to take part in this study, and your refusal to allow your child to participate or your decision to withdraw him/her from the study will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your child’s participation at any time.
- You understand why the study is being conducted and how it will be performed.
- You understand your rights as the parent/guardian of a research participant and you voluntarily consent to your child’s participation in this study.

Please return one copy of this form to your child’s language arts teacher or the school librarian.

Printed Name of Parent or Guardian

Printed Name of Student

Signature of Parent or Guardian

Date

APPROVED BY THE UNT IRB
FROM 9/17/08 TO 9/16/09
Student Assent Form

Title of Study: Middle School Students in Virtual Learning Environments: An Exploration of Information Behavior

Principal Investigator: Erin Drankwalter Wyatt, graduate student in the University of North Texas (UNT) Department of Interdisciplinary Ph.D. Program, School of Library and Information Science.

You are being asked to be part of a research project being done by the University of North Texas Department of Library and Information Science.

This study involves gathering your experiences with a research project using a wiki in your language arts class. The researcher is exploring the use of information and library services by students involved in working on projects in a virtual environment. The researcher will have access to the wiki site while you and your classmates work on the project.

You will be asked to take an online survey that will take about 20 minutes of your time after you have completed the project. You and the other members of your project group may be asked to participate in a follow-up group interview for more information about your experience during the project that will take no more than one hour of your time.

If you decide to be part of this study, please remember you can stop participating any time you want to.

If you are willing to be part of this study, please sign your name below.

Printed Name of Student

Signature of Student

Date

APPROVED BY THE UNT IRB

Page 1 of 1
Wiki Project Survey

Please think about your experiences during the nonfiction wiki project to answer the following questions.

1. Did you use any resources from the school library to complete the project?  
School library resources include library books, online databases, and the library website.
   - Yes
   - No

2. Did you get help from the school librarian during the project?
   - Yes
   - No

3. Did you talk to your teacher or the librarian in person about the assignment while working on the project?
   - Yes
   - No

4. Did you communicate with your teacher or the librarian virtually (through email, on the wiki, or using some other type of electronic communication) while working on this project?
   - Yes
   - No

5. Did you talk to other members of your group in person about the assignment while working on the project?
   - Yes
   - No

6. Did you communicate with other members of your group about the assignment virtually (through email, on the wiki, or using some other type of electronic communication)?
   - Yes
   - No
7. Please rate the following resources in their usefulness to you in completing the project.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Extremely helpful</th>
<th>Somewhat helpful</th>
<th>Of little help</th>
<th>Not helpful</th>
<th>Did not use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myself</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other members in my group</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The instructional sessions when we started the project</td>
<td>○</td>
<td>○</td>
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</tr>
<tr>
<td>The library resources on the wiki</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The video clips and how-to guides on the wiki</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The examples of work and looking at other group's pages on the wiki</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My teacher</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>My school librarian</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>The school library website</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Describe how your group worked together to complete the project.


9. When you were confused about using the wiki how did you figure out your problem?


10. When you were confused about finding information how did you figure out your problem?


11. What helped you most when completing this project?


12. Do you use school library resources to help you on assignments? Why or why not?
School library resources include library books, online databases, and the library website.


13. In this project, did it make a difference in your use of library resources that they were linked to and included in the project wiki?

14. How did the involvement of the school librarian in the wiki project make a difference in your use of the school librarian or the library resources?

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APPENDIX E

CODEBOOK FOR OPEN-ENDED SURVEY RESPONSES
QUESTION 8 : Describe how your group worked together to complete the project.

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compiled Individual Work</td>
<td>put together individual work</td>
<td>Each student created an individual piece of the project. To complete the collaborative effort, students compiled their work in a single paper.</td>
<td>Use when respondent says they worked separately or on their own topic, sub-topic and mentions compiling work or putting pieces in one paper.</td>
<td></td>
<td>&quot;We worked separately&quot;; &quot;did our own&quot;; &quot;added them together&quot;; &quot;put our topics into one paper&quot;</td>
</tr>
<tr>
<td>Helped with Questions (Progress)</td>
<td>getting help from peers when there were questions, checked up on progress</td>
<td>As an example of working together, students communicated with other members of their groups to ask questions, clarify when there was confusion, or to check in about the groups progress and find out about individual progress toward meeting that goal.</td>
<td>Use when respondent mentions asking or answering questions about the project or when there are comments about helping each other out</td>
<td></td>
<td>&quot;checking up on each other to see how we were doing&quot; &quot;answer any questions people in my group had&quot;</td>
</tr>
<tr>
<td>Share Workload</td>
<td>idea of planning as a group to complete work. Adding value to work through working together.</td>
<td>The planning and organization of the work that needed to be done together by the members of the group. Having specific idea that the members were sharing the workload and all needed to contribute in order to</td>
<td>Use when the respondent mentions planning, dividing work, and/or sharing responsibility</td>
<td></td>
<td>&quot;We talked and planned things out before doing it&quot;; &quot;we all participated&quot;; &quot;we just told each other what to do&quot;</td>
</tr>
<tr>
<td>Communication Code</td>
<td>Description</td>
<td>Example Use</td>
<td>Example Text</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Some members struggled expressing difficulty with completing the project</td>
<td>This code was used when there were indications of problems of individuals using the technology or completing the work</td>
<td>&quot;some of us had a little trouble&quot;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>communication code is used to denote some type of exchange between group members</td>
<td>The communication code denotes exchange of information or conversation between group members. Use when respondent mentions group members communicating in some form to during the project to help them make progress on the task.</td>
<td>&quot;we messaged each other&quot;;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication Breakdown</td>
<td>communication code is used to denote some type of exchange between group members, in this case when communication either goes badly or does not occur when it should</td>
<td>The communication code denotes exchange of information or conversation between group members. A specific type of communication is included to denote the method of communication. In this case it is when there is a communication breakdown or a lack of needed communication. Use when respondent mentions a problem with the communication within their group. Do not use when communication appears positive</td>
<td>&quot;things got confusing&quot;;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wiki as tool</td>
<td>use of the wiki as a tool for working together</td>
<td>An acknowledgement that the wiki itself with its features was a useful tool for the group to complete the project. The platform itself was helpful to project completion. Use of the wiki as a tool for editing is also included within the use of the wiki as tool.</td>
<td>Use when respondent mentioned the wiki was a useful tool or helped them complete the project</td>
<td>&quot;we used the wiki to get our ideas across&quot;; &quot;using the wiki made the project easier&quot;</td>
<td></td>
</tr>
</tbody>
</table>
QUESTION 9: When you were confused about using the wiki how did you figure out your problem?

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help - Teacher &amp;/or Librarian</td>
<td>Source of help was a teacher and/or a school librarian</td>
<td>Student identified when there was a question or confusion with using the wiki, he/she turned to a teacher and/or school librarian for assistance.</td>
<td>Use when a teacher or librarian is mentioned as a help</td>
<td></td>
<td>&quot;asked my teacher&quot;;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&quot;asked Ms. Kirsch&quot;;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&quot;asked Ms. Basic&quot;</td>
</tr>
<tr>
<td>Help - Notes</td>
<td>Referred to notes taken during introductory session</td>
<td>At the onset of the project, an introductory session was done giving information about the wiki and how-to instructions. Students took notes during these sessions. Referring back to these notes when working was one strategy mentioned as a help.</td>
<td>Use when notes are mentioned</td>
<td>Do not use when mention talking to a person.</td>
<td>&quot;I looked back at my notes and they helped me figure it out.&quot;; &quot;I looked at the notes I took during Mrs. Kirsch's presentation.&quot;</td>
</tr>
<tr>
<td>Help - Fiddled (Self)</td>
<td>Solved confusion independently by playing with the wiki</td>
<td>When encountering questions or confusion, the respondent answered those questions by trial and error or figuring out how to use the wiki on his/her own.</td>
<td>Use when figuring it out by his/herself while using the wiki.</td>
<td>Do not use when resources like notes or other people are indicated as the source of help.</td>
<td>&quot;I fiddled around&quot;;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&quot;I just figured it out myself&quot;</td>
</tr>
<tr>
<td>Help - Asked Other</td>
<td>solved confusion by asking someone</td>
<td>When encountering questions the person asked someone for assistance.</td>
<td>Use when it is not specified who was asked for help.</td>
<td>Do not use when a specific person or group of people are identified as the source of the help.</td>
<td>&quot;asked someone for help&quot;;</td>
</tr>
<tr>
<td>---------------------</td>
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<td>---------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Help - Instructions on Wiki</td>
<td>Source of help was tips and questions &amp; answers posted on the wiki</td>
<td>When encountering questions or confusion, the respondent found solutions through posting questions on the wiki or using the already existing helps provided</td>
<td>Use when questions tab is mentioned, forums dealing with problems posted by others</td>
<td>Do not use when a face-to-face solution has been sought.</td>
<td>&quot;I used the 'Questions?' tab to type a note to my teacher&quot;; &quot;Found my way to the forums. So I read what they asked and Ms. Basic or Ms. Kirsch answered their questions&quot;; &quot;go to the helpful tips section&quot;</td>
</tr>
<tr>
<td>Help - Group Members</td>
<td>Source of help was other students in the cooperative learning group</td>
<td>When encountering questions or confusion, the respondent sought assistance from other members of his/her cooperative learning group.</td>
<td>Use when group members are mentioned</td>
<td>Do not use with references to friends or classmates</td>
<td>&quot;asking some of the members of my group&quot;; &quot;my group members&quot;</td>
</tr>
<tr>
<td>Help - Other Students/Classmates</td>
<td>Source of helps was other students within the class</td>
<td>When encountering questions or confusion, the respondent answered questions by seeking help from another student or classmate.</td>
<td>Use when other students or classmates are mentioned</td>
<td>Do not use with references to group members</td>
<td>&quot;asked other students&quot;</td>
</tr>
</tbody>
</table>
| Help - Friend | Source of help was identified as a friend | When encountering questions or confusion, the respondent found solutions through asking friends | Use when friend is mentioned | Do not use with references to group members or classmates | "I asked a friend"; "I asked a friend near me or if I was home I would call a friend"

| Wiki? - page, post | Confusion about setting up own page | The respondent experienced confusion when it came to setting up a new page and posting materials | Use when confusion about setting up a new page is mentioned | "The wiki confused me when I had to set up my own page to post my outline, etc";

| Wiki? - rarely | Experienced a very small amount of confusion | The respondent encountered minimal confusion when using the wiki | Use when confusion is mentioned as rare or minimal | "I was rarely confused when using the wiki space."

| Wiki? - saving | Confusion about saving | The respondent encountered confusion when trying to save materials | Use when a problem saving is mentioned | "I was a little confused on how to save things both then I found out and everything was fine"; "how to save things";

| Wiki? - no | No confusion using the wiki | The respondent did not report being confused about using the wiki. | Use when there has been no confusion reported | "No, I wasn't confused it was actually very easy."; "I had no problems after Ms. Basic taught us how to use the wiki"
| Wiki? - edit | Confusion about how to edit pages | The respondent encountered confusion when trying to edit pages | Use when there is a problem editing or making changes to pages | "When I first started using the wikispace I was kind of confused on how to edit pages"; "on how the wiki can not save more that one thing at a time"

| Wiki? - communication | Confusion about the communication tools within the wiki | The respondent reported confusion when trying to use the various communication tools, like email and posting messages | Use when there is confusion using the wiki email or other messaging, communication features | "how to talk to someone via the wiki e-mail"

| Wiki? - adding attachment | Confusion about how to add attachments into the wiki. | The respondent reported confusion in adding attachments or uploading files into the wiki. | Use when confusion is about loading files or adding attachments | "confused when we had to add an attachment"
### QUESTION 10: When you were confused about finding information how did you figure out your problem?

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Help - Other Resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help - Group Members</td>
<td>Source of help was other students in the cooperative learning group</td>
<td>When encountering questions or confusion, the respondent sought assistance from other members of his/her cooperative learning group.</td>
<td>Use when group members are mentioned</td>
<td>Do not use with references to friends or classmates</td>
<td>&quot;asking some of the members of my group&quot;; &quot;my group members&quot;</td>
</tr>
<tr>
<td>Help - Other Students</td>
<td>Source of help was other students within the class</td>
<td>When encountering questions or confusion, the respondent answered questions by seeking help from another student or classmate.</td>
<td>Use when other students or classmates are mentioned</td>
<td>Do not use with references to group members</td>
<td>&quot;asked other students&quot;</td>
</tr>
<tr>
<td>Help - Teacher &amp;/or Librarian</td>
<td>Source of help was a teacher and/or a school librarian</td>
<td>Student identified when there was a question or confusion with using the wiki, he/she turned to a teacher and/or school librarian for assistance.</td>
<td>Use when a teacher or librarian is mentioned as a help</td>
<td></td>
<td>&quot;asked my teacher&quot;; &quot;asked Ms. Kirsch&quot;; &quot;asked Ms. Basic&quot;</td>
</tr>
<tr>
<td>Help - Refined Search</td>
<td>Kept refining search terms to find better information</td>
<td>When encountering obstacles in gathering information, respondent tried different search terms until getting a useful source.</td>
<td>Use when search terms and results are mentioned</td>
<td></td>
<td>&quot;I kept trying different search quotes and after about four or five I found a good source.&quot;</td>
</tr>
<tr>
<td>Help - Instruction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Help - Recommended Resources</td>
<td>Help - Notes</td>
<td>At the onset of the project, an introductory session was done giving information locating and using information and how-to instructions. Students took notes during these sessions. Referring back to these notes when working was one strategy mentioned as a help.</td>
<td>Use when notes are mentioned</td>
<td>Do not use when mention talking to a person.</td>
<td>&quot;I looked back at my notes and I figured out…&quot;;</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-----------------------------</td>
<td>--------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Information? - No</td>
<td>Information? - database use</td>
<td>No confusion finding information</td>
<td>The respondent did not report being confused about finding information.</td>
<td>Use when there has been no confusion reported</td>
<td>Do not use if the respondent indicates using a help or having a specific difficulty</td>
</tr>
</tbody>
</table>
QUESTION 11: What helped you most when completing this project?

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resources -</td>
<td>Database</td>
<td>The access and use of databases was identified as helpful.</td>
<td>Used when databases are mentioned including Gale, EBSCO.</td>
<td>Do not use when the free web</td>
<td>&quot;online database&quot;; &quot;Gale.com was an excellent source&quot;; &quot;EBSCO and GALE&quot;</td>
</tr>
<tr>
<td>database</td>
<td></td>
<td></td>
<td></td>
<td>(Google) or books are mentioned</td>
<td></td>
</tr>
<tr>
<td>Resources -</td>
<td>The availability of tools to help cite sources</td>
<td>Tools or guides that allow instructions, model how to cite sources, or provide</td>
<td>Use when works cited or citations are mentioned</td>
<td></td>
<td>&quot;also the citation source website&quot;</td>
</tr>
<tr>
<td>citation</td>
<td></td>
<td>citations that generate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources -</td>
<td>Use of print books as a resource</td>
<td>Print materials, books are identified as helpful.</td>
<td>Use when print or books are mentioned</td>
<td>do not use for online resources or databases</td>
<td>&quot;Books&quot;; &quot;Library books&quot;</td>
</tr>
<tr>
<td>books</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resources -</td>
<td>The how-to and tips that were housed on the wiki</td>
<td>The wiki included a page of tips and how-to information, as well as a place to</td>
<td>Use when wiki tips, how-to guides are mentioned</td>
<td>Do not use for face-to-face</td>
<td>&quot;The tips on the wiki that Ms. Basic or Mrs. Kirsch would put up.&quot;</td>
</tr>
<tr>
<td>wiki tips</td>
<td></td>
<td>post questions and answers</td>
<td></td>
<td>resources or helps</td>
<td></td>
</tr>
<tr>
<td>Ease of Use -</td>
<td>The portability of the wiki platform and the ability</td>
<td>The ease of use of the wiki, especially in relation to be able to work online</td>
<td>Use when portability, ability to use at multiple locations, work from home and</td>
<td></td>
<td>&quot;That you could save what you were working on at school and when you get</td>
</tr>
<tr>
<td>portability &amp;</td>
<td>to access work and materials online</td>
<td>and the amount of portability this provided.</td>
<td>home and school is mentioned, work is housed online</td>
<td></td>
<td>home you can just open what your were working on and keep working&quot;;</td>
</tr>
<tr>
<td>online access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&quot;being able to access wherever I wanted&quot;</td>
</tr>
<tr>
<td>Ease of Use - organization</td>
<td>The platform of using the wiki was an aid to organization</td>
<td>The single location of the wiki and the ability to be able to post materials was an aid to organization.</td>
<td>Use when organization mentioned</td>
<td>&quot;it helped me get organized better instead of keeping all those papers and I might lose them it helped me organize that way I would not lose anything.&quot;</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Ease of Use - online communication</td>
<td>The platform allowed for communication between group members beyond the school day</td>
<td>The communication tools built into the wiki allowed for group contact in school and beyond the school day.</td>
<td>Use when communication, email, or messaging are mentioned</td>
<td>&quot;It was so helpful to communicate there instead of the next day at school - especially if it was due tomorrow&quot;; &quot;being able to talk to my group online and talk about what needs to be done, etc&quot;</td>
<td></td>
</tr>
<tr>
<td>Wiki as Tool</td>
<td>The wiki was identified as the most helpful aspect of completing the project.</td>
<td>The wiki was mentioned as the most helpful thing, but no detail was provided about what features of the wiki were particularly appreciated.</td>
<td>Use when the wiki is mentioned without any explanation of specific helpful features of the tool</td>
<td>Do not use if the communication tools or specific reasons why the wiki is seen as valuable (such as the portability and organizational advantages) are mentioned</td>
<td>&quot;the wiki&quot;; &quot;the wiki all the way&quot;</td>
</tr>
<tr>
<td>Group</td>
<td>Other group members are seen as critical to completing the project</td>
<td>Having group members to work with are indicated as important to completing the project</td>
<td>Use when the group is indicated as helpful</td>
<td>Do not use if there is mention of communication between group members</td>
<td>&quot;my group members were very helpful&quot;</td>
</tr>
<tr>
<td>------------</td>
<td>------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>Teacher</td>
<td>The teacher is seen as a critical part in completing the project.</td>
<td>Assistance and support from the teacher is seen as a helpful piece to complete the project.</td>
<td>Use when the teacher or Ms. Basic is indicated</td>
<td>&quot;Ms. Basic&quot;</td>
<td></td>
</tr>
</tbody>
</table>


QUESTION 12: Do you use school library resources to help you on assignments? Why or why not? School library resources include books, online databases and the library website.

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>online databases</td>
<td>Database</td>
<td>The access and use of databases was identified.</td>
<td>Used when databases are mentioned including Gale, EBSCO.</td>
<td>Do not use when the free web (Google) or books are mentioned</td>
<td>&quot;online database&quot;; &quot;I would find on EBSCO or Gale would be well written.&quot;</td>
</tr>
<tr>
<td>book</td>
<td>Use of print books as a resource</td>
<td>Print materials, books are identified as used.</td>
<td>Use when print or books are mentioned</td>
<td>do not use for online resources or databases</td>
<td>&quot;Books&quot;; &quot;Library books&quot;</td>
</tr>
<tr>
<td>own computer</td>
<td>use of online resources at home.</td>
<td>Use of free web resources at home, using own equipment</td>
<td>Use when home computer mentioned</td>
<td>Do not use when school databases or other resources are mentioned</td>
<td>&quot;No I don't because I will search things up on my own computer at home if I need to.&quot;</td>
</tr>
<tr>
<td>public library</td>
<td>use of resources found at the public library.</td>
<td>Use of the local public library for resources available that are not accessible at the school library.</td>
<td>Use when public library is mentioned</td>
<td></td>
<td>&quot;At my school library it does not have a very good variety [sic] of books about the EAC, so I chose to use the public [sic] library more frequently.&quot;</td>
</tr>
<tr>
<td><strong>encyclopedia</strong></td>
<td><strong>use of an encyclopedia as a resource.</strong></td>
<td><strong>Use of an encyclopedia as a resource for information</strong></td>
<td><strong>Use when encyclopedia is mentioned</strong></td>
<td><strong>&quot;I used the encyclopedia to help find information about my subtopic.&quot;</strong></td>
<td></td>
</tr>
</tbody>
</table>


QUESTION 13: In this project, did it make difference in your use of library resources that they were linked to and included in the project wiki?

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>First code Y/N; then on any particularly tool or resource mentioned</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Quality</td>
<td>The information provided was of high quality.</td>
<td>Use of the internally linked resources was preferred because it was perceived to have high quality information, information that met the informational need.</td>
<td>Use when great information is mentioned</td>
<td></td>
<td>&quot;library resources provided in this link made a big difference because I found that the books and the online databases had TONS of great information.&quot;</td>
</tr>
<tr>
<td>Organization</td>
<td>Having information integrated within the source was an aid to organization</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helpful</td>
<td>It was helpful to have information resources integrated into the wiki</td>
<td>Using the wiki (virtual environment) as a jumping off point for information resources where links to the resources were included was deemed as helpful</td>
<td>Use when helpful is mentioned.</td>
<td>Do not use when easy is mentioned</td>
<td>&quot;It was helpful to have those linked to help out when needed&quot;;</td>
</tr>
<tr>
<td>---------</td>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>-------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Easy</td>
<td>Ease of use was mentioned because of the accessibility of links to information resources</td>
<td>Using the wiki (virtual environment) as a jumping off point for information resources where links to the resources were included was deemed as easy</td>
<td>Use when easy or ease of access is mentioned</td>
<td>Do not use when helpful is mentioned</td>
<td>&quot;It was very easy to get there&quot;; &quot;it was nice and easy to find the website&quot;; &quot;a lot easier to use&quot;</td>
</tr>
</tbody>
</table>
QUESTION 14: How did the involvement of the school librarian in the wiki project make a difference in your use of the school librarian or library resources?

<table>
<thead>
<tr>
<th>Code</th>
<th>Brief Definition</th>
<th>Full Definition</th>
<th>Guidelines for Use</th>
<th>Guidelines for when not to use</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Understanding</td>
<td>Interaction with the librarian led to increased understanding</td>
<td>The accessibility and services of the school librarian within the project led the respondent to report increased understanding</td>
<td>Use when respondent mentions learning and growing in knowledge/abilities</td>
<td>Do not use when no difference is mentioned</td>
<td>&quot;I understood how to use more of the library resources&quot;; &quot;I learned more about…&quot;</td>
</tr>
<tr>
<td>Not Involved/No difference</td>
<td>The librarian was not involved or made no difference in the respondent's experience during the project.</td>
<td>The respondent did not identify any involvement of the librarian or did not identify any difference made in the involvement of the librarian within the project.</td>
<td>Use when respondent mentions no involvement or no difference.</td>
<td></td>
<td>&quot;She was not really involved&quot;; &quot;having the librarian on the wiki space didn't really make a difference to me.&quot;</td>
</tr>
<tr>
<td>Use of wiki/technology</td>
<td>Interaction with the librarian led to more effective use of the wiki and/or technology</td>
<td>The respondent identified that the involvement of the school librarian led to more knowledge and/or comfort with using the wiki or technology involved in the project.</td>
<td>Use when respondent mentions learning about the wiki or gaining from the librarian's technology skills</td>
<td>Do not use when information resources are mentioned</td>
<td>&quot;Mrs. Kirsch helped me with the wiki&quot;; &quot;With her being involved I learned more about using the wiki and how to do stuff on that&quot;</td>
</tr>
<tr>
<td>Use of resources</td>
<td>interaction with the librarian led to finding resources perceived as helpful</td>
<td>The respondent identified that the involvement of the school librarian led to more knowledge in terms of finding and using resources and/or that the librarian helped facilitate the location of resources.</td>
<td>Use when respondent mentions information, resources and/or research</td>
<td>Do not use when the use of the wiki itself is mentioned</td>
<td>&quot;Also I learned about new resources that are better than a Google search&quot;; &quot;she helped me find most of the books that I needed to use.&quot;</td>
</tr>
<tr>
<td>------------------</td>
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<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ethical use</td>
<td>The librarian provided guidance is citing sources</td>
<td>The respondent indicated that the librarian provided instruction or guidance in using information ethically, particularly in the area of citing sources</td>
<td>Use when respondent mentions citation</td>
<td></td>
<td>&quot;citing some sources&quot;</td>
</tr>
<tr>
<td>Source of help</td>
<td>The librarian provided needed help at points of confusion</td>
<td>The respondent indicated that the librarian provided help at points of confusion of obstacles during the project.</td>
<td>Use when respondent mentions help or helpfulness</td>
<td></td>
<td>&quot;It was good to have the help&quot;; &quot;She was a lot of help&quot;</td>
</tr>
</tbody>
</table>
REFERENCES


Bernier, A. (2007). Introduction: Not broken by someone else’s schedule: On joy and


National School Boards Association. (July 2007). Creating and connecting: Research and guidelines on online social and educational networking.


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Walter, V. A., & Mediavilla, C. (2005). Teens are from Neptune, librarians are from

