A COMPARISON OF EDUCATION, BUSINESS, AND ENGINEERING UNDERGRADUATE STUDENTS' INTERNET USE AND THEIR EXPERIENCE, CONFIDENCE, AND COMPETENCE IN USING NEW LITERACIES OF THE INTERNET

A Dissertation

by

SU YEON KIM

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2011

Major Subject: Curriculum and Instruction

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Co-Chairs of Committee,	Erin McTigue
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ABSTRACT

A Comparison of Education, Business, and Engineering Undergraduate Students' Internet Use and Their Experience, Confidence, and Competence in Using New Literacies of the Internet. (May 2011)

Su Yeon Kim, B.A.; M.A., Ewha Womans University; M.A., Stony Brook University

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This study explored beginning and advanced pre-service teachers' Internet use and their experience, confidence, and competence in using new literacies of the Internet. In addition, this study compared the pre-service teachers to same-aged business and engineering students. Through using an online survey, this study recruited 1350 students from the various disciplines. This study conducted comparisons between a) underclassmen across the three majors, b) seniors across the majors, and c) underclassmen and seniors within the majors.

This study found that as digital natives, education, business, and engineering students used the Internet frequently. However, they were relatively unfamiliar with using new literacies of the Internet during their high school and university educational experiences. Overall, the three majors' students were confident but they were not competent in using new literacies of the Internet including locating and evaluating information on the Internet. Comparisons between and within the majors revealed that education underclassmen were less confident and competent than engineering

underclassmen peers and senior education students in evaluating information on the Internet. Education seniors were comparable to business and engineering seniors in their confidence and competence in both locating and evaluating information on the Internet. The findings imply that teacher educators need to understand the weaknesses of their pre-service teachers and provide them with appropriate opportunities and training to know how to effectively use and furthermore teach new literacies of the Internet.

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TABLE OF CONTENTS

CHAPTER Page

LIST OF TABLES

TABLE Page

TABLE Page

TABLE Page

TABLE Page

TABLE Page

CHAPTER I

INTRODUCTION AND THE IMPORTANCE OF THE STUDY

Introduction

The Internet has become an influential technology to search information and communicate with people at work, at home, and in school (Leu, Kinzer, Coiro, & Cammack, 2004). By using the Internet, people conveniently and quickly access and share massive information with others without restriction of time and space in their personal and professional lives. In this digital and information age, it is thus essential for educators to incorporate Internet-based technology and instruction in their classrooms to promote, improve, and reinforce the so-called new literacies of the Internet that "allow us to use the Internet…to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others" (Leu, et al., 2004, p.1572).

Current pre-service teachers are "digital natives" (Prensky, 2001, p.1) and accordingly, there is often an assumption that they will inherently have the skills needed to effectively use the Internet and thereby teach students new literacies of the Internet.

However, current pre-service teachers' frequent use of the Internet may not be enough to acquire the skills necessary to effectively use and furthermore teach new literacies of the Internet to their students. This study was designed to measure the extent

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This dissertation follows the style of *Scientific Studies of Reading*.

that current pre-service teachers are prepared to use and instruct with the Internet.

Internet Use

Since the advent of the Internet in the 1990s, the world has changed dramatically. The Internet has influenced the world's national, social, political, economic, and cultural boundaries because it connects people without restriction of time and space (Lee & So, 2002; Lee, Leung, & So, 2004). An almost unlimited number of Internet users can communicate at the same time (Lee, et al., 2004). Instead of spending time and money on business trips, people in different countries can work together by having real-time interactions through Internet-based video conferencing such as SKYPE, and they can exchange e-mails at any time from any location.

The Internet has also become inevitable and essential in modern people's personal lives. Through the Internet, people extend their capacities to locate, collect, and exchange information. Through web searching, people conduct research and gather a huge amount of information and data while at home or almost anywhere with Wi-Fi access. In 2009, about 60 percent of Americans went online by using wireless devices (Horrigan, 2009b). People read newspapers, literature, and magazines online and have news of their interests delivered to their personal e-mails. Through the Internet, for example, people take virtual tours before reserving hotels and buying houses, and they download driving directions, music, recipes, photos, videos, and podcasts. Websites such as eBay and Amazon have replaced many garage sales. According to Lenhart (2005), about 25 million Americans have sold things on the Internet. Through social

networking websites such as Facebook, Myspace, and Second Life, people build virtual communities to share and interact with other people.

Furthermore, the Internet has become essential in the workplace. The seventh annual Globalspec Engineering Trends online survey reported that engineers have depended heavily on the Internet to locate components, get product information, or research for work (Electronic Design, 2008). Business people have used the Internet for key work-related tasks such as e-commerce. According to the Connect Ohio 2008 Business Technology Assessment (2008), business people used the Internet for purposes such as online purchasing, online marketing, and online training. In more than 30 percent of Ohio businesses, all of the employees depend on the Internet for their work (Connect Ohio 2009 Business Technology Assessment, 2009). Leu, Kinzer, Coiro, and Cammack (2004) emphasized that in the information age, competitive workers must have capacities to identify important questions, locate relevant information to answer the questions, evaluate and synthesize information, and communicate the findings to people.

Students, Internet Use, and the New Literacies of the Internet

Colleges and universities have become reliant on the Internet and therefore knowledge and skills necessary for Internet use have become more important. Submitting applications for admissions and scholarships and taking tests online are more prevalent. Previously printed academic texts, such as journal articles, are now readily accessible online and e-books are populating libraries. According to the 2008 Global Student E-Book online survey, 50 percent of students at about 400 colleges and universities in the world responded that they “very often or often” preferred to use

electronic materials rather than printed books (Ebrary, 2008). Universities are providing more online courses. For example, four million university students took at least one online course in 2007 (Allen & Seaman, 2008). Online surveys, trainings, and course evaluations have been conducted. E-mails, instant messages, and online discussions are used in exchanging ideas and communicating with students. According to the 2008 Global Student E-Book online survey, college and university students used Google and other search engines most frequently for research and course assignments in 2008 than non-electronic sources (Ebrary, 2008).

Today's college students have grown up with the Internet as children and, as such, may be comfortable with this type of environment when they enter higher education. In 2009, about 251 million people in North America used the Internet (Internet World Stat, 2009) and 63 percent of adult Americans reported having broadband high-speed Internet access (Horrigan, 2009a). Within education settings, the Internet has rapidly become commonplace. While in 1994, only 34 percent of public schools had Internet access, almost all the schools reported having the Internet in 2005 (National Center for Education Statistics, 2005). In 2005, 94 percent of public schools indicated that their class rooms had Internet access (National Center for Education Statistics , 2005). This change is reflected in students' Internet use as well. In 2005, nearly 90 percent of all middle and high school students in the U.S. reported that they used the Internet (Rainie & Hitlin, 2005). According to the Parents & Teens 2006 Survey, 64 percent of 935 children in middle and high schools in the U.S. experienced

content creation activities (e.g., creating web pages or writing online journals) on the Internet (Lenhart, Madden, Macgill, & Smith, 2007).

Accordingly, with such high levels of exposure, today's children appear to navigate the Internet with ease. As so-called "digital natives" who are "native speakers of the digital language of computers, video games, and Internet" (Prensky, 2001, p. 1), children appear to know how to search websites that interest them and to use information they have found on the Internet. They use emails, instant messages, and various websites on the Internet for their schoolwork (Bruce, 2002). In addition to school work, children use the Internet for out-of-school uses such as playing computer games (Bruce, 2002). According to Rideout, Foehr, and Roberts (2010), social networking was the most popular computer activity among 2000 children between the ages of 8 and 18 in 2009. However, due to limited direct research in this area, educators may be overestimating young learners' facility with the Internet. Although demonstrating familiarity with the Internet, younger learners may not have mastered the distinct knowledge and skills appropriate for reading, writing, and communication on the Internet.

In addition to the foundational literacy skills, the Internet also requires the new literacies of the Internet that include "the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives" (Leu, et al., 2004, p. 1572). There are many decisions that must be made while reading on the Internet (Leu, et al. 2004). Younger generations may be too "accepting" of texts they read on the Internet. According to the

New Literacies Research Team at the University of Connecticut, about 90 percent of 54 seventh grade, high-performing online readers believed the false information related to the Pacific Northwest tree octopus on a website at http://zapatopi.net/treeoctopus (Leu, Reinking, et al., 2007). The website provided information of the tree octopus, pictures related to the octopus, (i.e., a tree octopus, a map of the habitats of the tree octopus, the tree octopus hat from 1923, and a poster to save the tree octopus), and highlighted words linked to other websites. When they came to know that the site did not provide true information, many of the students still did not accept that the information was not reliable (Leu, Coiro, et al, 2008).

Thus, the example of the Pacific Northwest tree octopus website highlights that today's children who are called "the digital natives may be tech savvy," but "they don't use a lot of information, or at least they don't know how to think critically about the information they use" (Miners & Pascopella, 2007, p. 2). They must learn to always question and evaluate the quality of the information on the Internet because according to Coiro and Doubler (2007), multi-modal online texts often include hidden agendas that normally are not found in closed hypertext learning systems such as a CD-ROM encyclopedia. In total, the new literacies of the Internet require multiple knowledges and skills (e.g., how to use a search engine, how to follow a link, and how to determine the validity of the online information read). Today's students apparently need Internet-based instruction that helps them to learn new literacies of the Internet.

Teachers, Internet Use, and New Literacies of the Internet

A well prepared teacher is essential for students to learn new literacies of the Internet so that they can live confidently and competently in the digital and information age. Teachers are not the only source to teach students new literacies of the Internet because students can learn them from peers (Leu & Kinzer, 2000). However, teachers must master the essential knowledge of new literacies of the Internet so that they can confidently and competently take the roles of the facilitator of student learning and the "orchestrator of literacy learning environments where members of a classroom community exchange new literacies that each has discovered" (Leu, et al., 2004, p. 1599). According to Henry (2007), middle school students from economically privileged districts scored higher than those from economically disadvantaged districts on online reading comprehension. By employing effective Internet-based instruction in their classrooms, teachers can contribute not only to decreasing the digital divide among students with different economical backgrounds but also contribute to helping children learn the basic and essential new literacies of the Internet.

However, teachers may not feel comfortable in effectively teaching the new literacies of the Internet. Teachers have not always felt prepared to implement Internet-based instruction into their classes (Youmans, 2007). Previous research indicates that teachers may be less confident than children in using the computer and the Internet (Madden, Ford, Miller, & Levy, 2005). Prensky (2001) described teachers as digital immigrants who relied on the Internet as only a secondary source of information and employed practices such as printing out e-mails and documents to read and edit.

Madden, Ford, Miller, and Levy (2003) reported that teachers at the City School in Sheffield, England felt that they were less competent than students in using the Internet. Survey data of state-funded secondary school teachers in Sheffield, England showed that teachers reported having less confidence in using the Internet (Madden, et al., 2005). In another study, it was reported that younger teachers may be more comfortable in using the Internet than their older peers. According to Russell, Bebell, O'Dwyer, and O'Connor (2003), overall teachers with five or fewer years of experience felt more comfortable in using computers than teachers possessing six or more years of experience.

In contrast to most current teachers, today's pre-service teachers are in a unique position in which they have virtually grown up with the Internet. Pre-service teachers belong to the generation of digital natives that "were all born after 1980, have access to networked digital technologies, and have the skills to use those technologies" (Palfrey & Gasser, 2008). In comparison to their parents and the majority of their teachers, pre-service teachers may feel more comfortable using the Internet to send e-mails, get information, and chat online. However, pre-service teachers may not be competent users of the new literacies because they have likely developed their knowledge and skills informally. Research on undergraduate students in Austria has reported that they felt comfortable but they were not competent in locating information on the Internet (Albion, 2007; Genrich, Roberts, & Grist, 2006). In light of the continuous and rapid development of new literacies of the Internet (Leu et al., 2004), it is important to prepare

pre-service teachers to understand how to use new literacies of the Internet so that they develop their abilities to teach students new literacy skills.

Purpose of the Study

This survey research compared education, business, and engineering underclassmen and seniors' Internet use and their experience, confidence, and competence with using new literacies of the Internet when they begin their university experiences and when they complete their undergraduate education. This study compared a) underclassmen across the three majors, b) senior students across the majors, and c) underclassmen and seniors within the majors. There is limited research that specifically quantifies the current generation of incoming teachers' new literacy skills. Additionally, there is little available research that compares educators' new literacy skills with their same aged peers in other professions. I chose business and engineering students as comparison groups because many jobs in 2008 (U.S. Census Bureau, 2010) were related to business and engineering in which the Internet has been increasingly used and thus proficiency with the Internet has become important. Furthermore, the SAT average verbal scores for the past 5 years indicated that students who intended to major in engineering scored higher than those who wanted to study education (The College Board, 2008). In contrast, students who intended to study education and business attained similar scores on the verbal portion of the SAT (The College Board, 2008). Verbal SAT scores may not predict online reading proficiency because according to Coiro (2007), high performing readers in print text might not perform well when reading online. Thus, this study explored weather the students of the diverse academic

backgrounds and different verbal SAT scores have the same or uniquely different levels of new literacy skills of the Internet when entering and exiting college.

Thus, comparisons of the students across and within their majors furthered the understanding of digital natives. Comparisons among underclassmen across the three majors allowed comparisons among different types of students regarding their pre-college preparation with new literacies of the Internet. Comparisons among the seniors across the three majors showed how well they have been prepared for using new literacies in their chosen professions. Comparisons between underclassmen and seniors within the majors examined whether their confidence and competence associated with the new literacies might have changed between the beginning and completion of their undergraduate education.

Research Questions

In the following section, I have listed the research questions investigated. I compared a) underclassmen across the three majors, b) senior students across the majors, and c) underclassmen and senior students within the majors. Each of the groups was asked questions in three main domains— a) Internet use; b) Experience with using new literacies of the Internet; and c) Confidence and Competence in using new literacies of the Internet. Specific research questions are:

A. Underclass University Students across Education, Business, and Engineering Majors

I. Internet use

a) During their high school years, did education, business, and engineering underclassmen differ in their Internet use?

b) During their enrollment at the university, do education, business, and engineering underclassmen differ in their Internet use?

II. Experience with using new literacies of the Internet

a) During high school years, did education, business, and engineering underclassmen differ in their experience with using new literacies of the Internet?

b) During their enrollment at the university, do education, business, and engineering underclassmen differ in their experience with using new literacies of the Internet?

III. Confidence and competence in using new literacies of the Internet

a) Do education, business, and engineering underclassmen differ in their level of confidence in locating and evaluating information on the Internet?

b) Do education, business, and engineering underclassmen differ in their level of competence in locating and evaluating information on the Internet?

c) Is education, business, and engineering underclassmen's confidence related to their competence in locating and evaluating information on the Internet?

B. Senior University Students across Education, Business, and Engineering Majors

I. Internet use

a) During their high school years, did senior education, business, and engineering students differ in their Internet use?

b) During their enrollment at the university, do senior education, business, and engineering students differ in their Internet use?

II. Experience with using new literacies of the Internet

a) During their high school years, did senior education, business, and engineering students differ in their experience with using new literacies of the Internet?

b) During their enrollment at the university, do senior education, business, and engineering students differ in their experience with using new literacies of the Internet?

III. Confidence and competence in using new literacies of the Internet

a) Do senior education, business, and engineering students differ in their level of confidence in locating and evaluating information on the Internet?

b) Do senior education, business, and engineering students differ in their level of competence in locating and evaluating information on the Internet?

c) Is senior education, business, and engineering students' confidence related to their competence in locating and evaluating information on the Internet?

C. Underclass and Senior University Students within Education, Business, and Engineering Majors

I. Internet use

a) During high school years, did underclassmen and senior students within education, business, and engineering majors differ in their Internet use?

b) During their enrollment at the university, do underclassmen and senior students within education, business, and engineering majors differ in their Internet use?

II. Experience with using and teaching new literacies of the Internet

a) During their high school years, did underclassmen and senior students within education, business, and engineering majors differ in their experience with using new literacies of the Internet?

b) During their enrollment at the university, do education, business, and engineering underclassmen and senior students within education, business, and engineering majors differ in their experience with using new literacies of the Internet?

c) During their enrollment at the university, do education underclassmen and senior students differ in their experience with teaching new literacies of the Internet?

d) What is senior education students' perceived level of preparation for teaching new literacies of the Internet?

III. Confidence and competence in using new literacies of the Internet

a) Do underclass and senior students within education, business, and engineering majors differ in their level of confidence in locating and evaluating information on the Internet?

b) Do underclass and senior students within education, business, and engineering majors differ in their level of competence in locating and evaluating information on the Internet?

Rationale of the Study

Since the advent of the Internet in the 1990s, this new technology has changed people's lives dramatically and rapidly. By using the Internet, people can search, collect, and share information with others without restriction of time and space. As previous studies have pointed out this situation has created a need for new literacy skills. The new literacies of the Internet are important and necessary especially, for digital natives including pre-service teachers who will teach current and future children of the digital and information age. However, there is little research that investigates pre-service teachers' level of their own knowledge and skills in using the Internet and their abilities to teach their students new literacies of the Internet. This study will help universities to know what courses they need to provide for pre-service teachers to be not only competent users of the Internet, but, more important, also be ready to teach their students new literacies of the Internet.

CHAPTER II

THEORETICAL FRAMEWORK AND THE REVIEW OF LITERATURE

Theoretical Framework

Due to its developing construct, researchers have yet to define a comprehensive theoretical framework of the new literacies of the Internet (Karchmer, Mallette, Kara-Soteriou, & Leu, 2005; Leu, Kinzer, Coiro, & Cammack, 2004) that includes multiple perspectives (Coiro, Knobel, Lankshear, & Leu, 2008). The construct of "new literacies" has been interpreted differently by various researchers and scholars (Coiro, Knobel, Lankshear, & Leu, 2008) and has continued to evolve within the past decade (Karchmer, Mallette, Kara-Soteriou, & Leu, 2005). A new literacies theory "seeks to include the multiple text formats and multimodal reading environments associated with the complex reading demands of the Internet and networked technologies in classroom instruction" (Henry, 2007).

Leu, Kinzer, Coiro, and Commack (2004) have drawn upon work in multiple areas to create a guiding set of principles of new literacies. These ten principles aim to form a basis for research in this area and ultimately a theory from which new literacies should be based (Leu, et al., 2004). These principles they have provided consider both the construct and application of new literacies. In summary, these principles are 1) the Internet and other ICTs are important for literacy that children will use to access and get appropriate information in an information age, 2) while fundamental literacies will be included importantly within new literacies, new literacy skills are required to fully use

the Internet and other ICTs, 3) technologies keep changing and requiring different new literacies, 4) literacy and technology transform the forms and functions of each other, 5) the nature of new literacies is multiple because of various technological contexts, 6) critical literacies are important in new literacies of the Internet because anyone can publish anything on the Internet, 7) within new literacies, social learning is important because teachers can use different students' knowledge of different new literacies collaboratively, 8) within new literacies, speed is important in locating, evaluating, utilizing, and communicating information, 9) new types of strategic knowledge are important to use new technologies effectively and 10) the teacher's role becomes more important in students' new literacy learning.

Review of Literature

New Literacies of the Internet

New literacies "include the skills, strategies, and disposition that allow us to use the Internet and other ICTs effectively to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others" (Leu et al., 2004, p.1572). In comparison to research on traditional literacies, relatively little research has been conducted on new literacies, specially, on the nature of new literacies of online reading comprehension (Castek, Coiro, Hartman, Henry, Leu, & Zawillinski, 2007). More empirical research on the new literacies of the Internet needs to be conducted in that the nature of literacy has changed due to continuous emergence of new technologies and thereby, students need additional skills to succeed in new literacies

environments (Leu, Coiro, Castek, Hartman, Henry, & Reinking, 2008). There are many overlaps between traditional reading and online reading (Castek et al., 2007), but the two forms of reading are "not isomorphic" (Leu et al., 2008, p.321). The International Reading Association (International Reading Association, 2001) thus emphasized that " traditional definitions of reading, writing, and viewing, and traditional definitions of best practice instruction—derived from a long tradition of book and other print media—will be insufficient" (p. 1). Therefore, we should know how traditional literacies and new literacies are different, what critical skills new literacies need, what knowledge of new literacies today's children have, and how well teachers have been prepared to use and teach new literacies.

Differences between Traditional Literacies and the New Literacies of the Internet

Differences between traditional literacies and the new literacies of the Internet come from the different nature of text they use for reading: Traditional literacy is "about print on a page,... They are the words and pictures students read and pore over that are contained in textbooks, in novels, on standardized tests, and even in comic books"(Miners & Pascopella, 2007, p.12). In traditional literacies, authors have dominant authority to readers (Reinking, 1999). Every reader is provided with the same information in the same order that the author has arranged with his intention. Most readers tend to accept the authenticity of information in print.

Texts online differ from print texts. In contrast to paper-based texts, texts online are quite flexible because they can be updated and changed more quickly and easily. A Web page consists of hypertexts and hypermedia. A rich hypertext is constructed by

many pages and links that connect each page (Bolter 1998). When clicked on, a hypertext link moves the user from page to page. Nonlinear hypertexts require the reader to actively engage in navigating hyperlinks and to use inferential reasoning skills (Coiro, 2003). Hypermedia consists of multiple representations and multimedia such as icons, animated symbols, graphics, video clips that "create new ways of conveying meaning, explaining procedures, and communicating interactively" (Coiro, 2003, p.3).

Critical Skills for New Literacies of the Internet

New literacies of the Internet require not only foundational reading skills but also additional skills and strategies because online reading is not just to read (Miners & Pascopella, 2007). Decoding is important to read heavy amounts of print on the Web (Eagleton & Doubler, 2007). Fluency is also important to process a variety of information on the Web (Eagleton & Doubler, 2007). Vocabulary knowledge is needed to understand the topic of the website and terms used on the Web (e.g., search engine, back button), and formulate a keyword to enter in a search engine (Eagleton & Doubler, 2007). Comprehension on the Internet requires skills beyond those needed for traditional texts and emphasizes certain skills to a higher degree because for example, hypertexts require readers to infer how links are related with one another (Coiro & Doubler, 2007).

From a new literacies perspective of online reading comprehension, online reading comprehension is a "problem-based inquiry process" (Leu et al., 2008, p.324). Members of new literacies research lab have focused on new skills of online reading comprehension in the following five areas: 1) to identify a question, 2) to locate information on the Web, 3) to evaluate information on the Web, 4) to synthesize

information on the Web, and 5) to communicate and exchange information on the Web (Mokhtari, Kymes, & Edwards, 2008).

While reporting Taboada and Guthrie' (2006) work to show the important difference between reading begun by a question and reading that is not in paper-based texts, Leu et al. (2008) pointed out that "the fact that online reading comprehension always begins with a question or problem may be an important source of the differences between online and offline reading comprehension" (p.4). Questioning is important to activate students' prior knowledge, check what they understand, explain explicitly ambiguous ideas, and pay attention to the task (Eagleton & Doubler, 2007).

To locate information on the Web, the user should know how to use a search engine, how to read search engine results, or how to read quickly a webpage to locate the best link to get appropriate information (Leu et al., 2008). There are search engines designed especially for kids such as Yahooligans (http://www.yahooligans.com), KidsClick (http://www.kidsclick.org), Ask Jeeves for Kids (http://ajkids.com), and TekMom's Search Tools for Students (http:// tekmom.com/search/index.html) (Leu, Leu, & Coiro, 2004). Kuiper, Volman, and Terwel (2008) reported that 5th grade students preferred to use the Google search engine in searching information on the Web. The Google search engine was also most frequently used by university students (Albion, 2009; Genrich et al., 2006). Online readers can use skimming and scanning strategies to determine the relevance of information on a webpage to their search question (Henry, 2006).

The abilities to evaluate critically, synthesize, and communicate information are important when reading on the Web. As anyone can publish anything on the Web, the role of critical reading and thinking is more important than ever (Leu et al., 2004; Leu et al., 2008). The online reader should determine the reliability of information on the Web. Synthesis is "the pulling together of separate and unique ideas to form a new understanding. As Internet sources come from multiple sources, the ability of synthesis of information is crucial" (Henry, 2006, p.614). The ability of communicating information on the Web is also important because the Internet is not just useful to get information but also provides opportunities to exchange and share ideas with others (Leu et al., 2004). Students around the world can exchange useful information through the Internet (Tao & Reinking, 2000).

Students, Internet Use, and New Literacies of the Internet

Today's children are called digital natives and are assumed to be tech-savvy. 9 in 10 middle and high school students in the U.S. used the Internet in late 2006 (Lenhardt, Madden, Rankin McGill, & Smith, 2007). Nearly 60% of American teens reported experiencing online content creation in 2006 (Lenhardt, Madden, Rankin McGill, & Smith, 2007). About 40 % of American online teenagers shared their creative contents such as photos with others in 2006 (Lenhardt, Madden, Rankin McGill, & Smith, 2007). In 2009, 70% of 299,677 K-12 students surveyed reported that they used the Internet to find information on the Web (Project Tomorrow, 2010).

However, children do not seem to be well prepared for using new literacies of the Internet. According to Leu, Coiro, Castek, Hartman, Henry, and Reinking (2007),

students have difficulties in locating information on the Internet. Previous studies have reported that children have difficulties in selecting and using keywords to search information (Kuiper and Volman, 2008). A ".com strategy" is frequently used by many middle school students (Leu, Reinking, et al., 2007). The Shenton and Dixon's study (2003) indicated that no students participated evaluated the accuracy of information online.

Teachers, Internet use, and the New Literacies of the Internet

Despite the fact that the Internet and thus new literacies are becoming increasingly important for today's children and their learning, teachers have not been well prepared to provide instruction in new literacies. The new literacies of online reading comprehension are not assessed in the United States (Mokhtari, Kymes, & Edwards, 2008). The United States did not join the 2009 PISA online reading comprehension assessment (Mokhtari, Kymes, & Edwards, 2008). In light of this current situation, the role of the teacher is important to teach students how to use new literacies of the Internet effectively.

However, teachers need more preparation for teaching new literacies. Especially, beginning teachers and pre-service teachers need more training to integrate the computer into learning activities: Survey data of 2,250 U.S. public and private school teachers (Becker, 1998) reported that 24% of them had Internet access at home and in the classroom. 15% of the 2,250 teachers had Internet access only at home and 35% of them used the Internet only in their classrooms. 68% of the 2,250 teachers used the Internet to find information for class lessons. Teachers who were under the age of 30 and had fewer

than 4 years of teaching experience were slightly less likely to use the Internet with students than the other older teachers (Becker, 1998). Teachers who were under the age of 30 and had 4 to 7 years of teaching experience were more likely to use the Internet for student research and Web publishing (Becker, 1998).

According to the National Center for Education Statistics (2000), teachers had used the Internet to make class materials, keep administrative records, find information for teaching, and communicate with colleagues, parents, and students. However, only 20% of the teachers surveyed responded that they felt well prepared for implementing the computer and the Internet in their classes. According to Youmans (2007), 48% of 136 Berkshire County teachers used the Internet in their classrooms daily. The Berkshire County teachers used the Internet more for class preparation and student assignments outside of class than for instruction and learning activities in the classroom. In answering the question of obstacles to Internet use in class, approximately 70% of the Berkshire County teachers responded that they did not know for sure how to incorporate the Internet in their classes.

CHAPTER III

METHODS

Participants

A total of 1350 students, 18 years of age or older were recruited from a public university in the Southwest United States. The 1350 participants included 132 education underclassmen, 107 education seniors, 239 business underclassmen, 205 business seniors, 335 engineering underclassmen, and 332 engineering seniors. Underclassmen were defined as undergraduate students in their academic first or second years who were the classes of 2012 and 2013. Senior students were defined as undergraduate students in their academic fourth year who were the class of 2010.The total participants consisted of 686 (50.8%) female and 664 (49.2%) male students: 128 (97%) females and 4 (3%) males in the education underclassmen; 102 (95.3%) females and 5 (4.7%) males in the education seniors; 137 (53.7%) females and 102 (42.7%) males in the business underclassmen; 127 (62%) females and 78 (38%) males in the business seniors; 226 (67.5%) males and 109 (32.5%) females in the engineering underclassmen; and 249 (75%) males and 83 (25%) females in the engineering seniors (see Table 3.1).

Table 3.1 Number and percent of male and female students in education, business, and engineering majors

	Males (N/%)	Females (N/%)
Education Underclassmen	4(3%)	128(97%)
Education Seniors	5(4.7%)	102(95.3%)
Business Underclassmen	102(42.7%)	137(57.3%)
Business Seniors	78(38%)	127(62%)
Engineering Underclassmen	226(67.5%)	109(32.5%)
Engineering seniors	249(75%)	83(25%)

The 1350 students self-identified as White (77.3%), Hispanic American (11.3%), Asian American (5.2%), Black or African American (2.4%), and American Indian (0.3%) while 3.5 % of the students reported more than one race or did not report their race. The vast majority (99.8 %) of the students were between 18 and 25 years old and the rest of the students (0.2%) ranged in ages from 26 to 29 years of age. The education students reported that their current or intended majors as PreK-6th Grades' education (56.1%), 4-8th Grades' math/science education (24.7%), 4-8th Grades' language arts/ social studies education (14.2%) and other education related majors (5%) (see Table 3.2).

Table 3.2 Number and percent of education students' majors

Majors	N(%) of Education students
PreK-6th Grades' education	134(56.1%)
4-8th Grades' math/science education	59(24.7%)
4-8th Grades' language arts/ social studies education	34(14.2%)
Other education related majors	12(5%)

The business students' current or intended majors were comprised of accounting (23.6%), finance (22.1%), management (16.9%), marketing (14.2%), business honors (8.1%), management information systems (6.5%), supply chain management (4.7%), and agribusiness (0.9%). In addition, 2.9% of all the business students reported double majors in business or did not report their majors (see Table 3.3).

The engineering students were majoring in mechanical engineering (13%), civil engineering (12.4%), petroleum engineering (9.6%), chemical engineering (9%), aerospace engineering (8.2%), biomedical engineering and science (8.2%), industrial engineering (6.6%), electrical engineering (6.1%), computer science and engineering (5.5%), industrial distribution (4.8%), nuclear engineering (4.5%), ocean engineering (4%), computer engineering (3.3%), engineering technology (2.8%), radiological health engineering (1.2%), and biological and agricultural engineering (0.3%). 0.1% of them did not indicate their majors (see Table 3.4).

Table 3.3 Number and percent of business students' majors

Majors	N(%) of Business students
Accounting	105(23.6%)
Finance	98(22.1%)
Management	75(16.9%)
Marketing	63(14.2%)
Business honors	36(8.1%)
Management information systems	29(6.5%)
Supply chain management	21(4.7%)
Agribusiness	4(0.9%)
Double majors/No report of their major	13(2.9%)

Table 3.4 Number and percent of engineering students' majors

Majors	N(%) of engineering students
Mechanical engineering	87(13%)
Civil engineering	83(12.4%)
Petroleum engineering	64(9.6%)
Chemical engineering	60(9%)
Aerospace engineering	55(8.2%)
Biomedical engineering and science	55(8.2%)
Industrial engineering	44(6.6%)
Nuclear engineering	30(4.5%)
Ocean engineering	27(4%)
Computer engineering	22(3.3%)
Engineering technology	19(2.8%)
Radiological health engineering	8(1.2%)
Biological and agricultural engineering	2(0.3%)
No report of their majors	1(0.1%)

Instrumentation

Survey Questions

I created the Survey of Undergraduate Students' New Literacies (SUSNL) based on previous surveys and empirical research in the field. The SUSNL consists of a total of 45 items that were completed by all the participants. Additionally, education participants answered additional questions with regards to their knowledge of *how to teach* the new literacies. Underclassmen education students answered two additional questions while education seniors answered five additional questions.

The SUSNL included 5 questions related to the participants' *demographics*, 7 questions designed to assess *confidence* in using new literacies of the Internet, 14 questions measuring *competence* in using new literacies, 16 questions assessing students' Internet *use*, and 8 questions of *experience* of new literacies of the Internet. As mentioned above, in the 8 questions of *experience* of new literacies of the Internet, 5 questions measured education students' knowledge of teaching new literacies of the Internet.

Survey Development

To create survey questions, I used 5 questions from Kumar and Kaur's (2006) Survey for Internet Users which was designed for teachers and students attending engineering colleges of Punjab, Haryana, and Himachal Pradesh States of India. I also used 18 questions from Henry's (2007) Digital Divide Measurement Scale for Students (DDMS-S). The DDMS-S was designed to specifically consider middle school students' ability to locate and evaluate information on the Internet. Henry (2007) also created a Digital Divide Measurement Scale for Teachers by modifying the DDMS-S. Based on consultation with literacy professors, I adapted items from the DDMS-S to be more appropriate for university students. In measuring students' *experience* of using and teaching new literacies, I used Leu, Kinzer, Coiro, and Cammack's (2004) definition of new literacies of the Internet and Leu, Leu, and Choir 's (2004) effective instructional models with the Internet -- Internet workshop, Internet inquiry, and Webquest activities. Additionally, with consultation with literacy professors, I created 3 questions for students' demographics, 7 questions for students' confidence in using new literacies, 2

questions inquiring about students' Internet use and 8 questions for students' experience of using and teaching new literacies. The survey provided multiple choice options for answering all questions. Three education undergraduate students piloted the original SUSNL survey and gave feedback for re-wording the survey questions after reading them. Changes were made accordingly. Survey items that were created, replicated, and adapted are compiled in Appendix D. The survey for education seniors that includes all 50 survey questions is also compiled in Appendix D.

Reliability

With regards to reliability of the original instruments, Kumar and Kaur (2006) did not report the reliability of their survey instrument. Henry (2007) estimated the internal consistency of reliability of DDMSS's Likert-scale items using two methods: the split-half coefficient was 0.946 and the coefficient alpha was 0.897. However, the Likert scale items did not include the competence/reading comprehension questions. She reported item-analysis statistics for the 14 online reading comprehension questions. In regards to this study, I calculated an overall reliability for both the confidence subscales and the competence/reading comprehension subscales combined. The overall reliability coefficient for both the confidence and competence combined was 0.695.

Online Survey Format

I posted five versions of the survey on Qualtrics, an online survey software, at www.qualtrics.com. The five versions were for 1) education underclassmen, 2) education seniors, 3) business underclassmen 4) business seniors, 5) engineering

underclassmen, and engineering seniors. Survey questions were grouped and arranged by the following topics: 1) the students' demographics, 2) confidence in using new literacies, 3) competence in using new literacies, 4) Internet use, and 5) experience of using (and teaching) new literacies.

Procedures

Contact with potential students was made through two methods --- through their instructors or via listserves. Through academic advisors in the colleges, I identified which courses were offered for underclassmen and senior students during the semester. I emailed or met with instructors to obtain permission to contact their students to take the survey. When permitted, I visited classes to explain the purpose of the survey and the study. Alternatively, instructors sent their students the link to the survey. Additionally, an education advisor sent all education underclassmen the link to the survey. A follow-up e-mail, including the link to the survey, was sent through the university e-mail server directly to engineering and business students. Students were offered no direct incentive for participation. However, participating students could choose to provide their e-mail address in order to enter a drawing for four gift cards to a local book-selling business.

Data Analysis

From Qualtrics, I downloaded SPSS files including the students' responses to the survey questions. Originally, a total of 1606 students participated in the survey (i.e., 157 education underclassmen; 137 education seniors; 284 business underclassmen; 235 business seniors; 389 engineering underclassmen; 404 engineering seniors). In order to

conduct correlation analysis between the students' confidence and their demonstrated competence in locating and evaluating information on the Internet, this study used only 1350 completed surveys. Chi-square analysis (χ^2=5.88, *df*=5, N=1606, p =0.32) showed that the removed sample of 256 students did not affect the overall analysis results of the study.

My survey instrument included 45 items for all of the students and five items only for education students. My survey was subscaled by topic area, so I used select sections of my survey for answering specific research questions. Items 1-5 of the survey collected demographic information about students' gender, race, major field of study, year of birth, and class level (i.e., freshmen, sophomore, junior, and senior), which I used to sort my sample population into the subgroups of education underclassmen, education seniors, business underclassmen, business seniors, engineering underclassmen, and engineering seniors. The assessment of the students' confidence in using new literacies of the Internet was determined by responses to items 6 to 12 of the survey. Regarding the students' competence in using new literacies of the Internet, survey items 13 to 26 were analyzed. Items 6 to 26 of the survey were used again to see how the students' confidence and competence are related. In answering research questions pertaining to the nature of the students' Internet use, I examined items 27 to 42 of the survey. For research questions about the students' experience with using new literacies of the Internet, I used survey items 44, 46, and 47. I analyzed items 43, 45, 48, 49, and 50 to examine education students' experience with teaching new literacies of the Internet.

I used descriptive statistics, chi-square, t-test, analysis of variance (ANOVA), and correlation to analyze the collected data. All significance levels were set at 0.05. I reported descriptive statistics related to each research question. To analyze research questions about students' Internet use and their experience with using new literacies of the Internet, I employed the chi-square that compared counts of categorical responses between groups (Sirkin, 2006). For the survey items where students were asked to choose a single answer from multiple categories, I collapsed the students' responses into two categories and ran 3x2 or 2x2 chi-square tests (see Table 3.5) because in chi-square, the "expected counts in 80% of the cells should be greater than 5" (Morgan, Leech, Gloechner & Barrett, 2004, p.99).

For the survey items to which students responded with multiple answers, I conducted the Pearson chi-square procedure for each of the answers. (i.e., For the question of "How did you acquire or learn your Internet skills? Please click on all of the items that apply," I ran chi-square for each of the 5 answers). If in conducting 2x2 chi-square tests, the cells still included expected counts that were not greater than 5 after combining the answers into two categories, I determined the differences between the groups by Yates's correction continuity recommended by a statistics professor through personal communication. In running comparisons among underclassmen and senior students across the three majors, I ran 3x2 chi-square tests. If the p-value for each question was significant, I conducted 2x2 chi-square tests to compare each of three groups—1) education and business students, 2) education and engineering students, and 3) business and engineering students. If the p-value was not significant but the cells

included expected counts that were not greater than 5, I ran 2x2 chi-square tests for each of the three groups and determined the differences by Yates's continuity correction.

Table 3.5 Combined categories used for analyzing the survey items in which participants chose a single answer

Survey items	Category A	Category B
Overall frequency of Internet use	Less than every day (i.e., Less than once a month, once a month, 2-3 times a month, once a week, and 2-5 times a week)	Every day
Hours of Internet use	Less than 5 hours	5 hours a week or more (i.e., 5-14 hours a week, 15-35 hours a week and over 35 hours a week)
Internet use required during class	Less than once a week (i.e., Never and less than once a month)	Once a week and more (i.e., Once a week, a few times each week, once a day, and several times a day)
Internet use required for school assignments	Less than once a week (i.e., Never and less than once a month)	Once a week and more (i.e., Once a week, a few times each week, once a day, and several times a day)
Internet use required for university coursework	Less than once a week (i.e., Never and less than once a month)	Once a week and more (i.e., Once a week, a few times each week, once a day, and several times a day)
Internet connection	Not connected	Connected (i.e., Telephone dial up Internet and high speed Internet)
Years of Internet use	Less than 9 years (i.e., less than 4 years, and 4-8 years)	9 years and more (i.e., 9-12 years, 13-16 years and more than 16 years)
Online courses taken	0 course	1 course or more
The Internet workshop activity completed	0 course	1 course or more
The Internet workshop activity completed	0 course	1 course or more
The Webquest activity completed	0 course	1 course or more
Modeling of using new literacy skills of the Internet	0 course	1 course or more
Hands-on activities using new literacy skills of the Internet	0 course	1 course or more
Learning of teaching new literacy skills of the Internet	0 course	1 course or more
Discussion, presentation, or modeling of teaching new literacy skills of the Internet	0 course	1 course or more

To analyze research questions that used numerical data, I conducted independent t-tests when comparing underclassmen and senior students within the three majors and then I used the univariate ANOVA procedure regarding underclassmen and seniors across the three majors. I also conducted the Pearson correlation that is used with two

normal variables (Morgan et al., 2004) to see the relation of students' confidence and competence in each of the two domains of locating and evaluating information on the Internet.

CHAPTER IV

RESULTS

Students' Answers

For each research question, the frequency and percentages of students' answers are reported in tabular form. Within the text I identified all significant analysis from the chi-square analysis. Details of the chi-square analyses are provided for the reader's reference in Appendix A.

A. Comparisons of Underclass University Students across Education, Business, and Engineering Majors

I. Internet use

a) *During their **high school years**, did education, business, and engineering **underclassmen** differ in their Internet use?*

In regards to overall frequency of Internet use, between 70% and 78% of underclassmen used the Internet daily in high school (see Table 4.1). Chi-square analysis found no significant differences between the majors.

Table 4.1 Number and percent of underclassmen's high school-related Internet use: Overall frequency of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Overall frequency of Internet use	Less than every day	39(29.5%)	52(21.8%)	99(29.6%)
	Every day	93(70.5%)	187(78.2%)	236(70.4%)

In terms of hours per week of Internet use, between 71% and 85% of underclassmen used the Internet for at least 5 hours a week in high school (see Table 4.2). Education underclassmen spent significantly fewer hours per week using the Internet than both business and engineering underclassmen.

Table 4.2 Number and percent of underclassmen's high school-related Internet use: Hours a week of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Hours a week of Internet use	Less than 5 hours a week	39(29.5%)	36(15.1%)	58(17.3%)
	5 hours a week or more	93(70.5%)	203(84.9%)	277(82.7%)

With regard to their Internet use required during high school classes, between 53% and 57% of underclassmen reported that they were required to use the Internet in class weekly (see Table 4.3). There were no significant differences between the majors.

Table 4.3 Number and percent of underclassmen's high school-related Internet use: Internet use required during class

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet use required during class	Less than once a week	62(47%)	104(43.5%)	158(47.2%)
	Once a week and more	70(53%)	135(56.5%)	177(52.8%)

In terms of their Internet use required for high school assignments, between 69% and 81% of underclassmen were required to use the Internet outside of school weekly

(see Table 4.4). Business underclassmen were assigned to use the Internet significantly more often than both education and engineering underclassmen. Education and engineering underclassmen did not differ significantly from each other.

Table 4.4 Number and percent of underclassmen's high school-related Internet use: Internet use required for school assignments

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet use required for school assignments	Less than once a week	40(30.3%)	45(18.8%)	103(30.7%)
	Once a week and more	92(69.7%)	194(81.2%)	232(69.3%)

In regards to purposes of Internet use, underclassmen, in general, used the Internet frequently for research for school work (93-95%), entertainment (86-93%), social networking (85-87%), communication (81-84%), and music, videos, or podcasts downloads (71-81%). However, they used the Internet rarely to create websites (2-10%) (see Table 4.5). In terms of group differences, business underclassmen used the Internet significantly more often than education underclassmen for the three purposes of a) reading news, b) downloading music, videos, or podcasts, and c) creating websites. Engineering underclassmen used the Internet significantly more often for creating websites than education underclassmen.

Table 4.5 Number and percent of underclassmen's high school-related Internet use: Purposes of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Purposes of Internet use	Research for schoolwork	125(94.7%)	226(94.6%)	311(92.8%)
	Entertainment	114(86.4%)	219(91.6%)	312(93.1%)
	E-learning	18(13.6%)	37(15.5%)	70(20.9%)
	Communication	111(84.1%)	194(81.2%)	271(80.9%)
	Shopping	69(52.3%)	131(54.8%)	156(46.6%)
	News	58(43.9%)	139(58.2%)	173(51.6%)
	Social networking	115(87.1%)	204(85.4%)	284(84.8%)
	Online banking	41(31.1%)	79(33.1%)	136(40.6%)
	Downloads	93(70.5%)	194(81.2%)	235(70.1%)
	Website creation	2(1.5%)	16(6.7%)	35(10.4%)

Regarding Internet connection, between 97% and 100% of underclassmen reported having Internet access when they lived with their parents (see Table 4.6).

Table 4.6 Number and percent of underclassmen's high school-related Internet use: Internet connection at home

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet connection at home	Not connected	1(0.8%)	1(0.4%)	10(3%)
	Connected	131(99.2%)	238(99.6%)	325(97%)

In terms of methods of learning Internet skills, underclassmen used the "trial and error" method most frequently (see Table 4.7). In terms of group differences, business and engineering underclassmen used the "trial and error" method significantly more than education underclassmen. Moreover, education underclassmen received teacher instruction and parent and peer guidance for learning Internet skills significantly more often than business and engineering underclassmen. Furthermore, engineering

underclassmen used significantly more other types of training activities than education underclassmen. However, education underclassmen and business underclassmen did not differ significantly from each other.

Table 4.7 Number and percent of underclassmen's high school-related Internet use: Methods of learning Internet skills

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Methods of learning Internet skills	The trial and error method	107(81.1%)	215(90%)	312(93%)
	Teacher instruction	98(74.2%)	152(63.6%)	133(39.7%)
	Guidance from parents and peers	102(77.3%)	159(66.5%)	173(51.6%)
	Books or online tutorials	17(12.9%)	32(13.4%)	68(20.3%)
	Other types of training activities	7(5.3%)	14(5.9%)	42(12.5%)

b) *During their enrollment at the **university**, do education, business, and engineering **underclassmen** differ in their Internet use?*

In regards to overall frequency of Internet use, between 99% and 100% of underclassmen used the Internet daily (see Table 4.8).

Table 4.8 Number and percent of underclassmen's current Internet use: Overall frequency of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Overall frequency of Internet use	Less than every day	0(0%)	3(1.3%)	4(1.2%)
	Every day	132(100%)	236(98.7%)	331(98.8%)

In terms of hours per week of Internet use, between 97% and 99% of underclassmen used the Internet for at least 5 hours a week (see Table 4.9). No significant differences were found between the majors.

Table 4.9 Number and percent of underclassmen's current Internet use: Hours a week of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Hours a week of Internet use	Less than 5 hours a week	4(3%)	3(1.3%)	4(1.2%)
	5 hours a week or more	128(97%)	236(98.7%)	331(98.8%)

With regard to their use of Internet required during class, between 42% and 76% of underclassmen used the Internet in class weekly (see Table 4.10). Engineering underclassmen were required to use the Internet during class significantly more often than both education and business underclassmen. Education and business underclassmen reported no significant difference from each other.

Table 4.10 Number and percent of underclassmen's current Internet use: Internet use required during class

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet use required during class	Less than once a week	70(53%)	139(58.2%)	80(23.9%)
	Once a week or more	62(47%)	100(41.8%)	255(76.1%)

In terms of their Internet use required for university coursework, between 96% and 99% of underclassmen were required to use the Internet outside of class weekly (see Table 4.11). No significant differences were found between the majors.

Table 4.11 Number and percent of underclassmen's current Internet use: Internet use required for university coursework

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet use required for coursework	Less than once a week	2(1.5%)	9(3.8%)	4(1.2%)
	Once a week or more	130(98.5%)	230(96.2%)	331(98.8%)

In regards to purposes of Internet use, underclassmen, in general, used the Internet frequently for many purposes except for website creation (see Table 4.12). In terms of group differences, business and engineering underclassmen used the Internet significantly more often for creating websites than education underclassmen. No significant difference was found between business and engineering underclassmen.

Table 4.12 Number and percent of underclassmen's current Internet use: Purposes of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Purposes for Internet use	Research for schoolwork	128(97%)	229(95.8%)	319(95.2%)
	Entertainment	128(97%)	232(97.1%)	329(98.2%)
	E-learning	128(97%)	225(94.1%)	306(91.3%)
	Communication	126(95.5%)	225(94%)	312(93.1%)
	Shopping	94(71.2%)	171(71.5%)	242(72.2%)
	News	100(75.8%)	194(81.2%)	278(83%)
	Social networking	122(92.4%)	229(95.8%)	304(90.7%)
	Online banking	113(85.6%)	195(81.6%)	282(84.2%)
	Downloads	103(78.1%)	199(83.3%)	265(79.1%)
	Website creation	3(2.3%)	23(9.6%)	29(8.7%)

In regards to methods of learning Internet skills, between 9% and 20% of underclassmen learned Internet skills in university courses (see Table 4.13). Business underclassmen learned Internet skills in university courses more than education and engineering underclassmen. Education and engineering underclassmen did not differ from each other.

Table 4.13 Number and percent of underclassmen's current Internet use: Methods of learning Internet skills

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Methods of learning Internet skills	Courses in university	13(9.8%)	47(19.7%)	29(8.7%)

With regards to years of using the Internet, between 62% and 69% of underclassmen used the Internet for at least 9 years with no inter-group differences (see Table 4.14).

Table 4.14 Number and percent of underclassmen's current Internet use: Years of Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Years of Internet use	Less than 9 years	41(31.1%)	77(32.2%)	129(38.5%)
	9 years or more	91(68.9%)	162(67.8%)	206(61.5%)

In terms of the number of online courses taken, between 31% and 59% of underclassmen took 1 or more online courses (see Table 4.15). Education underclassmen took more online courses than both business and engineering underclassmen.

Table 4.15 Number and percent of underclassmen's current Internet use: Number of online courses taken

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Number of online courses taken	0 course	54(40%)	166(69.5%)	227(67.8%)
	1 course or more	78(59.1%)	73(30.5%)	108(32.2%)

Concerning Internet connection, between 99% and 100% of underclassmen reported currently having the Internet in the place where they live (see Table 4.16).

Table 4.16 Number and percent of underclassmen's current Internet use: Internet connection at home, apartment, or dorm

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet connection at home, apartment, or dorm	Not Connected	1(0.8%)	0(0%)	3(0.9%)
	Connected	131(99.2%)	239(100%)	332(99.1%)

Regarding type of equipment for assessing the Internet, the personal laptop was most frequently reported by underclassmen (see Table 4.17). Engineering underclassmen used classroom and lab computers significantly more often than both education and business underclassmen. Education and business underclassmen did not differ significantly from each other.

Table 4.17 Number and percent of underclassmen's current Internet use: Type of equipment for Internet use

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Type of equipment for Internet use	Desktop computer	43(32.6%)	85(35.6%)	101(30.1%)
	Laptop computer	128(97%)	230(96.2%)	316(94.3%)
	Classroom computer	14(10.6%)	27(11.3%)	174(51.9%)
	Lab computer	98(74.2%)	169(70.7%)	289(86.3%)
	University library computer	72(54.5%)	147(61.5%)	176(52.5%)
	University issued computer	10(7.6%)	12(5%)	20(6%)
	P.D.A	54(40.9%)	95(39.7%)	123(36.7%)

II. Experience with using new literacies of the Internet

a) *During their **high school years**, did education, business, and engineering **underclassmen** differ in their experience with using new literacies of the Internet?*

Between 20% and 49% of underclassmen completed Internet workshop, Internet inquiry, or Webquest activities (see Table 4.18). Underclassmen did not differ significantly in their experience with Internet workshop. Education underclassmen received more Internet inquiry instruction significantly than both business and engineering underclassmen. Education and business underclassmen completed significantly more "Webquest" activities than engineering underclassmen.

Table 4.18 Number and percent of underclassmen's experience with using new literacies: Internet workshop, Internet inquiry, and Webquest

	N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Internet Workshop	36(27.3%)	62(25.9%)	67(20%)
Internet Inquiry	65(49.2%)	89(37.2%)	116(34.6%)
Webquest	57(43.2%)	90(37.7%)	94(28.1%)

b) *During their enrollment at the **university**, do education, business, and engineering **underclassmen** differ in their experience with using new literacies of the Internet?*

Between 24% and 38% of underclassmen took one or more courses in which professors modeled how to use new literacy skills (see Table 4.19). Education underclassmen did not differ significantly from business and engineering underclassmen.

Table 4.19 Number and percent of underclassmen's experience with using new literacies: Modeling of using new literacy skills

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Modeling of using new literacy skills	0 course	92(69.7%)	148(61.9%)	255(76.1%)
	1 course or more	40(30.3%)	91(38.1%)	80(23.9%)

Between 19% and 31% of underclassmen took at least one course in which they completed a hands-on activity using new literacy skills of the Internet (see Table 4.20). Education underclassmen took significantly more courses than engineering underclassmen. Education underclassmen did not differ significantly from business underclassmen.

Table 4.20 Number and percent of underclassmen's experience with using new literacies: Hands-on activities using new literacy skills

		N (%) Ed. underclassmen	N (%) Bus. underclassmen	N (%) Eng. underclassmen
Hands on activity using new literacy skills	0 course	91(68.9%)	180(75.3%)	270(80.6%)
	1 course or more	41(31.1%)	59(24.7%)	65(19.4%)

III. Confidence and competence in using new literacies of the Internet

*a) Do education, business, and engineering **underclassmen** differ in their level of **confidence** in locating and evaluating information on the Internet?*

Table 4.21 shows the total mean scores of underclassmen's confidence ratings on 7 survey items, 3 of which were related to locating information on the Internet and 4 of which were related to evaluating information on the Internet. A five point confidence scale was used for each of the seven items. The total possible score was 35 points.

Table 4.21 Means and standard deviations of underclassmen's confidence ratings on 7 items

Edu. underclassmen (N=132)	Bus. underclassmen (N=239)	Eng. underclassmen (N=335)
M=27.43 SD=3.75	M=28.02 SD=3.35	M=28.79 SD=3.86

The 7 items includes a) using keywords with a search engine, b) locating information within the search results, c) locating information within the webpage, and evaluating the d) accuracy, e) relevance, f) bias, and g) reliability of information on the

Internet. Overall, underclassmen were more confident in locating than evaluating information on the Internet (see Table 4.22).

Table 4.22 Number and percent of underclassmen's confidence ratings of agree or strongly agree on 7 individual items

	Edu. underclassmen	Bus. underclassmen	Eng. underclassmen
Items of location			
Item 6 (keyword use with a search engine)	122 (92.4%)	225(94.1%)	323 (96.4%)
Item 7 (within the search results)	116(87.9%)	222(92.9%)	307(91.7%)
Item 8 (within a webpage)	119(90.2%)	211(88.2%)	301(89.9%)
Items of evaluation			
Item 9 (accuracy)	78(59.1%)	169(70.8%)	246(73.4%)
Item 10 (relevance)	107(81%)	209(87.5%)	292(87.2%)
Item 11 (bias)	85(64.4%)	164(68.6%)	241(72%)
Item 12 (reliability)	95(71.9%)	170(71.1%)	262(78.2%)

Table 4.23 below shows the means and standard deviations of underclassmen's confidence ratings on each domain of locating and evaluating information on the Internet. The total possible score for locating information on the Internet was 15 points which is a summed score of 3 items. The total possible score for evaluating information was 20 points which is a summed score of 4 items.

Table 4.23 Means and standard deviations of underclassmen's confidence in locating and evaluating information on the Internet

	Edu. underclassmen	Bus. underclassmen	Eng. underclassmen
Confidence to locate	M=12.58 SD=1.75	M=12.77 SD=1.64	M=13.08 SD=1.75
Confidence to evaluate	M=14.86 SD=2.53	M=15.25 SD=2.24	M=15.70 SD=2.61

The summed scores were used as dependent variables to conduct ANOVA tests comparing the 3 groups. ANOVA revealed significant differences in underclassmen's confidence with both locating information (F (2, 703)=4.88 p=0.008) and evaluating information (F (2, 703)=6.15 p=0.002) on the Internet. Post hoc Sidak tests (see Table 4.24) revealed that engineering underclassmen were more confident than education underclassmen in both locating and evaluating information on the Internet. No other group differences were significant, indicating that education and business underclassmen reported comparable levels of confidence in locating and evaluating information on the Internet.

Table 4.24 Post hoc results of underclassmen's confidence in locating and evaluating information on the Internet

	Edu vs. Bus Underclassmen	Edu. Vs. Eng. Underclassmen	Bus Vs. Eng. Underclassmen
Confidence to locate	MD=-0.19 SE=0.19 p=0.65	MD=-0.50 SE=0.18 p=0.01*	MD=-0.31 SE=0.14 p=0.09
Confidence to evaluate	MD=-0.40 SE=0.27 p=0.37	MD=-0.85 SE=0.25 p=0.003*	MD=-0.45 SE=0.21 p=0.09

Notes. MD means mean difference, SE means standard error
* $p<0.05$

b) *Do education, business, and engineering **underclassmen** differ in their level of **competence** in locating and evaluating information on the Internet?*

Table 4.25 below shows the total mean scores of underclassmen's competence in 14 performance questions consisting of 6 items about locating information on the Internet and 8 items about evaluating information on the Internet. The total possible

score was 14 points. Students showed low performance with average group scores ranging from 6.75 to 7.47.

Table 4.25 Means and standard deviations of underclassmen's competence in 14 items

Edu. underclassmen (N=132)	Bus. underclassmen (N=239)	Eng. underclassmen (N=335)
M=6.75 SD=1.74	M=6.96 SD=1.83	M=7.47 SD=1.98

As seen in Table 4.26, many underclassmen did not correctly respond to questions about locating and evaluating information on the Internet.

Table 4.26 Number and percent of underclassmen who correctly answered comprehension questions

	Edu. underclassmen	Bus. underclassmen	Eng. underclassmen
Items of location			
Item 13	98(74.2%)	166(69.5%)	256(76.4%)
Item 16	75(56.8%)	139(58.2%)	215(64.2%)
Item 17	75(56.8%)	146(61.1%)	239(71.3%)
Item 18	88(66.7%)	166(69.5%)	253(75.5%)
Item 19	100(75.8%)	161(67.4%)	203(60.6%)
Item 22	78(59.1%)	140(58.6%)	206(61.5%)
Items of evaluation			
Item 14	95(72%)	165(69%)	190(56.7%)
Item 15	70(53%)	119(49.8%)	158(47.2%)
Item 20	118(89.4%)	220(92.1%)	318(94.9%)
Item 21	12(9.1%)	36(15.1%)	93(27.8%)
Item 23	15(11.4%)	42(17.6%)	111(33.1%)
Item 24	36(27.3%)	86(36%)	129(38.5%)
Item 25	29(22%)	71(29.7%)	119(35.5%)
Item 26	2(1.5%)	7(2.9%)	11(3.3%)

Table 4.27 below shows the means and standard deviations of the underclassmen's competence in each domain of **locating** and **evaluating** information on the Internet. Participants' scores could range from 0 to 6 in the domain of locating information on the Internet and from 0 to 8 in the domain of evaluating information on the Internet.

Table 4.27 Means and standard deviations of underclassmen's competence in locating and evaluating information on the Internet

	Edu. underclassmen	Bus. underclassmen	Eng. underclassmen
Competence to locate	M=3.89 SD=1.26	M=3.84 SD=1.29	M=4.10 SD=1.24
Competence to evaluate	M=2.86 SD=1.11	M=3.12 SD=1.17	M=3.37 SD=1.31

Through the ANOVA procedure, the underclassmen's competence was compared on the two summed variables. Significant differences were found among the underclassmen' competence in both locating information ($F(2, 703)=3.16$ $p=0.04$) and evaluating information ($F(2, 703)=8.90$ $p<0.001$) on the Internet. Follow up post hoc tests, Sidak and Games-Howell (see Table 4.28) indicated that engineering underclassmen were significantly more competent than education underclassmen in evaluating information on the Internet. However, education and business underclassmen did not differ significantly from each other.

Table 4.28 Post hoc results of underclassmen's competence in locating and evaluating information on the Internet

	Edu vs. Bus underclassmen	Edu. Vs. Eng. underclassmen	Bus Vs. Eng. underclassmen
Competence to locate	MD=0.05 SE=0.14 p=0.97	MD=-0.20 SE=0.13 p=0.32	MD=-0.25 SE=0.11 p=0.051
Competence to evaluate	MD=-0.27 SE=0.13 p=0.08	MD=-0.51 SE=0.12 p<0.001*	MD=-0.25 SE=0.10 p=0.04*

* p<0.05

c) *Is education, business, and engineering **underclassmen**'s **confidence** related to their **competence** in locating and evaluating information on the Internet?*

Table 4.29 shows the means and standard deviations of underclassmen's confidence and competence in locating and evaluating information on the Internet.

Table 4.29 Means and standard deviations of underclassmen's confidence and competence in locating and evaluating information on the Internet

Group	Variables	Means	Standard deviations
Edu.underclassmen (N=132)	Confidence to locate	12.58	1.75
	Competence to locate	3.89	1.26
	Confidence to evaluate	14.86	2.53
	Competence to evaluate	2.86	1.11
Bus.underclassmen (N=239)	Confidence to locate	12.77	1.64
	Competence to locate	3.84	1.29
	Confidence to evaluate	15.25	2.24
	Competence to evaluate	3.12	1.17
Eng.underclassmen (N=335)	Confidence to locate	13.08	1.75
	Competence to locate	4.10	1.24
	Confidence to evaluate	15.70	2.61
	Competence to evaluate	3.37	1.31

By using summed scores, Pearson correlation analysis was conducted for each domain of locating and evaluating information on the Internet. In terms of locating information on the Internet, only education underclassmen's confidence in locating information on the Internet was positively correlated with their demonstrated competence in locating information on the Internet (i.e., education underclassmen: $r(130)=0.32$ $p<0.001$; business underclassmen: $r(237)=0.08$ $p=0.23$; engineering underclassmen: $r(333)=0.03$ $p=0.59$). In regards to evaluating information on the Internet, only engineering underclassmen's confidence and their demonstrated competence in evaluating information on the Internet were positively correlated (i.e., education underclassmen: $r(130)=0.13$ $p=0.14$; business underclassmen: $r(237)=0.02$ $p=0.79$; engineering underclassmen: $r(333)=0.12$ $p=0.03$).

B. Comparisons of Senior University Students across Education, Business, and Engineering majors

I. Internet use

a) *During their **high school years**, did **senior** education, business, and engineering students differ in their Internet use?*

In regard to overall frequency of Internet use, between 49% and 66% of senior students used the Internet every day in high school (see Table 4.30). Business senior students used the Internet more frequently than both education and engineering seniors. Education and engineering senior students did not differ significantly from each other.

Table 4.30 Number and percent of senior students' high school-related Internet use: Overall frequency of Internet use

		N (%) Edu. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Overall frequency of Internet use	Less than every day	55(51.4%)	70(34.1%)	148(44.6%)
	Every day	52(48.6%)	135(65.9%)	184(55.4%)

In terms of hours per week of using the Internet, between 70% and 81% of senior students used the Internet for at least 5 hours a week in high school (see Table 4.31). No significant differences were found between the majors.

Table 4.31 Number and percent of senior students' high school-related Internet use: Hours a week of Internet use

		N (%) Edu. seniors	N (%) Bus.seniors	N (%) Eng. seniors
Hours a week of Internet use	Less than 5 hours a week	32(29.9%)	39(19.1%)	89(26.8%)
	5 hours a week or more	75(70.1%)	166(81%)	243(73.2%)

With regard to their Internet use required during high school classes, between 38% and 47% of senior students were required to use the Internet in class weekly (see Table 4.32). There were no significant differences between the majors.

Table 4.32 Number and percent of senior students' high school-related Internet use: Internet use required during class

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Internet use required during class	Less than once a week	60(56.1%)	109(53.2%)	205(61.7%)
	Once a week or more	47(43.9%)	96(46.8%)	127(38.3%)

In terms of their Internet use required for high school assignments, between 62% and 73% of senior students were required to use the Internet outside of class weekly (see Table 4.33). Education senior students were not different significantly from business and engineering seniors.

Table 4.33. Number and percent of senior students' high school-related Internet use: Internet use required for school assignments

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. Seniors
Internet use required for school assignments	Less than once a week	40(37.4%)	55(26.8%)	127(38.3%)
	Once a week or more	67(62.6%)	150(73.2%)	205(61.7%)

In regards to purposes of Internet use, when in high school, senior students, in general, used the Internet frequently for research for schoolwork (89-94%), entertainment (79-87%), and communication (77-84%) (see Table 4.34). However, they used the Internet rarely for e-learning (4-11%) and website creation (2-13%) (see Table 4.34). In terms of group differences, business senior students used the Internet significantly more often for a) shopping, b) social networking, and c) music, videos, or

podcasts downloads than education seniors. Furthermore, business and engineering senior students used the Internet significantly more frequently for creating websites than education seniors.

Table 4.34 Number and percent of senior students' high school-related Internet use: Purposes of Internet use

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Purposes for Internet use	Research for schoolwork	97(90.7%)	192(93.7%)	294(88.6%)
	Entertainment	85(79.4%)	179(87.3%)	279(84%)
	E-learning	4(3.7%)	21(10.2%)	38(11.4%)
	Communication	88(82.2%)	173(84.4%)	257(77.4%)
	Shopping	34(31.8%)	97(47.3%)	129(38.9%)
	News	34(31.8%)	87(42.4%)	136(41%)
	Social networking	74(69.2%)	172(83.9%)	195(58.7%)
	Online banking	17(15.9%)	58(27.3%)	76(22.9%)
	Downloading	60(56.1%)	145(70.7%)	201(60.5%)
	Website creation	2(1.9%)	19(9.3%)	43(13%)

In regard to Internet connection, between 97% and 100% of senior students had Internet access (see Table 4.35).

Table 4.35 Number and percent of senior students' high school-related Internet use: Internet connection at home

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Internet connection at home	Not connected	2(1.9%)	1(0.5%)	11(3.3%)
	Connected	105(98.1%)	204(99.5%)	321(96.7%)

Concerning methods of learning Internet skills, the "trial and error" method was most frequently reported by all senior students (see Table 4.36).

Table 4.36 Number and percent of senior students' high school-related Internet use: Methods of learning Internet skills

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Methods of learning Internet skills	The trial and error method	97(90.7%)	190(92.7%)	317(95.5%)
	Teacher instruction	61(57%)	106(51.7%)	132(39.8%)
	Guidance from parents and peers	75(70.1%)	115(56.1%)	172(51.8%)
	Books or online tutorials	12(11.2%)	33(16.1%)	72(21.7%)
	Other types of training activities	5(4.7%)	121(10.2%)	37(11.1%)

In terms of group differences, education and business senior students reported teacher instruction significantly more often for Internet use than engineering seniors. Education and business senior students did not differ significantly from each other. Also, education senior students received parent and peer guidance significantly more often than both business and engineering seniors. Furthermore, engineering senior students learned Internet skills through self-instruction with books and online tutorials significantly more often than education seniors.

b) *During their enrollment at the **university**, do **senior** education, business, and engineering students differ in their Internet use?*

In regard to overall frequency of Internet use, between 99% and 100% of senior students reported that they used the Internet every day (see Table 4.37). Chi-square found no significant differences between the majors.

Table 4.37 Number and percent of senior students' current Internet use: Overall frequency of Internet use

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Overall frequency of Internet use	Less than every day	1(0.9%)	1(0.5%)	5(1.5%)
	Every day	106(99.1%)	204(99.5%)	327(98.5%)

In terms of hours per week of Internet use, 98% of senior students used the Internet for at least 5 hours per week (see Table 4.38). Chi-square analysis revealed no significant differences between the majors.

Table 4.38 Number and percent of senior students' current Internet use: Hours a week of Internet use

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Hours a week of Internet use	Less than 5 hours a week	2(19%)	4(2%)	6(1.8%)
	5 hours a week or more	105(98%)	201(98%)	326(98.2%)

With regard to their use of Internet required during class, between 48% and 58% of senior students were required to use the Internet in class weekly (see Table 4.39). Senior students did not differ significantly.

Table 4.39 Number and percent of senior students' current Internet use: Internet use required during class

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Internet use required during class	Less than once a week	45(42.1%)	106(51.7%)	144(43.4%)
	Once a week or more	62(57.9%)	99(48.3%)	188(56.6%)

In terms of Internet use required for coursework, between 97% and 98% of senior students were required to use the Internet outside of class weekly (see Table 4.40). There were no significant differences between the majors.

Table 4.40 Number and percent of senior students' current Internet use: Internet use required for university coursework

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Internet use required for university coursework	Less than once a week	2(1.9%)	4(2%)	11(3.3%)
	Once a week or more	105(98.1%)	201(98%)	321(96.7%)

In regards to purposes of Internet use, in general, research for schoolwork (97-98%), entertainment (96-98%), social networking (92-99%), communication (91-99%), and e-learning (92-99%) were reported most frequently. Website creation (12%-21%) was least frequently reported by senior students (see Table 4.41). In terms of group differences, business senior students used the Internet significantly more often for a) communication, b) news, c) social networking, and d) online banking than education seniors. However, education and business senior students did not differ significantly in Internet use for e-learning. Moreover, education senior students used the Internet significantly more often for e-learning than engineering seniors. Engineering senior students used the Internet significantly more often for reading news than education seniors. Education and engineering senior students did not differ significantly in using the Internet for a) communication, b) social networking, and c) online banking.

Table 4.41 Number and percent of senior students' current Internet use: Purposes of Internet use

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Purposes for Internet use	Research for schoolwork	104(97.2%)	201(98%)	326(98.2%)
	Entertainment	102(95.3%)	203(99%)	327(98.5%)
	E-learning	105(98.1%)	195(95.1%)	302(91%)
	Communication	98(91.6%)	203(99%)	311(93.7%)
	Shopping	88(82.2%)	179(87.3%)	276(83.1%)
	News	87(81.3%)	188(91.7%)	299(90.1%)
	Social networking	99(92.5%)	202(98.5%)	301(90.7%)
	Online banking	92(86%)	199(97.1%)	303(91.3%)
	Download	88(82.2%)	172(83.9%)	267(80.4%)
	Website creation	13(12.1%)	42(20.5%)	50(15.1%)

In regards to methods of learning Internet skills, between 19% and 27% of senior students learned Internet skills in university courses without inter-group differences (see Table 4.42).

Table 4.42 Number and percent of senior students' current Internet use: Methods of learning Internet skills

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Methods of learning Internet skills	Courses in university	28(26.2%)	55(26.8%)	64(19.3%)

With regards to years of using the Internet, between 76% and 81% of senior students used the Internet for at least 9 years with no significant differences between the majors (see Table 4.43).

Table 4.43 Number and percent of senior students' current Internet use: Years of Internet use

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Years of Internet use	Less than 9 years	26(24.3%)	39(19%)	77(23.2%)
	9 years or more	81(75.7%)	166(81%)	255(76.8%)

In regard to the number of online courses taken, between 64% and 98.1% of senior students took at least 1 course (see Table 4.44). Education senior students took significantly more online courses than both business and engineering seniors. Business senior students took significantly more online courses than engineering seniors.

Table 4.44 Number and percent of senior students' current Internet use: Number of online courses taken

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Number of online courses taken	0 course	2(1.9%)	25(12.2%)	120(36.1%)
	1 course or more	105(98.1%)	180(87.8%)	212(63.9%)

In regard to Internet connection, between 99% and 100% of senior students reported currently having the Internet in the place where they live (see Table 4.45).

Table 4.45 Number and percent of senior students' current Internet use: Internet connection at home, apartment, or dorm

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Internet access at home, apartment, or dorm	Not connected	0(0%)	2(1%)	4(1.2%)
	Connected	107(100%)	203(99%)	328(98.8%)

Regarding type of equipment for assessing the Internet, the most frequently reported computer device was different depending on their major (see Table 4.46). Education senior students used a) classroom computers, b) lab computers, c) university library computers, and d) P.D.As significantly more than business seniors. Business senior students used personal desktops significantly more than education seniors. Furthermore, education students used personal laptop computers significantly more than engineering students. Engineering senior students used a) personal desktop computers, b) classroom computers, and c) lab computers significantly more than education students.

Table 4.46 Number and percent of senior students' current Internet use: Type of equipment for Internet use

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Type of equipment	Desktop computer	28(26.2%)	15(76.6%)	159(47.9%)
	Laptop computer	100(93.5%)	76(37.1%)	270(81.3%)
	Classroom computer	13(12.1%)	4(2%)	144(43.4%)
	Lab computer	83(77.6%)	20(9.8%)	311(93.7%)
	University Library computer	50(46.7%)	19(9.3%)	128(90.9%)
	University issued computer	5(4.7%)	2(1%)	26(7.8%)
	P.D.A	45(42%)	17(8.3%)	122(36.7%)

II. Experience with using new literacies of the Internet

a) *During their **high school** years, did **senior** education, business, and engineering students differ in their experience with using new literacies of the Internet?*

Between 18% and 49% of senior students completed Internet workshop, Internet inquiry, or Webquest activities (see Table 4.47). All senior students did not differ significantly in their experience with Internet workshop and Webquest. Education senior students received more Internet inquiry instruction significantly than both business and engineering seniors.

Table 4.47 Number and percent of senior students' experience with using new literacies: Internet workshop, Internet inquiry, and Webquest

	N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Internet Workshop	26(24.3%)	37(18%)	62(18.7%)
Internet Inquiry	52(48.6%)	73(35.6%)	96(28.9%)
Webquest	23(21.5%)	37(18%)	67(20.2%)

b) *During their enrollment at the **university**, do **senior** education, business, and engineering students differ in their experience with using new literacies of the Internet?*

Between 32% and 63% of senior students took one or more courses in which professors modeled how to use new literacy skills (see Table 4.48). Education senior students took significantly more courses, in which using new literacies were modeled, than both business and engineering seniors. Business senior students took significantly more courses than engineering seniors.

Table 4.48 Number and percent of education, business, and education senior students' experience with using new literacies: Modeling of using new literacy skills

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Modeling of using new literacy skills	0 course	40(37.4%)	118(57.6%)	226(68.1%)
	1 course or more	67(62.6%)	87(42.4%)	106(31.9%)

Between 24% and 60% of senior students took at least 1 course in which they completed a "hands-on" activity using new literacy skills of the Internet (see Table 4.49). Education senior students took significantly more courses with hands-on activities than both business and engineering seniors. Business senior students took significantly more courses than engineering seniors.

Table 4.49 Number and percent of senior students' experience with using new literacies: Hands-on activities using new literacy skills

		N (%) Ed. seniors	N (%) Bus. seniors	N (%) Eng. seniors
Hands-on activities using new literacy skills	0 course	43(40.2%)	138(67.3%)	254(76.5%)
	1 course or more	64(59.8%)	67(32.7%)	78(23.5%)

III. Confidence and competence in using new literacies of the Internet

*a) Do **senior** education, business, and engineering students differ in their level of **confidence** in locating and evaluating information on the Internet?*

Table 4.50 shows the total mean scores of senior students' confidence ratings on 7 survey items, 3 of which were related to locating information on the Internet and 4 of which were related to evaluating information on the Internet. A five point confidence scale was used for each of the seven items. The total possible score was 35 points.

Table 4.50 Means and standard deviations of senior students' confidence ratings on 7 items

Edu. seniors (N=107)	Bus. seniors (N=205)	Eng. seniors (N=332)
M=28.90 SD=3.92	M=28.58 SD=3.81	M=28.86 SD=3.76

The 7 items includes a) using keywords with a search engine, b) locating information within the search results, c) locating information within the webpage, and evaluating the d) accuracy, e) relevance, f) bias, and g) reliability of information on the

Internet. Overall, senior students were more confident in locating than evaluating information on the Internet (see Table 4.51).

Table 4.51 Number and percent of senior students' confidence ratings of agree or strongly agree on 7 individual items

	Edu. seniors	Bus. seniors	Eng. seniors
Items of location			
Item 6 (keyword use with a search engine)	102(95.4%)	199(97.1%)	324(97.6%)
Item 7 (within the search results)	102(95.4%)	196(95.6%)	314(94.6%)
Item 8 (within a webpage)	98(91.6%)	183(89.3%)	306(92.2%)
Items of evaluation			
Item 9 (accuracy)	85(79.4%)	143(69.8%)	255(76.8%)
Item 10 (relevance)	93(86.9%)	181(88.3%)	300(90.3%)
Item 11 (bias)	77(72%)	149(72.7%)	229(69%)
Item 12 (reliability)	81(75.7%)	151(73.7%)	253(76.2%)

Table 4.52 shows the means and standard deviations of senior students' confidence ratings on each domain of locating and evaluating information on the Internet. The total possible score for locating information on the Internet was 15 points which is a summed score of 3 items. The total possible score for evaluating information on the Internet was 20 points which is a summed score of 4 items.

Table 4.52 Means and standard deviations of senior students' confidence in locating and evaluating information on the Internet

	Edu. seniors	Bus. seniors	Eng. seniors.
Confidence to locate	M=13.22 SD=1.86	M=13.09 SD=1.58	M=13.22 SD=1.76
Confidence to evaluate	M=15.68 SD=2.47	M=15.49 SD=2.68	M=15.64 SD=2.44

The summed scores were used as dependent variables to conduct ANOVA tests comparing the 3 groups. Senior students did not differ in their confidence ratings on both locating and evaluating information on the Internet. No significant difference was found among the senior students' confidence in both locating information ($F(2, 641)=0.42$ $p=0.66$) and evaluating information ($F(2, 641)=0.30$ $p=0.74$) on the Internet. Items were also analyzed individually, and revealed no group difference.

*b) Do **senior** education, business, and engineering students differ in their level of **competence** in locating and evaluating information on the Internet?*

Table 4.53 shows the total mean scores of senior students' competence in 14 performance questions consisting of 6 items of locating information on the Internet and 8 items of evaluating information on the Internet. The total possible score was 14 points. Students showed low performance with average group scores ranging from 7.13 to 7.46.

Table 4.53 Means and standard deviations of senior students' competence in 14 items

Edu. seniors (N=107)	Bus. seniors (N=205)	Eng. Seniors (N=332)
M=7.13 SD=1.99	M=7.46 SD=1.95	M=7.40 SD=1.80

Table 4.54 shows that many of the senior students did not correctly respond to questions about evaluating information on the Internet.

Table 4.54 Number and percent of senior students who correctly answered comprehension questions

	Edu. seniors	Bus. Seniors	Eng.seniors
Items of location			
Item 13	83(77.6%)	162(79%)	272(81.9%)
Item 16	64(59.8%)	101(49.3%)	202(60.8%)
Item 17	61(57%)	141(68.8%)	243(73.2%)
Item 18	71(66.4%)	162(79%)	252(75.9%)
Item 19	80(74.8%)	156(76.1%)	188(56.6%)
Item 22	66(61.7%)	124(60.5%)	181(54.5%)
Items of evaluation			
Item 14	78(72.9%)	128(62.4%)	187(56.3%)
Item 15	60(56.1%)	99(48.3%)	142(42.8%)
Item 20	91(85%)	189(92.2%)	318(95.8%)
Item 21	20(18.7%)	48(23.4%)	102(30.7%)
Item 23	14(13.1%)	68(33.2%)	110(33.1%)
Item 24	40(37.4%)	66(32.2%)	117(35.2%)
Item 25	34(31.8%)	77(37.6%)	128(38.6%)
Item 26	1(0.9%)	8(3.9%)	15(4.5%)

Table 4.55 shows the means and standard deviations of senior students' overall competence in each domain of **locating** and **evaluating** information on the Internet.

Participants' scores could range from 0 to 6 in the domain of locating information on the Internet and from 0 to 8 in the domain of evaluating information on the Internet.

Table 4.55 Means and standard deviations of senior students' competence in locating and evaluating information on the Internet

	Edu. seniors	Bus. seniors	Eng. seniors
Competence to locate	M=3.97 SD=1.27	M=4.13 SD=1.23	M=4.03 SD=1.2
Competence to evaluate	M=3.16 SD=1.18	M=3.33 SD=1.31	M=3.37 SD=1.28

Through the ANOVA procedure, the senior students' competence was compared on the two summed variables. Senior students across the majors did not differ in their competence in both locating and evaluating information on the Internet. No significant difference was found among the senior students' competence to locate information (F (2, 641)=0.67 p=0.51) and evaluate information (F (2, 641)=1.13 p=0.33) on the Internet.

c) *Is **senior** education, business, and engineering students' **confidence** related to their **competence** in locating and evaluating information on the Internet?*

Table 4.56 below shows the means and standard deviations of senior students' confidence and competence in locating and evaluating information on the Internet.

Table 4.56 Means and standard deviations of senior students' confidence and competence in locating and evaluating information on the Internet

Group	Variables	Means	Standard deviations
Education seniors (N=107)	Confidence to locate	13.22	1.86
	Competence to locate	3.97	1.27
	Confidence to evaluate	15.68	2.47
	Competence to evaluate	3.16	1.18
Business seniors (N=205)	Confidence to locate	13.09	1.58
	Competence to locate	4.13	1.23
	Confidence to evaluate	15.49	2.68
	Competence to evaluate	3.33	1.31
Engineering seniors (N=332)	Confidence to locate	13.22	1.76
	Competence to locate	4.03	1.2
	Confidence to evaluate	15.64	2.44
	Competence to evaluate	3.37	1.28

Pearson correlation analysis was conducted for each domain of locating and evaluating information on the Internet using summed scores. Concerning locating information on the Internet, only education senior students' confidence to locate information on the Internet was positively correlated with their demonstrated competence to locate information on the Internet (i.e., education senior students: $r(105)=0.19$ $p=0.049$; business senior students: $r(203)=-0.04$ $p=0.54$; engineering senior students: $r(330)=0.03$ $p=0.54$). In terms of evaluating information on the Internet, there was no relation between senior students' confidence and their demonstrated competence in evaluating information on the Internet (i.e., education senior students: $r(105)=0.07$ $p=0.48$; business senior students: $r(203)=0.09$ $p=0.19$; engineering senior students: $r(330)=0.09$ $p=0.1$).

For the following section of exploring within group differences (i.e, underclassmen to senior students in one major) I found minimal differences between education underclassmen and senior students. I have presented the findings that are directly relevant to this study in the following section. The remaining analysis is located in Appendix B.

C. Underclassmen and Senior Students within Education, Business, and Engineering Majors

II. Experience with using and teaching new literacies of the Internet

c) *During their enrollment at **the university**, do education **underclassmen and senior students** differ in their experience with teaching new literacies of the Internet?*

34 % of education underclassmen and 68% of education seniors took at least one education course in which they read about, discussed, or explored teaching students to use new literacy skills of the Internet (see Table 4.57). Education senior students took significantly more education courses, which teach new literacy skills, than their underclassmen peers.

Table 4.57 Number and percent of education underclass and senior students' experience with teaching new literacies: Student learning of teaching how to use new literacy skills

		Edu. underclassmen	Edu. seniors
Student learning of teaching how to use new literacy skills	0 course	87(65.9%)	34(31.8%)
	1 course or more	45(34.1%)	73(68.2%)

29% of education underclassmen and 65% of education senior students took a course in which professors discussed, presented, or modeled how to teach new literacy skills of the Internet (see Table 4.58). Education senior students took more courses, which teach new literacy skills, than their underclassmen peers.

Table 4.58 Number and percent of education underclass and senior students' experiences with teaching new literacies: Professors' discussion, presentation, and modeling of teaching new literacy skills

		Edu.underclassmen	Edu. seniors
Professors' discussion, presentation, or modeling of teaching new literacy skills	0 course	94(71.2%)	38(35.5%)
	1 course or more	38(28.8%)	69(64.5%)

d) What is senior education students' perceived level of preparation for teaching how to use new literacies of the Internet?

Overall, more than half of the senior education students did not think that they were "very well" or "pretty well" prepared to teach Internet workshop, Internet inquiry, or Webquest activities (see Table 4.59).

Table 4.59 Number and percent of senior education students' perceived level of preparation for new literacy instruction

	Internet workshop	Internet Inquiry	Webquest
Totally unprepared	12(11.2%)	11(10.3%)	12(11.2%)
Somewhat unprepared	20(18.7%)	14(13.1%)	16(15%)
A little prepared	32(29.9%)	34(31.8%)	27(25.2%)
Pretty well prepared	35(32.7%)	36(33.6%)	37(34.6%)
Very well prepared	8(7.5%)	12(11.2%)	15(14%)

III. Confidence and competence in using new literacies of the Internet

*a) Do **underclass and senior students** within education, business, and engineering majors differ in their level of **confidence** in locating and evaluating information on the Internet?*

Table 4.60 shows the total mean scores of underclassmen and senior student's confidence ratings on 7 survey items, 3 of which were related to locating information on the Internet and 4 of which were related to evaluating information on the Internet. A five point confidence scale was used for each of the 7 items. The total possible score was 35 points.

Table 4.60 Means and standard deviations of underclass and senior students' confidence ratings on 7 items

Ed. UC. (N=132)	Ed. seniors (N=107)	Bus. UC. (N=239)	Bus. seniors (N=205)	Eng. UC. (N=335)	Eng. seniors (N=332)
M=27.43 SD=3.75	M=28.90 SD=3.92	M=28.02 SD=3.35	M=28.58 SD=3.81	M=28.79 SD=3.86	M=28.86 SD=3.76

The 7 items includes a) using keywords with a search engine, b) locating information within the search results, c) locating information within the webpage, and evaluating the d) accuracy, e) relevance, f) bias, and g) reliability of information on the Internet. Overall, underclassmen and senior students were more confident in locating than in evaluating information on the Internet (see Table 4.61).

Table 4.61 Number and percent of underclass and senior students' confidence rating of agree or strongly agree on 7 individual items

	N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Items of location						
Item 6 (keyword use with a search engine)	122 (92.4%)	102(95.4%)	225(94.1%)	199(97.1%)	323 (96.4%)	324(97.6%)
Item 7 (within the search results)	116(87.9%)	102(95.4%)	222(92.9%)	196(95.6%)	307(91.7%)	314(94.6%)
Item 8 (within a webpage)	119(90.2%)	98(91.6%)	211(88.2%)	183(89.3%)	301(89.9%)	306(92.2%)
Items of evaluation						
Item 9 (accuracy)	78(59.1%)	85(79.4%)	169(70.8%)	143(69.8%)	246(73.4%)	255(76.8%)
Item 10 (relevance)	107(81.1%)	93(86.9%)	209(87.5%)	181(88.3%)	292(87.2%)	300(90.3%)
Item 11 (bias)	85(64.4%)	77(72%)	164(68.6%)	149(72.7%)	241(72%)	229(69%)
Item 12 (reliability)	95(71.9%)	81(75.7%)	170(71.1%)	151(73.7%)	262(78.2%)	253(76.2%)

Table 4.62 shows the means and standard deviations of the underclassmen and senior students' confidence ratings on each domain of locating and evaluating information on the Internet. The total possible score for locating information on the Internet was 15 points which is a summed score of 3 items. The total possible score for evaluating information on the Internet was 20 points which is a summed score of 4 items.

Table 4.62 Means and standard deviations of underclass and senior students' confidence in locating and evaluating information on the Internet

	Ed. UC. (N=132)	Ed. seniors (N=107)	Bus. UC. (N=239)	Bus. seniors (N=205)	Eng. UC. (N=335)	Eng. Seniors (N=332)
Locating information on the Internet	M=12.58 SD=1.75	M=13.22 SD=1.86	M=12.77 SD=1.64	M=13.09 SD=1.58	M=13.08 SD=1.75	M=13.22 SD=1.76
Evaluating Information on the Internet	M=14.86 SD=2.53	M=15.68 SD=2.47	M=15.25 SD=2.24	M=15.49 SD=2.68	M=15.70 SD=2.61	M=15.64 SD=2.44

The summed scores were used as dependent variables to conduct t-tests comparing underclassmen and senior students within the majors. As is seen in Table 4.63, education senior students were significantly more confident than their underclass peers in both locating and evaluating information on the Internet. Business senior students were more confident than their underclassmen peers in locating information on the Internet.

Table 4.63 T-test results of underclass and senior students' confidence in locating and evaluating information on the Internet

	Edu UC.vs.Edu seniors	Bus. UC. vs. Bus. seniors	Eng. UC. vs. Eng. seniors
Confidence to locate	MD=-0.64 t=-2.73 *df*= 237 p=0.007*	MD=-0.32 t=-2.07 *df*= 442 p=0.04*	MD=-0.14 t=-1.05 *df*= 665 p=0.30
Confidence to evaluate	MD=-0.83 t=-2.54 *df*= 237 p=0.01*	MD=-0.24 t=-1 *df*= 398.61 p=0.32	MD=0.07 t=0.34 *df*= 665 p=0.74

Notes. MD means mean difference

*b) Do **underclass and senior students** within education, business, and engineering majors differ in **competence** to locate and evaluate information on the Internet?*

Table 4.64 below shows the total mean scores of underclassmen and senior students' competence in 14 survey questions consisting of 6 items about locating information on the Internet and 8 items about evaluating information on the Internet. The total possible score was 14 points.

Table 4.64 Means and standard deviations of underclass and senior students' competence in 14 survey questions

Ed. UC. (N=132)	Ed. seniors (N=107)	Bus. UC. (N=239)	Bus. seniors (N=205)	Eng. UC. (N=335)	Eng. Seniors (N=332)
M=6.75 SD=1.74	M=7.13 SD=1.99	M=6.96 SD=1.83	M=7.46 SD=1.95	M=7.47 SD=1.98	M=7.40 SD=1.80

As seen in Table 4.65, many underclassmen and senior students did not respond correctly to questions about locating and evaluating information on the Internet.

Table 4.65 Number and percent of underclass and senior students who correctly answered comprehension questions

	Ed. UC. (N=132)	Ed. seniors (N=107)	Bus. UC. (N=239)	Bus. seniors (N=205)	Eng. UC. (N=335)	Eng. Seniors (N=332)
Items of location						
Item 13	98(74.2%)	83(77.6%)	166(69.5%)	162(79%)	256(76.4%)	272(81.9%)
Item 16	75(56.8%)	64(59.8%)	139(58.2%)	101(49.3%)	215(64.2%)	202(60.8%)
Item 17	75(56.8%)	61(57%)	146(61.1%)	141(68.8%)	239(71.3%)	243(73.2%)
Item 18	88(66.7%)	71(66.4%)	166(69.5%)	162(79%)	253(75.5%)	252(75.9%)
Item 19	100(75.8%)	80(74.8%)	161(67.4%)	156(76.1%)	203(60.6%)	188(56.6%)
Item 22	78(59.1%)	66(61.7%)	140(58.6%)	124(60.5%)	206(61.5%)	181(54.5%)
Items of evaluation						
Item 14	95(72%)	78(72.9%)	165(69%)	128(62.4%)	190(56.7%)	187(56.3%)
Item 15	70(53%)	60(56.1%)	119(49.8%)	99(48.3%)	158(47.2%)	142(42.8%)
Item 20	118(89.4%)	91(85%)	220(92.1%)	189(92.2%)	318(94.9%)	318(95.8%)
Item 21	12(9.1%)	20(18.7%)	36(15.1%)	48(23.4%)	93(27.8%)	102(30.7%)
Item 23	15(11.4%)	14(13.1%)	42(17.6%)	68(33.2%)	111(33.1%)	110(33.1%)
Item 24	36(27.3%)	40(37.4%)	86(36%)	66(32.2%)	129(38.5%)	117(35.2%)
Item 25	29(22%)	34(31.8%)	71(29.7%)	77(37.6%)	119(35.5%)	128(38.6%)
Item 26	2(1.5%)	1(0.9%)	7(2.9%)	8(3.9%)	11(3.3%)	15(4.5%)

Table 4.66 shows the means and standard deviations of the underclassmen and senior students' overall competence in each domain of *locating* and *evaluating* information on the Internet. Participants' scores could range from 0 to 6 in the domain of

locating information on the Internet and from 0 to 8 in the domain of evaluating information on the Internet.

Table 4.66 Means and standard deviations of underclass and senior students' competence in locating and evaluating information on the Internet

	Ed. UC. (N=132)	Ed. seniors (N=107)	Bus. UC. (N=239)	Bus. seniors (N=205)	Eng. UC. (N=335)	Eng. Seniors (N=332)
Competence to locate	M=3.89 SD=1.26	M=3.97 SD=1.27	M=3.84 SD=1.29	M=4.13 SD=1.23	M=4.10 SD=1.24	M=4.03 SD=1.2
Competence to evaluate	M=2.86 SD=1.11	M=3.16 SD=1.18	M=3.12 SD=1.17	M=3.33 SD=1.31	M=3.37 SD=1.31	M=3.37 SD=1.28

Through the t-test procedure, the underclassmen's overall competence was compared on the two summed variables. Education senior students were significantly more competent than their underclassmen in evaluating information on the Internet. Business senior students scored significantly higher than their underclassmen in locating information on the Internet. Engineering underclassmen and seniors did not differ significantly in locating or evaluating information on the Internet (see Table 4.67).

Table 4.67 T-test results of underclass and senior students' competence in locating and evaluating information on the Internet

	Edu UC vs.Edu seniors.	Bus. UC vs. Bus. seniors.	Eng. UC. vs. Eng. seniors.
Competence to locate	MD=-0.08 t=-0.48 *df*= 237 p=0.64	MD=-0.29 t=-2.38 *df*= 442 p=0.02*	MD=0.07 t=0.69 *df*= 665 p=0.49
Competence to evaluate	MD=-0.30 t=-2.03 *df*= 237 p=0.04*	MD=-0.21 t=-1.78 *df*= 412.43 p=0.08	MD=-0.0003 t=-0.003 *df*= 665 p=1

Notes. MD means mean difference
*p<0.05

CHAPTER V

CONCLUSIONS

Discussion

This survey investigated beginning and advanced pre-service teachers' Internet use and their experience, confidence, and competence with using new literacies of the Internet. Additionally, by comparing education students' skills and dispositions about the Internet to their same-aged peers, majoring in business and engineering, I investigated the education students' relative Internet Literacy. Like education, the business and engineering professions have increasingly required the use of the Internet in recent years. Specifically, this study compared the differences between a) underclassmen across the three majors, b) seniors across the majors, and c) underclassmen and seniors within the majors. I looked at differences between majors in their reported Internet use and their experience with activities and courses related to new literacy skills during their high school and university educational experiences. I also looked at their (current) confidence level and competency performances in locating and evaluating information on the Internet. In addition, this study analyzed the pre-service teachers' knowledge of *teaching* new literacy skills along with their confidence in *teaching the skills* to their future students. Through the analysis of the results, this study found the following key findings.

Digital Natives may not be active readers. General findings of the present study indicated that as digital natives as defined earlier as "native speakers of the digital language of computer, video, and Internet" (Prensky, 2001, p.1), education, business,

and engineering underclassmen and senior students were familiar with using the Internet. About 50-80% of underclassmen and senior students used the Internet daily in high school. During their university educational experiences, almost all of the students used the Internet every day. Nearly all of the students enjoyed access to the Internet in their homes during their high school years and they continued to have convenient access to the Internet in their dorms and apartments during college. About 70-85% of all students spent at least 5 hours a week using the Internet in high school while almost all of the students spent this much time on the Internet during college. They used the Internet frequently for research (89-95%), entertainment (79-93%), and communication (77-84%) while they were high school students. In college, they continued to use the Internet often for these purposes but also reported using the Internet frequently for additional purposes.

However, while the university students frequently use the Internet for accessing resources and for communicating, they are less likely to create or add to the resources on the Internet. For example, only 2-10% of education, business, and engineering students used the Internet for website creation during high school. Also, 2-21% of the students created websites by using the Internet during their university educational experiences. This indicates that even though they use the Internet frequently, they may not have developed their Internet skills well enough to create their own websites and upload information.

Additionally, through frequent use of the Internet, the students had many opportunities to navigate and collect information on the Internet but have not always

developed their critical reading skills. Based on their overall low performance on tasks that demand readers to evaluate information on the Internet, many of them were not active readers who read and interpret information with critical thinking. Passive consumers of information run the risk of accepting incorrect information. These skills of evaluating information are particularly important for future teachers.

Overall confidence in using new literacies. The present study found that, in general, the college students reported having confidence in using new literacies of the Internet. They indicated their confidence in both locating and evaluating information on the Internet. For example, the overall mean score (total confidence) for underclassmen was 28.08 out of 35 (M of Edu=27.43, M of Bus=28.02, and M of Eng=28.79). The overall mean score for senior students was 28.78 out of 35 (M of Edu=28.90, M of Bus=28.58, and M of Eng=28.86).

Within the construct of overall confidence, students were more confident in their ability to locate information on the Internet than in their ability to evaluate information on the Internet. In the domain of *locating information* on the Internet, the mean scores for all underclassmen and for all senior students was 12.81 out of 15 (85%) and 13.18 out of 15 (88%) respectively. However, in the domain of *evaluating information* on the Internet, the mean scores for all underclassmen and for all senior students were 15.27 out of 20 (76%) and 15.6 out of 20 (78%) respectively. In total, both underclassmen and senior students showed similar patterns -- they felt relatively more confident in *locating* than *evaluating* information. These findings emphasize the importance of teaching students how to evaluate information on the Internet.

In comparing a) underclassmen across the three majors, b) senior students across the majors, and c) underclassmen and senior students within the majors, it became evident that education underclassmen were relatively less confident than their peers. Specifically, education underclassmen were less confident than engineering underclassmen in locating and evaluating information on the Internet. This discrepancy may be a result of the amount of exposure to the Internet during high school. Students majoring in engineering reported significantly more hours of weekly Internet use during high school than education students. This finding has implications for education professors, because their incoming students may not be as technologically literate as their engineering peers. Although all underclassmen are digital natives, it must be recognized that there is also great variability within this group regarding their experiences with the Internet. However, it is important to note that the senior education students did not significantly differ from senior students in engineering and business in confidence of locating and evaluating information, which indicates that education students may gain confidence in these skills during their university experience.

Education *underclassmen* were also significantly less confident than the *senior* education students in locating and evaluating information. The difference between the two groups does *not* likely stem from disparate high school experiences. They did not differ in their hours of Internet use in high school, nor in their Internet use for classes. Education underclassmen used the Internet more frequently than their senior students during their high school years. Therefore, we infer that their different levels of confidence may stem from their experiences in their major classes at the university.

Multiple pieces of evidence support this inference. First, education seniors (62.6%) were more likely to take one or more classes in which the professor modeled using new literacy skills of the Internet than their business (42.4%) and engineering (31.9%) peers. Second, education seniors (59.8%) were more likely to take one or more classes in which they completed a "hands-on activity" using new literacy skills than business (32.7%) and engineering seniors (23.5%). Finally education seniors took more online classes than their peers in the other majors.

Overall low competence in using new literacies. The present study found that overall, the college students demonstrated surprisingly high levels of difficulty in locating and evaluating information on the Internet as reflected by the 50% mean performance during the online reading comprehension test. Out of a possible score of 14 points on the online reading comprehension test, the grand mean score for underclassmen was 7.06 with a mean of 6.75 for education, 6.96 for business, and 7.47 for engineering. The senior students did not perform significantly better than the underclassmen. The overall mean score across all groups of senior students was 7.3 out of 14. Education seniors scored an average score of 7.16; business students scored an average of 7.44; and engineering students scored an average of 7.40.

In particular, students struggled with questions that pertained to evaluating information on the Internet. For example, fewer than 5% of the students in each group responded correctly to a question measuring readers' evaluation of information bias. The question asked the students to report where they would first look for information (for a report) within a website dedicated to Martin Luther King. Only 2-5% of the

students first considered the authorship of the site. Many of the students seemed to assume the website was reliable and went directly to the seemingly most relevant subheading. This result indicates that students need to learn more about evaluating information on the Internet because anyone, regardless of his or her expertise and/or intent can readily place any information or misinformation on the Internet. It should be common practice for skilled Internet readers to first consider the source of information.

The results of the current study are similar to those found in the Henry survey study (2007) involving middle school students and teachers from both economically privileged and disadvantaged districts. As previously described in the methods, the comprehension questions on this survey were adapted from Henry's original survey for students. The survey was slightly modified to make the items more appropriate for university students. The total mean score for the middle school students' online reading comprehension in Henry's study was 5.40 out of 14, which is lower than the mean score of the undergraduate subjects in the current study (7.2 out of 14). The total mean score for the teachers' online reading comprehension in Henry's study was 7.51, which is comparable to the results of the current study. Like the current study, Henry's study also showed that evaluating bias of information on the Internet was challenging for middle school students and teachers (Henry, 2007). The similar results between the current study and Henry's work in 2007 indicate that similar challenges of using new literacies of the Internet are still persistent regardless of age. These findings give evidence to the importance of educating pre-service teachers who will teach the future generation how to critically evaluate information in an ever expanding information age.

Confidence unrelated to competence in using the new literacies. One critical finding was that education, business, and engineering students' confidence in using new literacies of the Internet was not always significantly related to their competence in using the new literacy skills. For example, only one of the six subgroups, engineering underclassmen, indicated that the more confident they were, then the more competent they were in the *evaluation of information on the Internet*. All other groups' scores (engineering upperclassmen and both levels of business and education students) did not demonstrate a significant direct relationship between the students' perceived abilities as reflected by their confidence ratings and their actual performances on tasks requiring critical evaluation of information that they read on the Internet.

Regarding the *location of information on the Internet* in particular, only education students (both underclass and senior level students) reflected positive correlations between their confidence ratings and their performance scores. However, these noted correlations among the education students' scores were both weak, as they were lower than $r = 0.33$. Both business and engineering students' confidence and competence were not significantly correlated for this important relationship between perceived confidence and actual performance on locating information on the Internet. Overall, these results imply that students' confidence was not always demonstrated in their competence with using new literacies of the Internet. Stated in yet another way, the undergraduate students apparently believed that they were more adept at using the new literacies than their actual performances on tasks requiring them to evaluate and locate information on the Internet.

The results of the current study appear to corroborate the results of earlier studies (Albion, 2006; Genich, Roberts, & Gist, 2006) indicating a disconnect between subjects' confidence and competence in new literacy skills. For example, Albion (2006) reported that about 90% of 516 first-year undergraduate students were confident in Internet reading assignments and search engine use to find information. However, most of the students who also participated in lab sessions did *not* perform successfully in actual tasks to locate information on the Internet. Furthermore, Genich, Roberts, and Grist (2006) also determined that undergraduate students' confidence in using search engines to find information on the Internet was not manifested in competency tests. Thus, the two studies results are in concert with the findings of this study and indicate that students tend to overestimate their ability to critically read on the Internet.

This disconnect between students' confidence and competence in using new literacies implies that students are not metacognitive about their reading process on the Internet. They may need further instructional opportunities in order to become more tech-savvy, critical readers who use their new literacies of the Internet appropriately and more effectively. If students are inaccurately overly confident, and unaware of their lack of skills, they will probably not independently seek instruction or opportunities to improve their skills because they do not realize their performance limitations.

Pre-service Teachers Knowledge of using and teaching New Literacies. The present study also indicates that as pre-service teachers, education students may need more support and instruction to learn how to use as well as teach new literacies of the Internet. As stated earlier, compared to peers, education *underclassmen* were less

competent than engineering underclassmen in their skill of evaluating information. Education students may not be entering college with the same level of Internet literacy as their engineering peers. However, education underclassmen reported that in learning Internet skills, they received more teacher instruction and completed more Internet inquiry and Webquest activities, than engineering underclassmen. Education underclassmen also reported that they took more university courses in which they completed hands-on activities related to new literacy skills, than engineering underclassmen. In total, the results indicated that education students received more opportunities for Internet use, yet the underclassmen still lagged behind in certain skills. Possibly, while education underclassmen had more experiences in learning about using new literacies of the Internet, they may not have mastered the skills. In contrast, engineering students may be more self-directed in their learning because they reported using more trial and error approaches to learn Internet skills than the education students.

As described earlier, education *seniors* demonstrated more comparable Internet skills to their engineering peers, however, education senior students were still not confident in teaching new literacies of the Internet to their future students. Education senior students had low confidence in teaching Internet workshop, Internet inquiry, and Webquest activities. These three activities are commonly used instructional practices for developing new literacy skills (e.g., Leu, et al., 2004) Therefore, if students are unaware/not confident about these common activities, this may indicate that they are uniformed about teaching strategies for new literacies in general. Thus, their lack of confidence in teaching the three activities reminds us that educators need to check out

the current status of students' knowledge of new literacies of the Internet and help them to reach the level of teaching how to use new literacies of the Internet confidently and competently.

Limitations

This study has some limitations. As this study posed a large number of research questions without adjusting the .05 error rate, it is possible that the error rate may have become inflated, thereby risking the prospect of unnecessarily rejecting the null hypothesis. Therefore the significant results of the study should be interpreted with a level of caution.

The results of the study might not be generalizable to represent all university students in the states because even though the sample size was large, the students were recruited from one university in the Southwestern region. However, as it sampled students from three different majors, it can better generalize to university students' Internet use and their experience, confidence and competence in using new literacies of the Internet in general.

Furthermore, in survey research in general, and in this study in particular, the researcher has to depend on the fallibility of self-report. However, in this survey, student's competence in locating and evaluating information on the Internet was also measured by an online reading comprehension test. The test revealed their current level of using new literacies of the Internet and does not rely on self-report.

In measuring the students' competence in using new literacies of the Internet, this study used Henry's 14 items on online reading comprehension including only two domains - locating and evaluating information on the Internet. Thus, the assessment did not measure the other three domains of new literacies skills that include a) identifying important questions, b) synthesizing information collected, and c) communicating information by using digital devices (Henry 2007). However, Henry pointed out that "a measure of critical evaluation conducted in isolation of other aspects of online reading may show an individual succeeding when they may not have been able to locate the information" (Henry 2007).

Implications

This study suggests that even though they are digital natives, pre-service teachers should be trained to know how to not only use but also teach new literacies of the Internet before they teach their students who will live more digitalized lives in the 21st century. Thus, university educators should provide courses in which pre-service teachers should have more opportunities to complete hand-on activities in relation to using and teaching new literacy skills so that they are more comfortable and competent when they teach in their professional field.

Furthermore, this study suggests that after they become in-service teachers, pre-service teachers should be kept informed on using and teaching new literacies of the Internet effectively. According to the results of this study, schools appeared to teach Internet skills to children more than before. However, in light of the underclassmen's

competence in locating and evaluating information on the Internet, schools need to provide students with more instruction of new literacy skills. Because of the characteristic of continuous change of the new literacies (Leu et al., 2004), teachers should be kept updated through professional developments.

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APPENDIX A

Table A.1 Chi-square analysis results of underclassmen's high school-related Internet use

		Edu. vs. Bus.vs. Eng. underclassmen (N=706, *df*=2)	Edu. vs. Bus. underclassmen (N=371, *df*=1)	Edu.vs. Eng. underclassmen (N=467, *df*=1)	Bus. vs. Eng. underclassmen (N=574, *df*=1)
Overall frequency of Internet use		χ^2=4.88, p=0.09			
Hours a week of Internet use		χ^2=12.64, p=0.002*	χ^2=11.06, p=0.001*	χ^2=8.61, p=0.003*	χ^2=0.52 p =0.47
Internet use required during class		χ^2=0.82, p=0.66			
Internet use required for school assignments		χ^2=11.26, p=0.004*	χ^2=6.34, p=0.01*	χ^2=0.001 p=0.97	χ^2=10.35, p=0.001*
Purposes of Internet use	Research for schoolwork	χ^2=0.95, p=0.62			
	Entertainment	χ^2=5.53, p=0.06			
	E-learning	χ^2=4.65, p=0.1			
	Communication	χ^2=0.69, p=0.71			
	Shopping	χ^2=4.02, p=0.13			
	News	χ^2=7.04, p=0.03*	χ^2=6.90 p=0.009*	χ^2=2.25, p=0.13	χ^2=2.39, p=0.12
	Social networking	χ^2=0.42, p=0.81			
	Online banking	χ^2=5.33, p=0.07			
	Downloads	χ^2=9.82, p =0.007*	χ^2=5.58 p =0.02*	χ^2=0.004, p =0.95	χ^2=8.98, p =0.003*
	Website creation	χ^2=11.23, p=0.004*	χ^2=4.94 p=0.03*	χ^2=10.36, p=0.001*	χ^2=2.43, p=0.12
Internet connection at home		–	χ^2=0.18 p =0.69	χ^2=1.19, p =0.28	χ^2=3.62, p =0.57
Methods of learning Internet skills	The trial and error method	χ^2=15.08, p=0.001*	χ^2=5.87 p=0.02*	χ^2=14.97, p <0.001*	χ^2=1.87, p=0.17
	Teacher instruction	χ^2=58.24, p <0.001*	χ^2=4.38 p =0.04*	χ^2=45.19, p<0.001*	χ^2=31.86, p<0.001*
	Guidance from parents and peers	χ^2=30.16, p<0.001*	χ^2=4.71 p=0.03*	χ^2=25.69, p <0.001*	χ^2=12.67, p <0.001*
	Books and online tutorials	χ^2=6.42, p=0.04*	χ^2=0.02 p=0.89	χ^2=3.5, p=0.06	χ^2=4.63, p=0.03*
	Other types of training activities	χ^2=10.28, p=0.006*	χ^2=0.05 p =0.83	χ^2=5.28, p=0.02*	χ^2=7.07, p=0.008*

Notes. Edu. means education, Bus. means business, Eng. means engineering.
* p <0.05

Table A.2 Chi-square analysis results of underclassmen's current Internet use

		Edu. vs. Bus.vs. Eng. underclassmen (N=706, *df*=2)	Edu. vs. Bus. underclassmen (N=371, *df*=1)	Edu.vs. Eng. underclassmen (N=467, *df*=1)	Bus. vs. Eng. underclassmen (N=574, *df*=1)
Overall frequency of Internet use		–	χ^2=0.47, p=0.49	χ^2=0.5, p=0.48	χ^2=0.000, p=1
Hours a week of Internet use		χ^2=2.3, p=0.32			
Internet use required during class		χ^2=77.61, p <0.001*	χ^2=0.91, p=0.34	χ^2=36.90, p <0.001*	χ^2=69.46, p <0.001*
Internet use required for coursework		χ^2=4.72, p=0.09			
Purposes for Internet use	Research for schoolwork	χ^2=0.71, p=0.7			
	Entertainment		χ^2=0.000, p=1	χ^2=0.23, p=0.63	χ^2=0.82, p=0.37
	E-learning	χ^2=5.20, p=0.07			
	Communication	χ^2=0.93, p=0.63			
	Shopping	χ^2=0.06, p=0.97			
	News	χ^2=3.22, p=0.2			
	Social networking	χ^2=5.38, p=0.07			
	Online Banking	χ^2=1.17, p=0.56			
	downloads	χ^2=2.06, p=0.36			
	Website creation	χ^2=7.06, p=0.03*	χ^2=7.05, p=0.01*	χ^2=6.05, p=0.01*	χ^2=0.16, p=0.69
Methods of learning Internet skills	Courses in university	χ^2=16.46, p <0.001*	χ^2=6.05, p=0.01*	χ^2=1.16, p=0.69*	χ^2=14.72, p <0.001
Years of Internet use		χ^2=3.53, p=0.17			
Number of online courses taken		χ^2=35.26, p<0.001	χ^2=28.71, p<0.001*	χ^2=28.49, p<0.001*	χ^2=0.19, p=0.67
Internet connection at home, apartment, or dorm		–	χ^2=0.09, p=0.76	χ^2=0.09, p=0.76	χ^2=0.77, p=0.38
Type of equipment for Internet use	Desktop computer	χ^2=1.87, p=0.39			
	Laptop computer	χ^2=2.02, p=0.37			
	Classroom computer	χ^2=139.99, p<0.001*	χ^2=0.04, p=0.84	χ^2=67.27, p <0.001*	χ^2=101.26, p <0.001*
	Lab computer	χ^2=22.15, p <0.001*	χ^2=0.53, p=0.47	χ^2=0.9.65, p=0.002*	χ^2=20.94, p <0.001*
	University library computer	χ^2=4.68, p=0.96			
	University issued computer	χ^2=0.99, p=0.61			
	P.D.A	χ^2=0.93, p=0.63			

* p <0.05

Table A.3 Chi-square analysis results of underclassmen's experience with using new literacies of the Internet

	Edu. vs. Bus.vs. Eng. underclassmen (N=706, *df*=2)	Edu. vs. Bus. underclassmen (N=371, *df*=1)	Edu.vs. Eng. underclassmen (N=467, *df*=1)	Bus. vs. Eng. underclassmen (N=574, *df*=1)
Internet workshop	χ^2=4.13 p = 0.13			
Internet inquiry	χ^2=8.72, p = 0.01*	χ^2=5.05, p = 0.03*	χ^2=8.52, p = .004*	χ^2=0.41, p = 0.52
Webquest	χ^2=11.62, p = 0.003*	χ^2=1.09, p = 0.30	χ^2=9.9, p = 0.002*	χ^2=5.90, p = 0.02*
Modeling of using new literacy skills	χ^2=13.43, p = 0.001*	χ^2=2.25, p = 0.13	χ^2=2.05, p = 0.15	χ^2=13.44, p <0.001*
Hands on activity using new literacy skills	χ^2=7.53, p = 0.02*	χ^2=1.76, p = 0.19	χ^2=7.33, p = 0.007*	χ^2=2.30, p = 0.13

* p <0.05

Tale A.4 Chi-square analysis results of senior students' high school-related Internet use

		Edu. vs. Bus.vs. Eng. Seniors (N=644, *df*=2)	Edu. vs. Bus. seniors (N=312, *df*=1)	Edu.vs. Eng. Seniors (N=439, *df*=1)	Bus. vs. Eng. Seniors (N=537, *df*=1)
Overall frequency of Internet use		χ^2=9.91, p =0.007*	χ^2=8.72, p =0.003*	χ^2=1.52, p =0.22	χ^2=5.72, p=0.02*
Hours a week of Internet use		χ^2=5.87, p =0.053			
Internet use required during class		χ^2=4.04, p =0.13			
Internet use required for school assignments		χ^2=7.8, p =0.02*	χ^2=3.70, p =0.054	χ^2=0.03, p =0.87	χ^2=7.38, p=0.007*
Purposes for Internet use	Research for schoolwork	χ^2=3.85, p =0.15			
	Entertainment	χ^2=3.34, p =0.19			
	E-learning	χ^2=5.52, p =0.06			
	Communicati-on	χ^2=4.19, p =0.12			
	Shopping	χ^2=7.71, p =0.02*	χ^2=6.97, p =0.008*	χ^2=1.74, p =0.19	χ^2=3.72, p =0.054
	News	χ^2=3.65, p =0.16			
	Social networking	χ^2=37.22, p <0.001*	χ^2=9.16, p =0.002*	χ^2=3.71, p =0.054	χ^2=37.11, p <0.001*
	Online banking	χ^2=5.19, p =0.08			
	Downloads	χ^2=8.32, p =0.02*	χ^2=6.70, p =0.01*	χ^2=0.67, p =0.41	χ^2=5.74, p =0.02*
	Website creation	χ^2=11.26, p =0.004*	χ^2=6.13, p =0.01*	χ^2=10.80, p =0.001*	χ^2=1.68, p =0.19
Internet connection at home		–	χ^2=0.33 p =0.57	χ^2=0.19, p =0.66	χ^2=3.43, p =0.06
Methods of learning Internet skills	The trial and error method	χ^2=3.87, p =0.15			
	Teacher instruction	χ^2=13.05, p =0.001*	χ^2=0.79, p =0.37	χ^2=9.77 p=0.002*	χ^2=7.33, p=0.007*
	Guidance from parents and peers	χ^2=11, p=0.004*	χ^2=5.78, p =0.02*	χ^2=11, p =0.001*	χ^2=0.94, p =0.33
	Books and online tutorials	χ^2=6.84, p=0.03*	χ^2=1.36, p =0.24	χ^2=5.74, p=0.02*	χ^2=2.51, p=0.11
	Other types of training activities	χ^2=3.91, p=0.14			

* p <0.05

Table A.5 Chi-square analysis results of senior students' current Internet use

		Edu. vs. Bus.vs. Eng. seniors (N=644, *df*=2)	Edu. vs. Bus. seniors (N=312, *df*=1)	Edu.vs. Eng. seniors (N=439, *df*=1)	Bus. vs. Eng. seniors (N=537, *df*=1)
Overall frequency of Internet use		–	χ^2=0.000 p =1	χ^2=0.000 p =1	χ^2=1.19 p =0.28
Hours a week of Internet use		–	χ^2=0.000 p =1	χ^2=0.000 p =1	χ^2=0.000 p =1
Internet use required during class		χ^2=4.27, p =0.12			
Internet use required for coursework		χ^2=1.21, p =0.55			
Purposes for Internet use	Research for schoolwork	–	χ^2=0.006 p =0.94	χ^2=0.06 p =0.81	χ^2=0.000 p =1
	Entertainment	–	χ^2=2.86, p =0.09	χ^2=2.36, p =0.12	χ^2=0.02, p =0.89
	E-learning	χ^2=8.15, p =0.02*	χ^2=1.00, p =0.32	χ^2=6.15, p =0.01*	χ^2=3.17, p =0.08
	Communication	χ^2=10.90, p =0.004*	χ^2=9.35, p =0.002*	χ^2=0.55, p =0.46	χ^2=8.85, p =0.003*
	Shopping	χ^2=2.10, p =0.35			
	News	χ^2=8.46, p =0.02*	χ^2=7.27, p =0.007*	χ^2=5.84, p =0.02*	χ^2=0.41, p =0.52
	Social networking	χ^2=13.08, p =0.001*	χ^2=5.81, p =0.02*	χ^2=0.35, p =0.56	χ^2=13.25, p <0.001*
	Online Banking	χ^2=12.98, p =0.002*	χ^2=13.78, p <0.001*	χ^2=2.51, p =0.11	χ^2=7.02, p =0.008*
	Downloads	χ^2=1.05, p =0.59			
	Website creation	χ^2=4.36, p =0.11			
Method of learning Internet skills	Courses in university	χ^2=4.92, p =0.09			
Years of Internet use		χ^2=1.66, p =0.44			
Number of online courses taken		χ^2=73.26, p <0.001*	χ^2=9.48 p =0.002*	χ^2=47.37 p <0.001*	χ^2=36.88 p <0.001*
Internet connection at home, apartment, or dorm		–	χ^2=0.77 p =0.78	χ^2=0.31, p =0.58	χ^2=0.000, p =1
Type of equipment for Internet use	Desktop computer	χ^2=80.22, p<0.001*	χ^2=74.04 p <0.001*	χ^2=15.62, p <0.001*	χ^2=43.09, p<0.001*
	Laptop computer	χ^2=151.87, p <0.001*	χ^2=90.90 p<0.001*	χ^2=8.99, p =0.003*	χ^2=108.30, p <0.001*
	Classroom computer	χ^2=127.28, p<0.001*	χ^2=14.19, p <0.001*	χ^2=34.34, p <0.001*	χ^2=108.92, p <0.001*
	Lab computer	χ^2=396.62, p <0.001*	χ^2=146.2, p <0.001*	χ^2=22.81, p <0.001*	χ^2=377.47, p <0.001*
	University library computer	χ^2=66.94, p <0.001*	χ^2=57.28 p <0.001*	χ^2=2.24, p =0.13	χ^2=54.68, p <0.001*
	University issued computer	χ^2=12.31, p =0.002*	χ^2=2.86 p =0.09	χ^2=1.23, p =0.27	χ^2=12.05, p =0.001*
	P.D.A	χ^2=61.72, p <0.001*	χ^2=50.33 p<0.001*	χ^2=0.97, p =0.33	χ^2=53.49, p <0.001*

* p <0.05

Table A.6 Chi-square analysis results of senior students' experience with using new literacies of the Internet

	Edu. vs. Bus.vs. Eng. seniors (N=644, *df*=2)	Edu. vs. Bus. seniors (N=312, *df*=1)	Edu.vs. Eng. seniors (N=439, *df*=1)	Bus. vs. Eng. seniors (N=537, *df*=1)
Internet workshop	χ^2=1.99 p = 0.37			
Internet inquiry	χ^2=14.13, p = 0.001*	χ^2=4.94 p = 0.03*	χ^2=14.03 p <0.001*	χ^2=2.63 p = 0.11
Webquest	χ^2=0.62, p = 0.73			
Modeling of using new literacy skills	χ^2=32.19 p< 0.001*	χ^2=11.45 p = 0.001*	χ^2=31.92 p <0.001*	χ^2=6.08 p =0.01*
Hands on activity using new literacy skills	χ^2=48.70, p < 0.001*	χ^2=21.25 p < 0.001*	χ^2=48.78 p < 0.001*	χ^2=5.43 p = 0.02*

* p <0.05

Table A.7 Chi-square analysis results of underclass and senior students' high school-related Internet use

		Edu. UC. vs. seniors (N=239, *df*=1)	Bus. UC. vs. seniors (N=444, *df*=1)	Eng. UC. vs. seniors (N=667, *df*=1)
Overall frequency of Internet use		χ^2=11.83, p =0.001*	χ^2=8.5 p =0.004*	χ^2=16.15 p <0.001*
Hours a week of Internet use		χ^2=0.004, p =0.95	χ^2=1.23, p =0.27	χ^2=8.75, p =0.004*
Internet use required during class		χ^2=1.96 p =0.16	χ^2=4.12, p =0.04*	χ^2=14.30, p<0.001*
Internet use required for school assignments		χ^2=1.33, p =0.25	χ^2=4.05, p =0.04*	χ^2=4.16, p =0.04*
Purposes for Internet use	Research for schoolwork	χ^2=1.46, p=0.23	χ^2=0.16, p =0.7	χ^2=3.63, p =0.06
	Entertainment	χ^2=2.03, p=0.15	χ^2=2.21, p =0.14	χ^2=13.67, p <0.001*
	E-learning	χ^2=6.93, p =0.008*	χ^2=2.67, p =0.1	χ^2=10.97, p =0.001*
	Communication	χ^2=0.15, p =0.7	χ^2=0.8, p =0.37	χ^2=1.23, p =0.27
	Shopping	χ^2=10.12, p =0.001*	χ^2=2.48, p =0.12	χ^2=4.05 p =0.44
	News	χ^2=3.69, p =0.06	χ^2=10.91, p =0.001*	χ^2=7.65, p =0.006*
	Social networking	χ^2=11.53, p =0.001*	χ^2=0.18, p =0.67	χ^2=55.87, p <0.001*
	Online banking	χ^2=7.4, p =0.07	χ^2=1.72, p =0.19	χ^2=24.11, p <0.001*
	Downloads	χ^2=5.31, p =0.02*	χ^2=6.66, p =0.01*	χ^2=6.80, p =0.009*
	Website creation	χ^2=0.05, p =0.83	χ^2=1.01, p =0.32	χ^2=1.01, p =0.13
Internet connection at home		χ^2=0.34 p =0.86	χ^2=0.000, p =1	χ^2=0.06, p =0.81
Methods of learning Internet skills	The trial and error method	χ^2=4.35, p =0.04*	χ^2=1.02, p =0.31	χ^2=1.71, p =0.19
	Teacher instruction	χ^2=7.88, p =0.005*	χ^2=6.41, p=0.01*	χ^2=0.000, p=0.99
	Guidance from parents and peers	χ^2=1.59, p =0.21	χ^2=5.08, p =0.02*	χ^2=0.002, p =0.97
	Books and online tutorials	χ^2=1.15, p =0.7	χ^2=0.65, p =0.42	χ^2=0.19, p =0.66
	Other types of training activities	χ^2=0.05, p =0.82	χ^2=2.92, p =0.09	χ^2=0.31, p =0.58

* p <0.05

Table A.8 Chi-square analysis results of underclass and senior students' current Internet use

		Edu. UC. vs. seniors (N=239, *df*=1)	Bus. UC. vs. seniors (N=444, *df*=1)	Eng. UC. vs. seniors (N=667, *df*=1)
Overall frequency of Internet use		χ^2=0.01, p =0.92	χ^2=0.12, p =0.73	χ^2=0.000, p =0.99
Hours a week of Internet use		χ^2=0.02, p =0.88	χ^2=0.04, p =0.56	χ^2=0.11, p =0.74
Internet use required during class		χ^2=2.85, p =0.09	χ^2=1.86, p=0.17	χ^2=28.41, p <0.001*
Internet use required for coursework		χ^2=0.000, p =0.83	χ^2=1.28, p =0.26	χ^2=3.41, p =0.06
Purposes for Internet use	Research for schoolwork	χ^2=0.000, p =1	χ^2=1.8, p =0.18	χ^2=4.61, p =0.03*
	Entertainment	χ^2=0.10, p =0.75	χ^2=2.12, p =0.15	χ^2=0.08, p =0.77
	E-learning	χ^2=0.02, p =0.88	χ^2=0.21, p =0.65	χ^2=0.03, p =0.86
	Communication	χ^2=1.50, p =0.22	χ^2=7.57, p =0.006*	χ^2=0.08, p =0.78
	Shopping	χ^2=3.96, p =0.047*	χ^2=16.44, p<0.001*	χ^2=11.41, p= 0.001*
	News	χ^2=1.07, p =0.30	χ^2=10.20, p =0.001*	χ^2=7.15, p =0.007*
	Social networking	χ^2=0.001, p =0.98	χ^2=2.87, p =0.09	χ^2=0.001, p =0.97
	Online banking	χ^2=0.007, p =0.93	χ^2=26.47, p <0.001*	χ^2=7.77, p =0.005*
	Downloads	χ^2=0.65, p =0.42	χ^2=0.03, p =0.86	χ^2=0.18, p =0.67
	Website creation	χ^2=9.23, p =0.002*	χ^2=10.42, p =0.001*	χ^2=6.55, p =0.01*
Methods of learning Internet skills	Courses in university	χ^2=11.08, p =0.001*	χ^2=3.2, p =0.07	χ^2=15.68, p <0.001*
Years of Internet use		χ^2=1.34, p =0.25	χ^2=7.17, p =0.007*	χ^2=5.34, p =0.02*
Number of online courses taken		χ^2=50.02, p <0.001*	χ^2=147.60, p <0.001*	χ^2=66.78, p <0.001*
Internet connection at home, apartment, or dorm		χ^2=0.000 p =1	χ^2=0.67, p =0.41	χ^2=0.000, p =0.99
Type of equipment for Internet use	Desktop computer	χ^2=1.16, p =0.28	χ^2=74.88, p <0.001*	χ^2=22.07, p <0.001*
	Laptop computer	χ^2=1.66, p =0.20	χ^2=180.31, p <0.001*	χ^2=26.43, p <0.001*
	Classroom computer	χ^2=0.14, p =0.71	χ^2=14.84, p <0.001*	χ^2=4.91, p =0.03*
	Lab computer	χ^2=0.36, p =0.55	χ^2=167.71, p <0.001*	χ^2=10.12, p =0.001*
	University library computer	χ^2=1.45, p =0.23	χ^2=128.63, p <0.001*	χ^2=13.14, p <0.001*
	University issued computer	χ^2=0.85, p =0.36	χ^2=5.91, p =0.02*	χ^2=0.90, p =0.34
	P.D.A	χ^2=0.03, p =0.86	χ^2=57.89, p <0.001*	χ^2=0.000, p =0.99

* p <0.05

Table A.9 Chi-square analyses of underclass and senior students' experiences with using new literacies of the Internet

	Edu. UC. vs. seniors (N=239, *df*=1)	Bus. UC. vs. seniors (N=444, *df*=1)	Eng. UC. vs. seniors (N=667, *df*=1)
Internet Workshop	χ^2=0.27 p = 0.60	χ^2=3.97 p = 0.046*	χ^2=0.19 p = 0.67
Internet Inquiry	χ^2=0.01 p = 0.92	χ^2=0.13 p = 0.72	χ^2=2.51 p = 0.11
Webquest	χ^2=12.48 p <0.001*	χ^2=20.78, p <0.001*	χ^2=5.65 p = 0.02*
Modeling of using new literacy skills	χ^2=24.96 p <0.001*	χ^2=0.88, p = 0.35	χ^2=5.37, p = 0.02*
Hands-on activity using new literacy skills	χ^2=19.83 p <0.001*	χ^2=3.47, p = 0.06	χ^2=1.66, p = 0.20

* p <0.05

Table A.10 Chi-square analysis results of education underclass and senior students' experiences with teaching new literacy of the Internet

	Edu.underclassmen vs. Edu. seniors (N=239, *df*=1)
Student learning of teaching new literacy skills of the Internet	χ^2=27.55, p<0.001*
Professors' discussion, presentation or modeling of teaching the new literacy skills	χ^2=30.46, p<0.001*

* p <0.05

APPENDIX B

Students' Answers

C. Comparisons of Underclass and Senior University Students within Education, Business, and Engineering Majors

I. Internet use

*a) During their **high school years**, did **underclassmen and senior students** within education, business, and engineering majors differ in their Internet use?*

In regards to overall frequency of Internet use, between 71% and 78% of underclassmen and between 49% and 66% of senior students used the Internet every day in high school (see Table B.1). Education, business, and engineering underclassmen used the Internet more frequently than their senior students.

Table B.1 Number and percent of underclass and senior students' high school-related Internet use: Overall frequency

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Overall Frequency of Internet use	Less than every day	39 (29.5%)	55 (51.4%)	52 (21.8%)	70 (34.1%)	99 (29.6%)	148 (44.6%)
	Every day	93((70.5%)	52(48.6%)	187(78.2%)	135(65.9%)	236(70.4%)	184(55.4%)

Note. UC=Underclassmen

In terms of hours per week of Internet use, between 70% and 85% of underclassmen and senior students used the Internet for at least 5 hours a week in high school (see Table B.2). Education and business underclassmen were not different

significantly from their senior students. Engineering underclassmen spent significantly more hours to use the Internet than their senior students.

Table B.2 Number and percent of underclass and senior students' high school-related Internet use: Hours a week of Internet use

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Hours a week of Internet use	Less than 5 hours a week	39(29.5%)	32(29.9%)	36(15.1%)	39(19.1%)	58(17.3%)	89(26.8%)
	5 hours a week or more	93(70.5%)	75(70.1%)	203(84.9%)	166(81%)	277(82.7%)	243(73.2%)

In terms of their Internet use required during class in high school, between 53% and 57% of underclassmen and between 38% and 47% of senior students were required to use the Internet in class weekly (see Table B.3). Education underclassmen and senior students were not significantly different from each other. Business and engineering underclassmen were required to use the Internet in class significantly more often than their seniors.

Table B.3 Number and percent of underclass and senior students' high school-related Internet use: Internet use required during class

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet use required during class	Less than once a week	62(47%)	60(56.1%)	104(43.5%)	109(53.2%)	158(47.2%)	205(61.7%)
	Once a week or more	70(53%)	47(43.9%)	135(56.5%)	96(46.8%)	177(52.8%)	127(38.3%)

In terms of their Internet use required for high school assignments, between 69% and 81% of underclassmen and between 62% and 73% of senior students were required to use the Internet outside of class weekly (see Table B.4). Business and engineering underclassmen were required to use the Internet significantly more often outside of class than their seniors. There was no significant difference between education underclassmen and senior students.

Table B.4 Number and percent of underclass and senior students' high school-related Internet use: Internet use required for school assignments

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet use required for school assignments	Less than once a week	40(30.3%)	40(37.4%)	45(18.8%)	55(26.8%)	103(30.7%)	127(38.3%)
	Once a week or more	92(69.7%)	67(62.6%)	194(81.2%)	150(73.2%)	232(69.3%)	205(61.7%)

Overall, all underclassmen and senior students used the Internet frequently for research for schoolwork (89-95%), entertainment (79-93%), and communication (77-84%) (see Table B.5). Website creation (2-13%) was the least frequently reported purpose for which underclassmen and senior students used the Internet (see Table B.5). In terms of group differences within the majors, education underclassmen used the Internet significantly more often for e-learning, shopping, social networking and music, videos, or podcasts downloads than their senior students. Business underclassmen used the Internet significantly more often for reading news and downloading music, videos, or podcasts than their senior students. Engineering underclassmen used the Internet

significantly more frequently for a) entertainment, b) e-learning, c) news, d) social networking, e) online banking, and f) music, videos, or podcasts downloads than their senior students.

Table B.5 Number and percent of underclass and senior students' high school-related Internet use: Purposes of Internet use

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Purpose for Internet use	Research for schoolwork	125(94.7%)	97(90.7%)	226(94.6%)	192(93.7%)	311(92.8%)	294(88.6%)
	Entertainment	114(86.4%)	85(79.4%)	219(91.6%)	179(87.3%)	312(93.1%)	279(84%)
	E-learning	18(13.6%)	4(3.7%)	37(15.5%)	21(10.2%)	70(20.9%)	38(11.4%)
	Communi-cation	111(84.1%)	88(82.2%)	194(81.2%)	173(84.4%)	271(80.9%)	257(77.4%)
	Shopping	69(52.3%)	34(31.8%)	131(54.8%)	97(47.3%)	156(46.6%)	129(38.9%)
	News	58(43.9%)	34(31.8%)	139(58.2%)	87(42.4%)	173(51.6%)	136(41%)
	Social networking	115(87.1%)	74(69.2%)	204(85.4%)	172(83.9%)	284(84.8%)	195(58.7%)
	Online banking	41(31.1%)	17(15.9%)	79(33.1%)	58(27.3%)	136(40.6%)	76(22.9%)
	Download	93(70.5%)	60(56.1%)	194(81.2%)	145(70.7%)	235(70.1%)	201(60.5%)
	Website creation	2(1.5%)	2(1.9%)	16(6.7%)	19(2%)	35(10.4%)	43(13%)

In regard to Internet connection, between 97% and 100% of underclassmen and senior students used the Internet at home (see Table B.6).

Table B.6 Number and percent of underclass and senior students' high school-related Internet use: Internet connection at home

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet connection at home	Not Connected	1(0.8%)	2(1.9%)	1(0.4%)	1(0.5%)	10(3%)	11(3.3%)
	Connected	131(99.2%)	105(98.1%)	238(99.6%)	204(99.5%)	325(97%)	321(96.7%)

In terms of methods of learning Internet skills, the "trial and error" method, teacher instruction, and parent and peer guidance were frequently reported by underclassmen and senior students (see Table B.7). Education senior students used the "trial and error" method significantly more than their underclassmen. Moreover, education and business underclassmen received significantly more teacher instruction than their senior students. Furthermore, business underclassmen received significantly more guidance from parents and peers than their senior students. Underclassmen and senior students within education and engineering majors were not different significantly from each other.

Table B.7 Number and percent of underclass and senior students' high school-related Internet use—Methods of learning Internet skills

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Methods of learning Internet skills	The trial and error method	107 (81.1%)	97 (90.7%)	215 (90%)	190 (92.7%)	312 (93%)	317 (95.5%)
	Teacher instruction	98 (74.2%)	61 (57%)	152 (63.6%)	106 (51.7%)	133 (39.7%)	132 (39.8%)
	Guidance from parents/ peers	102 (77.3%)	75 ((70.1%)	159 (66.5%)	115 (56.1%)	173 (51.6%)	172 (51.8%)
	Books and online tutorials	17 (12.9%)	12 (11.2%)	31 (13.4%)	33 (16.1%)	68 (20.3%)	72 (21.7%)
	Other types of training activities	7 (5.3%)	5 (4.7%)	14 (5.9%)	21 (10.2%)	42 (12.5%)	37 (11.1%)

*b) During their enrollment at the **university**, do **underclassmen and senior students** within education, business, and engineering majors differ in their Internet use?*

In regards to overall frequency of Internet use, between 99% and between 100% of underclassmen and senior students used the Internet every day (see Table B.8).

Table B.8 Number and percent of underclass and senior students' current Internet use: Overall frequency of Internet use

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Overall frequency of Internet use	Less than every day	0(0%)	1(0.9%)	3(1.3%)	1(0.5%)	4(1.2%)	5(1.5%)
	Every day	132(100%)	106(99.1%)	236(98.7%)	204(99.5%)	331(98.8%)	327(98.5%)

In terms of hours per week of Internet use, between 97% of 99% of underclassmen and senior students spent at least 5 hours a week using the Internet (see Table B.9). Chi-square analyses found no significant differences within the majors.

Table B.9 Number and percent of underclass and senior students' current Internet use: Hours a week of Internet use

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Hours a week of Internet use	Less than 5 hours a week	4(3%)	2(19%)	3(1.3%)	4(1.2%)	4(1.2%)	6(1.8%)
	5 hours a week or more	128(97%)	105(98%)	236(98.7%)	201(98%)	331(98.8%)	326(98.2%)

With regard to their use of Internet required during class, between 42% and 76% of underclassmen and between 48% and 58% of senior students were required to use the Internet in class weekly (see Table B.10). Engineering underclassmen used the Internet significantly more often than their senior students. Education and business senior students did not differ significantly from their underclassmen.

Table B.10 Number and percent of underclass and senior students' current Internet use: Internet use required during class

		N (%) Ed. Uc.	N (%) Ed. seniors	N (%) Bus. Uc.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet use required during class	Less than once a week	70(53%)	45(42.1%)	139(58.2%)	106(51.7%)	80(23.9%)	144(43.3%)
	Once a week or more	62(47%)	62(57.9%)	100(41.8%)	99(48.3%)	255(76.1%)	188(56.6%)

In terms of students' Internet use required for coursework, between 96 and 99% of underclassmen and senior students were required to use the Internet outside of class weekly (see Table B.11). Chi-square analyses found no significant differences within the majors.

Table B.11 Number and percent of underclass and senior students' current Internet use: Internet use required for university coursework

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet use required for university coursework	Less than once a week	2(1.5%)	2(1.9%)	9(3.8%)	4(2%)	4(1.2%)	11(3.3%)
	Once a week or more	130(98.5%)	105(98.1%)	230(96.2%)	201(98%)	331(98.8%)	321(96.7%)

In regards to purposes of Internet use, website creation was the least frequently reported purpose for which senior students used the Internet (see Table B.12). Education senior students used the Internet significantly more often for shopping and website creation than their underclassmen. Furthermore, business seniors used the Internet significantly more often for a) communication, b) shopping, c) news, d) online banking, and e) website creation than their underclassmen. Moreover, engineering seniors used the Internet significantly more often for a) research for coursework, b) shopping, c) news, d) online banking, and e) website creation than their underclassmen.

Table B.12 Number and percent of underclass and senior students' current Internet use: Purpose of Internet use

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Purpose for Internet use	Research for schoolwork	128(97%)	104(97.2%)	229(95.8%)	201(98%)	319(95.2%)	326(98.2%)
	Entertainment	128(97%)	102(95.3%)	232(97.1%)	203(99%)	329(98.2%)	327(98.5%)
	E-learning	128(97%)	105(98.1%)	225(94.1%)	195(95.1%)	306(91.3%)	302(91.1%)
	Communica-tion	126(95.5%)	98(91.6%)	225(94.1%)	203(99%)	312(93.1%)	311(93.7%)
	Shopping	94(71.2%)	88(82.2%)	171(71.5%)	179(87.3%)	242(72.2%)	276(83.1%)
	News	100(75.8%)	87(81.3%)	194(81.2%)	188(91.7%)	278(83%)	299(90.1%)
	Social networking	122(92.4%)	99(92.5%)	229(95.8%)	202(98.5%)	304(90.7%)	301(90.7%)
	Online banking	113(85.6%)	92(86%)	195(81.6%)	199(97.1%)	282(84.2%)	303(91.3%)
	Downloads	103(78.1%)	88(82.2%)	199(83.3%)	172(83.9%)	265(79.1%)	267(80.4%)
	Website creation	3(2.3%)	13(12.1%)	23(9.6%)	42(20.5%)	29(8.7%)	50(15.1%)

In regards to methods of learning Internet skills, between 9% and 20% of underclassmen and between 19% and 27% of senior students learned Internet skills in university courses (see Table B.13). Education and engineering senior students learned Internet skills significantly more in university courses than their underclassmen. Business senior students and underclassmen did not differ from each other.

Table B.13 Number and percent of underclass and senior students' current Internet use: Method of learning Internet skills

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Method of learning Internet skills	Courses in university	13(9.8%)	28(26.2%)	47(19.7%)	55(26.8%)	29(8.7%)	64(19.3%)

With regards to years of using the Internet, between 62% and 69% of underclassmen and between 76% and 81% of senior students used the Internet for at

least 9 years (see Table B.14). Education underclassmen and senior students within the majors did not differ from each other.

Table B.14 Number and percent of underclass and senior students' current Internet use: Years of Internet use

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Years of Internet use	Less than 9 years	41(31.1%)	26(24.3%)	77(32.2%)	39(19%)	129(38.5%)	77(23.2%)
	9 years or more	91(68.9%)	81(75.7%)	162(67.8%)	166(81%)	206(61.5%)	255(76.8%)

In regards of the number of online courses taken, between 31% and 59% of underclassmen and between 64% and 98% of senior students took more than 1 course (see Table B.15). Senior students took significantly more online courses than their underclassmen.

Table B.15 Number and percent of underclass and senior students' current Internet use: Number of online courses taken

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Online courses taken	0 course	54(40.9%)	2(1.9%)	166(69.5%)	25(12.2%)	227(67.8%)	120(36.1%)
	1 course or more	78(59.1%)	105(98.1%)	73(30.5%)	180(87.8%)	108(32.2%)	212(63.9%)

Concerning Internet connection, between 99% and 100% of underclassmen and senior students reported currently having Internet access in the place where they live (see Table B.16).

Table B.16 Number and percent of underclass and senior students' current Internet use: Internet connection at home, apartment, or dorm

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet connection at home, apartment, or dorm	Not connected	1(0.8%)	0(0%)	0(0%)	2(1%)	3(0.9%)	4(1.2%)
	Connected	131(99.2%)	107(100%)	239(100%)	203(99%)	332(99.1%)	328(98.8%)

In regard to type of equipment for accessing the Internet, the personal laptop computer was most frequently reported by all underclassmen and education seniors (see Table B.17). In terms of group differences within the majors, education senior students and underclassmen did not differ significantly from each other. Business underclassmen used a) personal laptop computers, b) classroom computers, c) lab computers, d) university library computers, e) university issued computers, and f) P.D.As significantly more than their senior students. Business senior students used desktop computers significantly more than their underclassmen. Furthermore, engineering underclassmen used a) personal laptop computers, b) classroom computers, and c) university library computers significantly more than their senior students. Engineering senior students used desktop and laptop computers significantly more than their underclassmen.

Table B.17 Number and percent of underclass and senior students' current Internet use: Type of equipment for Internet use

		N (%) Ed.UC.	N (%) Ed.seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Type of equipment for Internet use	Desktop computer	43(32.6%)	28(26.2%)	85(35.6%)	157(76.6%)	101(30.1%)	159(47.9%)
	Laptop computer	128(97%)	100(93.5%)	230(96.2%)	76(37.1%)	316(94.3%)	270(81.3%)
	Classroom computer	14(10.6%)	13(12.1%)	27(11.3%)	4(2%)	174(51.9%)	144(43.4%)
	Lab computer	98(74.2%)	83(77.6%)	169(70.7%)	20(9.8%)	289(86.3%)	311(93.7%)
	University library computer	72(54.5%)	50(46.7%)	147(61.5%)	19(9.3%)	176(52.5%)	128(90.9%)
	University issued computer	10(7.8%)	5(4.7%)	12(5%)	2(1%)	20(6%)	26(7.8%)
	P.D.A	54(40.9%)	45(42%)	95(39.7%)	17(8.3%)	123(36.7%)	122(36.7%)

II. Experience with using and teaching new literacies of the Internet

a) *During their **high school years**, did **underclassmen and senior students** within education, business, and engineering majors differ in their experience with using new literacies of the Internet?*

Between 20% and 49% of underclassmen and between 18% and 49% of senior students completed Internet workshop, Internet inquiry, or Webquest activities (see Table B.18). Business underclassmen completed Internet workshop activities significantly more than their senior students. No significant differences were found between underclassmen and senior students within education and engineering majors. Moreover, chi-square analysis found no significant differences within the three majors in their experience with Internet Inquiry instruction. Underclassmen received more Webquest instruction than their senior students.

Table B.18 Number and percent of underclass and senior students' experience with using new literacies: Internet workshop, Internet inquiry, and Webquest

	N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Internet Workshop	36(27.3%)	26(24.3%)	62(25.9%)	37(18%)	67(19.4%)	62(18.7%)
Internet Inquiry	65(49.2%)	52(48.6%)	89(37.2%)	73(35.6%)	116(34.6%)	96(28.9%)
Webquest	57(43.2%)	23(21.5%)	90(37.7%)	37(18%)	94(28.1%)	67(20.2%)

b) *During their enrollment at the **university**, do **underclassmen and senior students** within education, business, and engineering majors differ in their experience with using new literacies of the Internet?*

Between 24% and 38% of underclassmen and between 32% and 63% of senior students across the majors took 1 or more courses in which professors modeled how to use new literacy skills (see Table B.19). Education and engineering senior students took more courses than their underclassmen.

Table B.19 Number and percent of underclass and senior students' experience with using new literacies: Modeling of using new literacy skills

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Modeling of using new literacy skills	0 course	92(69.7%)	40(37.4%)	148(61.9%)	118(57.6%)	225(76.1%)	226(68.1%)
	1 course or more	40(30.3%)	67(62.6%)	91(38.1%)	87(42.4%)	80(23.9%)	106(31.9%)

Between 19% and 31% of underclassmen and between 24% and 60% of senior students took at least 1 course in which they completed a hands-on activity using new literacy skills of the Internet (see Table B.20). Education senior students took significantly more courses than their underclassmen.

Table B.20 Number and percent of underclass and senior students' experience with using new literacies of the Internet: Hands-on activities using new literacy skills

		N (%) Ed. UC.	N (%) Ed. seniors	N (%) Bus. UC.	N (%) Bus. seniors	N (%) Eng. UC.	N (%) Eng. seniors
Hands on activity using new literacy skills	0 course	91(68.9%)	43(40.2%)	180(75.3%)	138(67.3%)	270(80.6%)	254(76.5%)
	1 course or more	41(31.1%)	64(59.8%)	59(24.7%)	67(32.7%)	65(19.4%)	78(23.5%)

APPENDIX C

Created, Replicated, and Adapted Survey Questions

Created Questions

- My academic major is
- I was born a. before 1981 b. between 1981 and 1984 c. between 1985 and 1988 d. between 1989 and 1990 e. between 1991 and 1992
- I am a a. Freshman (Class of 2013) b. Sophomore (Class of 2012) c. Junior (Class of 2011) d. Senior (Class of 2010)
- I am confident in using appropriate key words with a search engine to locate information on the Internet.

  a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree
- I am confident in locating the most relevant information within the search results.

  a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree
- I am confident in locating the most useful information within a webpage.

  a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree
- I am confident in evaluating the accuracy of information on the Internet (that means evaluating whether information on the Internet is correct or incorrect).

a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree

- I am confident in evaluating the relevancy of information on the Internet.

  a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree

- I am confident in evaluating the bias of information on the Internet.

  a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree

- I am confident in evaluating the reliability of information on the Internet (that means evaluating whether information and information sources on the Internet are trustworthy or plausible).

  a. Strongly Disagree b. Disagree c. Neither Agree nor Disagree d. Agree e. Strongly Agree

- What type of equipment do you use to access the Internet? Please check on all of the items that apply.

  a. Personal desktop b. Personal laptop c. University computer in classroom d. University computer in computer lab. e. University computer in university library f. University issued laptop g. P.D.A. (e.g., blackberry, i-phone).

  h. Other (please specify)

- As a college-aged person, how many courses that were an entirely online format have you taken?

a. 0 b. 1 c. 2 d. 3 e. more than 3

- In how many of your education courses have you read about, discussed, or explored teaching students to effectively use New Literacy skills of the Internet?

  a. 0 b. 1 c. 2 d. more than 2

- In how many of your education courses has your professor discussed, presented information, or modeled how to teach New Literacy skills of the Internet?

  a. 0 b. 1 c. 2 d. more than 2

- In how many of your classes has your professor modeled how to use New Literacy skills of the Internet?

  a. 0 b. 1 c. 2 d. more than 2

- In how many of your classes have you completed a hands-on activity in using New Literacy skills of the Internet?

  a. 0 b. 1 c. 2 d. more than 2

- Which of the following activities did you complete in high school? Please check on all of the items that apply.

  INTERNET WORKHOP activity in which you explored information on the assigned website for a lesson and shared your discoveries, questions, and new literacy strategies with classmates.

INTERNET INQUIRY activity in which you 1) generated a question to explore, 2) located information relevant the idea on the Internet, 3) evaluated the information, 4) composed a presentation of the information, and 5) shared the information.

WEBQUEST activity in which you or a group of classmates were provided with 1) an introduction 2) a task description 3) the process description, 4) online information resources to use, 5) guidance about organizing the information collected in completing the task and 6) a concluding activity.

None of the above activities

- When you become a classroom teacher, how well prepared will you be to use the Internet workshop activity to integrate the Internet into the classroom and teach new literacy skills of the Internet.

  a. Totally unprepared b. Somewhat unprepared c. A little prepared d. Pretty well prepared e. Very well prepared

- When you are a classroom teacher, how well prepared will you be to use the Internet inquiry activity to integrate the Internet into the classroom and teach new literacy skills of the Internet.

  a. Totally unprepared b. Somewhat unprepared c. A little prepared d. Pretty well prepared e. Very well prepared

- When you are a classroom teacher, how well prepared will you be to use the Webquest activity to integrate the Internet into the classroom and teach new literacy skills of the Internet.

a. Totally unprepared b. Somewhat unprepared c. A little prepared

d. Pretty well prepared e. Very well prepared

Replicated and Adapted Questions from Henry's (2007) Survey

- Original question replicated:

  I am a a. Male b. Female

- Original question: Please select the option that best describes you.

  a. American Indian b.Asian American c.Black d. Hispanic e.White f.Other (please specify)

  Answer choices changed:

  a. American Indian b.Asian American c. Black or African-American d.Hispanic American e.White f.Other (please specify)

- Original question: *How did Oprah Winfrey get started with her talk show?*

  You want to find the answer to this question. What would be the best way to search the Internet for an answer?

  a. Go to Google and search for Amazon.com

  b. Go to Google and search using the words *Oprah Winfrey career*

  c. Go to www.talkshowstars.com

  d. Go to www.oprahwinfreycareer.com

Answer choices changed and added:

b. Go to Google and search using the words “How did Oprah Winfrey get started with her talk show?”

d. Type in www.talkshowstars.com in the Google address bar

e. Type in www.oprahwinfreycareer.com in the Google address bar

- Original question: You are writing a report about ancient Egypt. You are looking for information that is reliable. Which site would you go to first?

  a. Ancient Egypt Travel & Vacation Tours b. Ancient Egypt Thematic Unit

  c. The Ancient Egypt Site d. Ancient Egypt Web

  Revised question: A ten-year-old student is going to write a report about ancient Egypt. She is looking for information that is reliable. Among the search results below, which site would you recommend her to go to first?

  Answer choice added: e. Ancient Egypt - Wikipedia, the free encyclopedia

- Original question: You are looking for reliable websites about the rainforest. If you had to predict which link would lead to the MOST reliable information about rainforests, which link would you pick?

  a. www.davesite.com/rainforest b. www.rainforest-australia.net

  c.www.usmith.edu/rainforest/~jpeters/savetheforest.html

  d.www.rain-tree.com/schoolreports.htm

  Revised question: You are searching for reliable websites about the rainforest like the one in the picture below. If you had to predict which link would most

probably lead to the MOST reliable information about rainforests, which link would you pick?

- Original question: You are looking for information about Jupiter's atmosphere. You are using the Internet and the search engine Google. Here are the search engine results that came up. What do you click now?

  a. The Planet Jupiter b. Jupiter-MSN Encarta c. Jupiter, planet Jupiter, discover planet, Jupiter the d. StarChild: The planet Jupiter

  Revised question: You are searching on the Internet for information about Jupiter's atmosphere. You have obtained the following Google search engine results. What would probably be the most useful link for the specific information that you are seeking?

- Original question: You want to find other books by the author of *The Chronicles of Prydain*. Which link you choose?

  a. History b. Children's literature c. What links here d. Lloyd Alexander

  Revised question: You want to find a list of award-winning books written by the author of *The Chronicles of Prydain*. On the website, which link would you choose first?

  Answer choices added: e. Chronicles of Prydain f. Newbery Medal

- Original question: This is the website for the Anne Frank Center, USA. If you wanted to visit this center, what would you click on to find the street address?

  a. about us b. our exhibits c. news & media updates

  d. the anne frankhouse.amsterdam

Revised question: You have found the website for the Anne Frank Center, USA. Where would you locate the street address of this center on the website?

- Original question: You want to find the name of the person in charge of the Burger King company. Which would be the most reliable site to visit to find out the name of the person?

  a. Burger King b. Burger King-Wikipedia, the free encyclopedia c. Burger King-Phoenix,AZ, 85004-Citysearch d. Burger King Calories and Calorie Center

  Revised question: You want to find the name of the C.E.O of the Burger King company. In the following Google search engine results, which would be the most reliable site to visit to find out the name of the person?

  Answer choice added: e.Burger King - SourceWatch

- Original Question: You are studying the Civil War. You are looking for information about what it was like to be a soldier. You have come to this webpage. What would be the best thing to do?

  a. Search This site using What was it like? b. Click on “Prisoners of War” c. Click on “Civil war soldiers” d. Click on “Soldier Life”

  Revised Question: You are looking for information about what it was like to be a soldier during the Civil War. From this website below, what would be the best way to proceed?

  Answer choice changed:

a. Type the words “a soldier at war” in the Search This Site search engine

- Original question: What is the best way to check if the information on this page is correct?”

  a. Check if all the links work b. Check to see if there is an email address for the person who created the site c. Look at the copyright information d. Check to see if it’s on an endangered species list on another site

  Revised question: What is the best way to check if the information on the following web page is correct?

  Answer choices changed or added:

  c. Check to see if the octopus is on an endangered species list on another site

  d. Check the date on which the web page has been updated.

  e. Check if the site has commercial advertisement links.

- Original question: You are looking for information about the lost city of Atlantis. You typed the word “Atlantis” in the Google search bar. You got the results above. What key words should you use to get better results with another search?

  a. Atlantis Not vacation b. Atlantis OR city c. Atlantis Caribbean

  d. Atlantis city

  Revised question: You are looking for information about the lost city of Atlantis. You typed the word “Atlantis” in the Google search bar. You got the results below. What key words should you use to get better results with another search?

Answer choice added: e. Atlantis Not Island f. Atlantis and Cyprus

- Original question: You have a bank account with Bank of America. You received the message above on email. What should you do?

  a. Click on the link in the email b. Google Bank of America phishing c. Go to the bank and check your balance d. Send a reply to the email message

  Revised question: You have a bank account with Bank of America. You received the message below on email. What should you do?

  Answer choices changed and added:

  a. Click on the link in the email to log into your account and check Alert history

  b. Sign in through the link in the email to see if your account is locked.

- Original question: What clue indicates that you probably cannot trust this website?

  a. It has a link to FirstGov b. It has a Public Comment area c. It has a search engine d. It says ExxonMobil to fund White House energy plan

  Revised question: What clue indicates that you probably cannot trust the following website?

- Original question: Where would you go to see if this new story below is true or false?

  a. www.images.google.com b. www.snopes.com

  c. www.falsephotos.net d. www.IsItTrue.com

Revised question: Where would you go to see if the new story below is true or false?

- Original question: You are doing a report on the Martin Luther King holiday. You have found the site. Now where should you go?

  a. Truth About King b. The King Holiday c. Download flyers to pass out at your school d. Hosted by Stormfront

  Revised question: You are doing a project on the Martin Luther King holiday. You have found the following site. Now where should you go first?

- Original Question: What kind of Internet connection do you have in your home?

  a. Telephone dial up b. High Speed Internet (like at&t, Charter, Comcast, Covad, etc.) c. I don't know

  Revised question: What kind of Internet connection do you have in your home, dorm, or apartment?

  Answer choices changed: a.Telephone dial up Internet b. High Speed Internet c.I don't have Internet connection

  Extended question: What kind of Internet connection did you have when you lived with your parent?

  a. Telephone dial up Internet b. High Speed Internet c. I didn't have Internet connection

- Original question: How often have you been required to use the Internet for a school assignment?

  a. Never b. Less than once a week c. Once a week d. A few times each week e.Once a day f. Several times a day

  Revised Question: As a college-aged person, how often have you been required to use the Internet for university course work?

  Answer choices changed:

  a.Never b.Less than once a month c. Once a week d. A few times each week e.Once a day f.Several times a day

  Extended questions: When you were a high school aged student, how often had you been required to use the Internet for school assignments?

  a.Never b. Less than once a month c. Once a week d. A few times each week e.Once a day f. Several times a day

  Extended question: As a college student, how often have you been required to use the Internet during class?

  a.Never b.Less than once a month c. Once a week d. A few times each week e.Once a day f. Several times a day

  Extended question: When you were a high school aged student, how often had you been required to use the Internet during class?

  a.Never b. Less than once a month c. Once a week d. A few times each week e.Once a day f. Several times a day

Adapted Questions from Kumar and Kaur's (2006) Survey

- Original question: How long have you been using the Internet?

  a. Less than 6 months b. 6 months-1 year c.1-2 years d.2-4 years

  e.More than 4 years

  Revised question: How many years have you been using the Internet?

  Answer choices changed:

  a.Less than 4 years b. 4-8 years c. 9-12 years d. 13-16 years e. more than 16 years

- Original question: How often do you use Internet services?

  a. Daily b.2-3 times a week c.2-3 times a month d.Once in a month

  Revised question: As a college-aged person, how often do you use the Internet?

  Answer choices changed:

  a. Less than once a month b. Once a month c. 2-3 times a month d. Once a week e. 2-5 times a week f. Every day

  Extended question: When you were of high school age, how often did you use the Internet?

  a. Less than once a month b. Once a month c. 2-3 times a month d. Once a week e. 2-5 times a week f. Every day

- Original question: On average, how many hours you spend in a week to use Internet?

a.Less than 1 hour a week b.2-4 hours a week c.5-6 hours a week d.7-9 hours a week e. 10-20 hours a week f. Over 20 hours a week

Revised question: As a college-aged person, how many hours do you spend per week using the Internet?

Answer choices changed:

a. Less 5 hours a week b.5-14 hours a week c.15-35 hours a week d.Over 35 hours a week

Extended question: When you were a high school aged person, how many hours did you spend in a week to use the Internet?

- Original Question and answer choices: Methods of Learning Internet Skills (Please Tick (√) whichever is applicable)

  a.Trial and error method b.Guidance from colleagues and friends c.Training from college d.Self instruction e.External courses

  Revised Question: How did you acquire or learn your Internet skills? Please check on <u>all</u> of the items that apply.

  a.Trial and error method b.Teacher Instruction in K-12 c.Guidance from parents and peers d. Courses in university e.Self instruction using books or online tutorials f. Other types of training activities

- Original question: The purpose(s) you mainly use the Internet for? (Tick (√) all that apply)

  1.Research 2.Entertainment 3.Education 4.Communication

Revised Question: As a college-aged student, for what purpose(s) do you use the Internet? Please check on all of the items that apply.

a.Research for university course work b.Entertainment c.E-learning d.Communication e.Shopping f.News g.Social networking h.Online Banking i.Downloading music, videos, or podcasts j. Creating websites

Extended question: When you were a high school aged person, for what purpose(s) did you use the Internet? Please check on all of the items that apply.

Survey of Undergraduate Students' New Literacies (SUSNL) for Education Senior Students

Question 1.
I am a
Male Female
○ ○

Question 2.
Please select the option that best describes you.

○ American Indian	○ Hispanic American
○ Asian American	○ White
○ Black or African American	○ Other(Please specify)

Question 3.
My academic major is

PreK-6th grades education	4-8th grades math/science education	4-8th grades language arts/social studies	Other(Please specify)
○	○	○	○

Question 4.
I was born

Before 1981	Between 1981 and 1984	Between 1985 and 1988	Between 1989 and 1990	Between 1991 and 1992
○	○	○	○	○

Question 5.
I am a

Freshman (Class of 2013)	Sophomore (Class of 2012)	Junior (Class of 2011)	Senior (Class of 2010)
○	○	○	○

Question 6.
I am confident in using appropriate key words with a search engine to locate information on the Internet.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 7.
I am confident in locating the most relevant information within the search results.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 8.
I am confident in locating the most useful information within a webpage.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 9.
I am confident in evaluating the accuracy of information on the Internet (that means evaluating whether information on the Internet is correct or incorrect).

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 10.
I am confident in evaluating the relevance of information on the Internet.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 11.
I am confident in evaluating the bias of information on the Internet.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 12.
I am confident in evaluating the reliability of information on the Internet (that means evaluating whether information and information sources on the Internet are trustworthy or plausible).

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
○	○	○	○	○

Question 13.
How did Oprah Winfrey get started with her talk show?
You want to find the answer to this question. What would be the best way to search the Internet for an answer?

- ○ A. Go to Google and search for Amazon.com
- ○ B. Go to Google and search using the words “How did Oprah Winfrey get started with her talk show? ”
- ○ C. Go to Google and search using the words “Oprah Winfrey career”
- ○ D. Type in www.talkshowstars.com in the Google address bar
- ○ E. Type in www.oprahwinfreycareer.com in the Google address bar

Question 14.
A 10-year-old student is going to write a report about ancient Egypt. She is looking for information that is reliable. Among the Google search results below, which site would you recommend her to go to first?

A.Ancient Egypt Travel & Vacation Tours	B. Ancient Egypt Thematic Unit	C.The Ancient Egypt Site	D. Ancient Egypt Web	E. Ancient Egypt-Wikipedia, the free encyclopedia
○	○	○	○	○

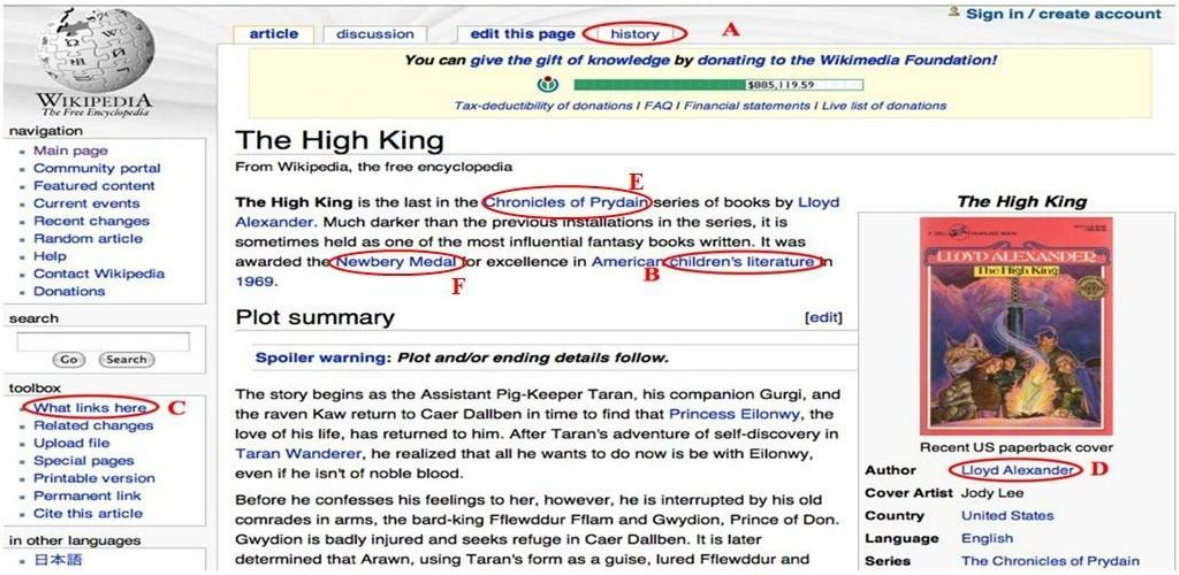
Question 15.
You are searching for reliable websites about the rainforest like the one in the picture below. If you had to predict which link would most probably lead to the MOST reliable information about rainforests, which link would you pick?

- A.www.davesite.com/rainforest
- B.www.rainforest-australia.net
- C.www.usmith.edu/rainforest/~jpeters/savetheforest.html
- D.www.rain-tree.com/schoolreports.htm

Question 16.
You are searching on the Internet for information about Jupiter's atmosphere.
You have obtained the following Google search engine results. What would probably be the most useful link for the specific information that you are seeking?

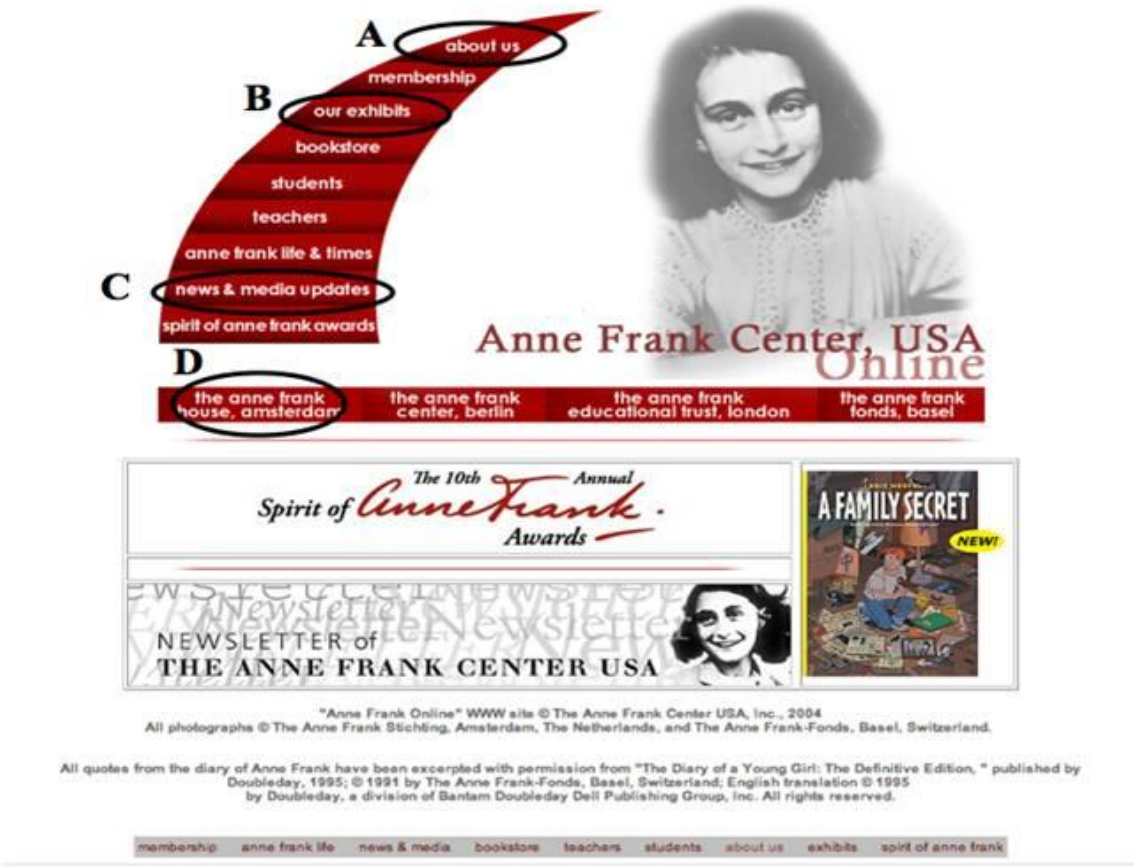
- A. The Planet Jupiter
- B. Jupiter-MSN Encarta
- C. Jupiter, planet Jupiter, discover planet, Jupiter the...
- D. StarChild: The planet Jupiter

Question 17.
You want to find a list of award-winning books written by the author of The Chronicles of Prydain. On the website below, which link would you choose first?



A. History	B. Children's literature	C. What links here	D. Lloyd Alexander	E. Chronicles of Prydain	F. Newbery Medal
○	○	○	○	○	○

Question 18.
You have found the following website for the Anne Frank Center, USA. Where would you locate the street address of the center on the website?

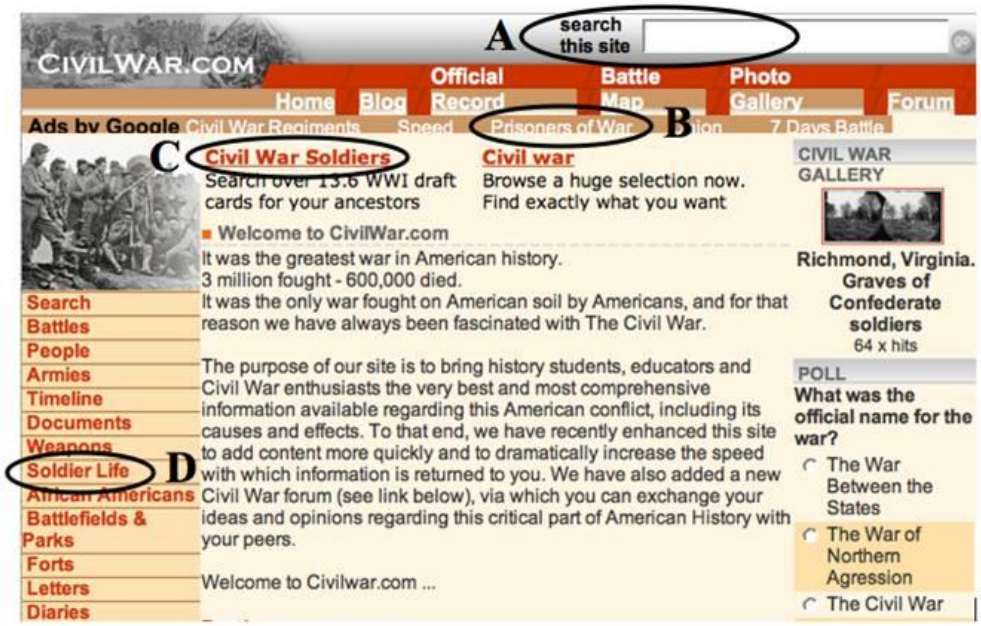


- A. about us
- B. our exhibits
- C. news & media updates
- D. the anne frank house, amsterdam

Question 19.
You want to find the name of the C.E.O of the Burger King company. In the following Google search engine results, which would be the most reliable site to visit to find out the name of the person?

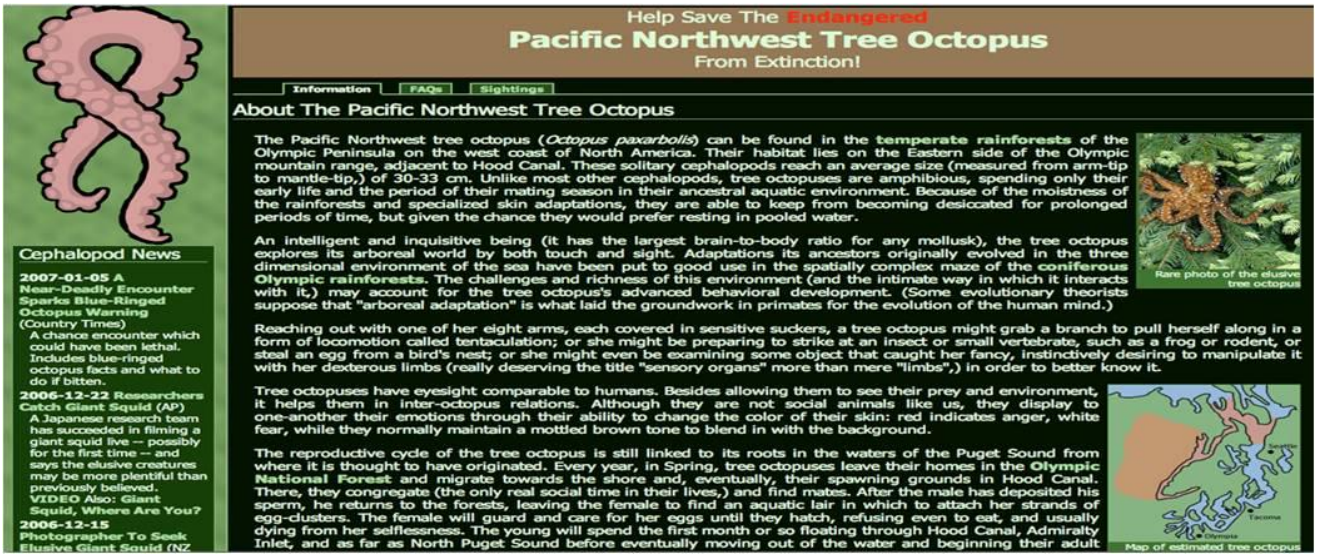
- A. Burger King
- B. Burger King-Wikipedia, the free encyclopedia
- C. Burger King-Phoenix, AZ, 85004-Citysearch
- D. Burger King Calories and Calorie Counter
- E. Burger King-SourceWatch

Question 20.
You are looking for information about what it was like to be a soldier during the Civil War. From the website below, what would be the best way to proceed?



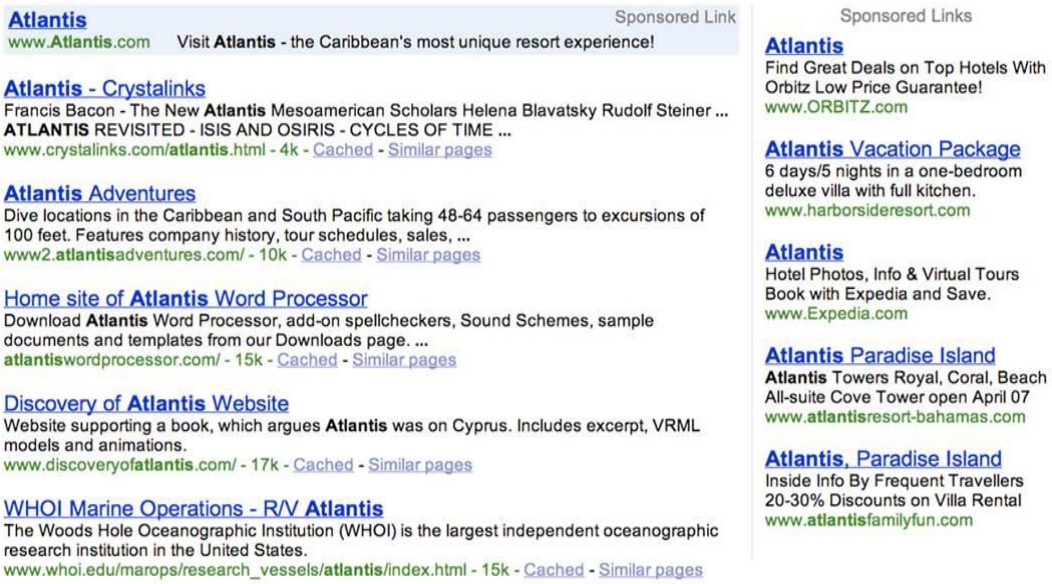
- A. Type the words “a soldier at war” in the Search This Site search engine
- B. Click on "Prisoners of War“
- C. Click on “Civil war soldiers”
- D. Click on “Soldier Life”

Question 21.
What is the best way to check if the information on the following web page is correct?



- A. Check if all the links work
- B. Check to see if there is an email address for the person who created the site
- C. Look at the copyright information
- D. Check to see if the octopus is on an endangered species list on another site.
- E. Check the date on which the web page has been updated.

Question 22.
You are looking for information about the lost city of Atlantis. You typed the word "Atlantis" in the Google search bar. You got the results below. What key words should you use to get better results with another search?



Atlantis Sponsored Link
www.**Atlantis**.com Visit **Atlantis** - the Caribbean's most unique resort experience!

Atlantis - Crystalinks
Francis Bacon - The New **Atlantis** Mesoamerican Scholars Helena Blavatsky Rudolf Steiner ... **ATLANTIS** REVISITED - ISIS AND OSIRIS - CYCLES OF TIME ...
www.crystalinks.com/**atlantis**.html - 4k - Cached - Similar pages

Atlantis Adventures
Dive locations in the Caribbean and South Pacific taking 48-64 passengers to excursions of 100 feet. Features company history, tour schedules, sales, ...
www2.**atlantis**adventures.com/ - 10k - Cached - Similar pages

Home site of **Atlantis** Word Processor
Download **Atlantis** Word Processor, add-on spellcheckers, Sound Schemes, sample documents and templates from our Downloads page. ...
atlantiswordprocessor.com/ - 15k - Cached - Similar pages

Discovery of **Atlantis** Website
Website supporting a book, which argues **Atlantis** was on Cyprus. Includes excerpt, VRML models and animations.
www.discoveryof**atlantis**.com/ - 17k - Cached - Similar pages

WHOI Marine Operations - R/V **Atlantis**
The Woods Hole Oceanographic Institution (WHOI) is the largest independent oceanographic research institution in the United States.
www.whoi.edu/marops/research_vessels/**atlantis**/index.html - 15k - Cached - Similar pages

Sponsored Links

Atlantis
Find Great Deals on Top Hotels With Orbitz Low Price Guarantee!
www.ORBITZ.com

Atlantis Vacation Package
6 days/5 nights in a one-bedroom deluxe villa with full kitchen.
www.harborsideresort.com

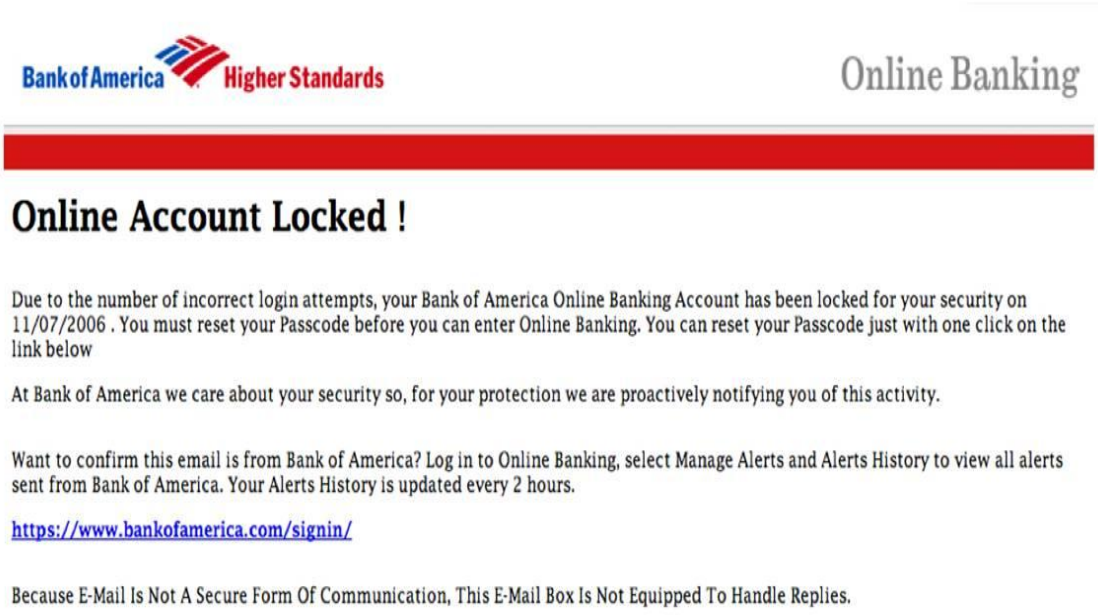
Atlantis
Hotel Photos, Info & Virtual Tours Book with Expedia and Save.
www.Expedia.com

Atlantis Paradise Island
Atlantis Towers Royal, Coral, Beach All-suite Cove Tower open April 07
www.**atlantis**resort-bahamas.com

Atlantis, Paradise Island
Inside Info By Frequent Travellers 20-30% Discounts on Villa Rental
www.**atlantis**familyfun.com

- A. Atlantis NOT vacation
- B. Atlantis OR City
- C. Atlantis Caribbean
- D. Atlantis city
- E. Atlantis Not Island
- F. Atlantis and Cyprus

Question 23.
You have a bank account with Bank of America. You received the message below on email. What should you do?



Bank of America Higher Standards Online Banking

Online Account Locked !

Due to the number of incorrect login attempts, your Bank of America Online Banking Account has been locked for your security on 11/07/2006 . You must reset your Passcode before you can enter Online Banking. You can reset your Passcode just with one click on the link below

At Bank of America we care about your security so, for your protection we are proactively notifying you of this activity.

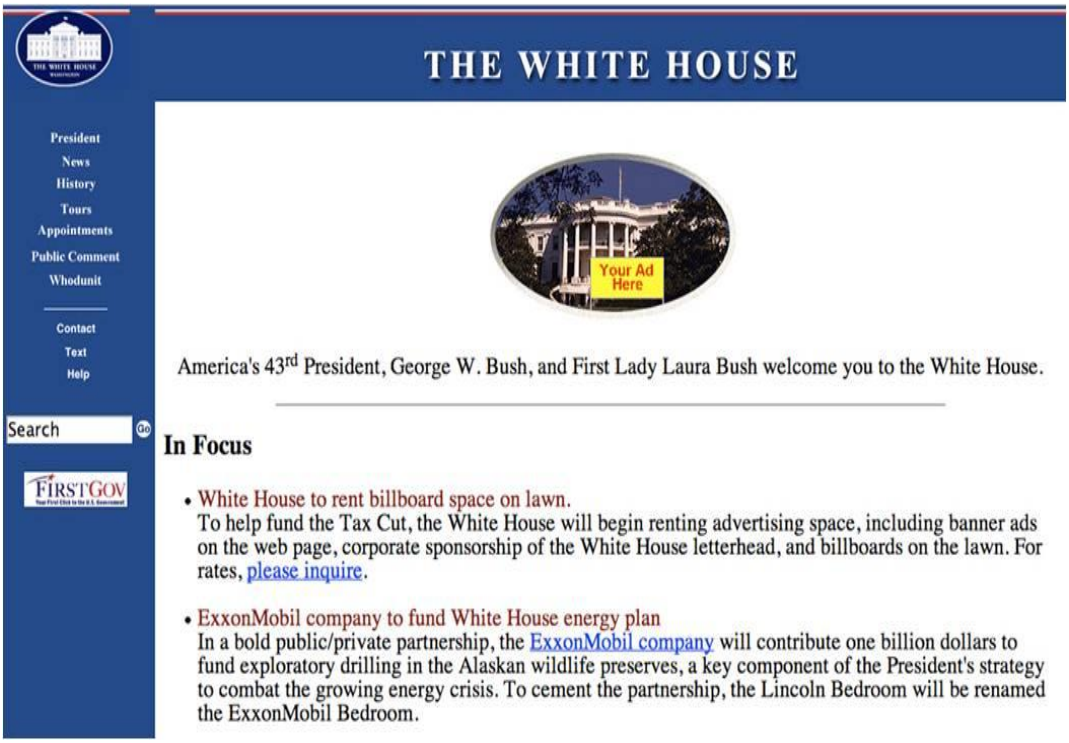
Want to confirm this email is from Bank of America? Log in to Online Banking, select Manage Alerts and Alerts History to view all alerts sent from Bank of America. Your Alerts History is updated every 2 hours.

https://www.bankofamerica.com/signin/

Because E-Mail Is Not A Secure Form Of Communication, This E-Mail Box Is Not Equipped To Handle Replies.

- A. Click on the link in the email to log into your account and check Alert history
- B. Sign in through the link in the email to see if your account is locked.
- C. Google Bank of America phishing
- D. Go to the bank and check your balance
- E. Send a reply to the email message

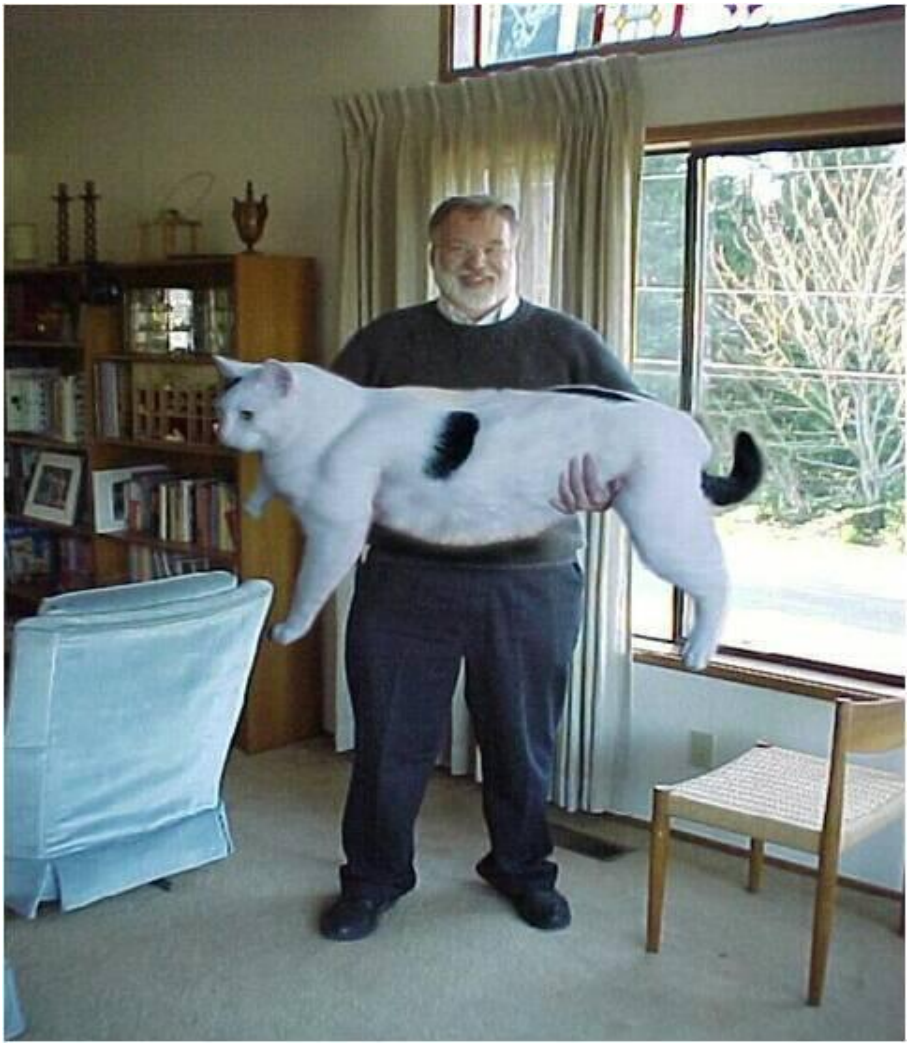
Question 24.
What clue indicates that you probably cannot trust the following website?



- A. It has a link to FirstGov
- B. It has a Public Comment area
- C. It has a search engine
- D. It says ExxonMobil to fund White House energy plan

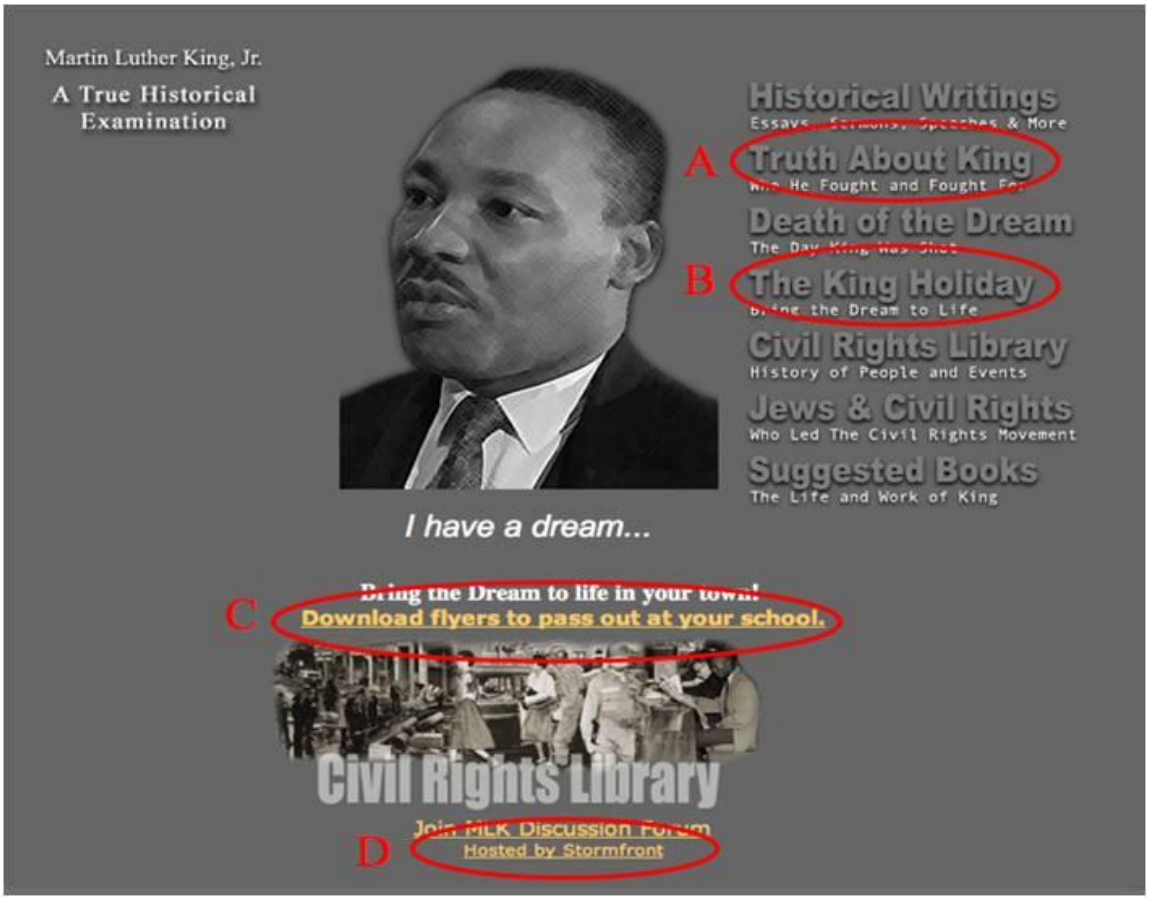
Question 25.
Where would you go to see if the news story below is true or false?

CANADIAN MAN RAISES ENORMOUS 80 ib, 60-inch CAT



A.www.images.google.com B.www.snopes.com C.www.falsephotos.net D.www.IsItTrue.com

Question 26.
You are doing a project on the Martin Luther King holiday. You have found the following site. Now where should you go first?



A. Truth About King
B. The King Holiday
C. Download flyers to pass out at your school
D. Hosted by Stormfront

Question 27.
What type of equipment do you use to access the Internet? Please click on all of the items that apply.

- ☐ Personal desktop
- ☐ Personal laptop
- ☐ University computer in classroom
- ☐ University computer in computer lab
- ☐ University computer in university library
- ☐ University issued laptop
- ☐ P.D.A. (e.g., blackberry, i-phone)
- ☐ Other(please specify)

Question 28.
What kind of Internet connection did you have when you lived with your parents?

Telephone dial up Internet	High speed Internet	I didn't have Internet connection
○	○	○

Question 29.
What kind of Internet connection do you currently have in your home, dorm, or apartment?

Telephone dial up Internet	High speed Internet	I don't have Internet connection
○	○	○

Question 30.
How many years have you been using the Internet?

Less than 4 years	4-8 years	9-12 years	13-16 years	More than 16 years
○	○	○	○	○

Question 31.
As a college-aged person, how often do you use the Internet?

Less than once a month	Once a month	2-3 times a month	Once a week	2-5 times a week	Every day
○	○	○	○	○	○

Question 32.
When you were of high school age, how often did you use the Internet?

Less than once a month	Once a month	2-3 times a month	Once a week	2-5 times a week	Every day
○	○	○	○	○	○

Question 33.
As a college-aged person, how many hours do you spend per week using the Internet?

Less 5 hours a week	5-14 hours a week	15-35 hours a week	Over 35 hours a week
○	○	○	○

Question 34.
When you were a high school aged person, how many hours did you spend in a week to use the Internet?

Less 5 hours a week	5-14 hours a week	15-35 hours a week	Over 35 hours a week
○	○	○	○

Question 35.
As a college-aged person, how many courses that were an entirely online format have you taken ?

0	1	2	3	more than 3
○	○	○	○	○

Question 36.
How did you acquire or learn your Internet skills? Please click on all of the items that apply.

- ☐ Trial and error method
- ☐ Teacher instruction in K-12
- ☐ Guidance from parents and peers

- ☐ Courses in university
- ☐ Self instruction using books or online tutorials
- ☐ Other types of training activities

Question 37.
As a college-aged student, for what purpose(s) do you use the Internet? Please click on all of the items that apply.

- ☐ Research for university course work
- ☐ Entertainment
- ☐ E-learning
- ☐ Communication
- ☐ Shopping
- ☐ News
- ☐ Social networking
- ☐ Online Banking
- ☐ Downloading music, videos, or podcasts
- ☐ Creating websites
- ☐ Other(Please specify) _____

Question 38.
When you were a high school aged person, for what purpose(s) did you use the Internet? Please click on all of the items that apply.

- ☐ Research for school assignments
- ☐ Entertainment
- ☐ E-learning
- ☐ Communication
- ☐ Shopping
- ☐ News
- ☐ Social networking
- ☐ Online Banking
- ☐ Downloading music, videos, or podcasts

- [ ] Creating websites
- [ ] Other(Please specify) _____

Question 39.
As a college-aged student, how often have you been required to use the Internet during class?

Never	Less than once a month	Once a week	A few times each week	Once a day	Several times a day
○	○	○	○	○	○

Question 40.
When you were a high school aged student, how often had you been required to use the Internet during class?

Never	Less than once a Month	Once a week	A few times each week	Once a day	Several times a day
○	○	○	○	○	○

Question 41.
As a college-aged student, how often have you been required to use the Internet for university course work?

Never	Less than once a month	Once a week	A few times each week	Once a day	Several times a day
○	○	○	○	○	○

Question 42.
When you were a high school aged student, how often had you been required to use the Internet for school assignments?

Never	Less than once a month	Once a week	A few times each week	Once a day	Several times a day
○	○	○	○	○	○

New Literacy skills of the Internet include " the skills, strategies, and dispositions that allow us to use the Internet effectively to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others" (Leu, Kinzer, Coiro, & Commack, 2000).

Question 43.
In how many of your education courses have you read about, discussed, or explored teaching students to effectively use New Literacy skills of the Internet?

0 1 2 More than 2

Question 44.
In how many of your courses has your professor modeled how to use New Literacy skills of the Internet?

0 1 2 More than 2

Question 45.
In how many of your education courses has your professor discussed, presented information, or modeled how to teach New Literacy skills of the Internet?

.0 1 2 More than 2

Question 46.
In how many of your courses have you completed a hands-on activity in using New Literacy skills of the Internet?

0 1 2 More than 2

Question 47.
Which of the following activities did you complete in high school? Please click on all of the items that apply.

INTERNET WORKSHOP activity in which you explored information on the assigned website for a lesson and shared your discoveries, questions, and new literacy strategies with classmates.

☐ INTERNET INQUIRY activity in which you 1) generated a question to explore, 2) located information relevant the idea on the Internet, 3) evaluated the information, 4) composed a presentation of the information, and 5) shared the information.

☐ WEBQUEST activity in which you or a group of classmates were provided with 1) an introduction 2) a task description 3) the process description, 4) online information resources to use, 5) guidance about organizing the information collected in completing the task and 6) a concluding activity.

☐ None of the above activities

Question 48.
When you become a classroom teacher, how well prepared will you be to use the Internet workshop activity to integrate the Internet into the classroom and teach new literacy skills of the Internet.

Totally unprepared	Somewhat unprepared	A little prepared	Pretty well prepared	Very well prepared
○	○	○	○	○

Question 49.
When you are a classroom teacher, how well prepared will you be to use the Internet inquiry activity to integrate the Internet into the classroom and teach new literacy skills of the Internet.

Totally unprepared	Somewhat unprepared	A little prepared	Pretty well prepared	Very well prepared
○	○	○	○	○

Question 50.
When you are a classroom teacher, how well prepared will you be to use the Webquest activity to integrate the Internet into the classroom and teach new literacy skills of the Internet.

Totally unprepared	Somewhat unprepared	A little prepared	Pretty well prepared	Very well prepared
○	○	○	○	

VITA

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