Surveying digital literacy use and motivation in elementary school students

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New technologies are rapidly transforming the nature of literacy. Research has indicated that students are interested in digital literacies. Investigators hypothesized that digital literacy instruction can nurture intrinsic motivation by providing opportunities to engage in real-world problem solving. An investigation commenced to identify elementary students’ interest and motivation levels towards digital literacies versus printed literature. Ninety third graders completed a digital literacy survey, yielding a statistically significant difference in value towards digital literacies between those who prefer reading traditional texts and those who prefer reading on the computer.

Keywords: digital literacies, reading, efficacy, e-books, print

INTRODUCTION

Since the beginning of the 21st century, school systems have increased their implementation of technology in hopes that it will improve student learning. Students can work simultaneously, become engaged, and learn via programmed environments that allow for skill practice and comprehension development. Digital literacies were originally aimed at secondary students (Gee, 1999; Kress, 2000; Lewis and Fabos, 2005; New London Group, 1996) to aid in their preparation for college and career readiness; more recently, research has transcended into the elementary grades related to developing digital literacy skills (Barone and Wright, 2008; Warschauer, 2006), or those “necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge” (Leu, et al., 2004).

As students are increasingly bombarded with media and digital texts at young ages, it is critical to identify what peaks their interest and maintains high levels of motivation. Though the topic of digital literacies has warranted increasing attention in the last decade (Cassidy and Ortlieb, 2011), limited research has focused on elementary students’ interest and motivation levels towards digital texts in relation to traditional printed literature. Additional research in this area is vital for effective instructional planning and program implementation in the elementary grades.

Theoretical Framework

Theories of motivation and its impact on learning generally encompass both implicit and explicit factors. Early studies were rooted on extrinsic reinforcement for desired behaviors (Stipek, 1996), but extrinsic rewards can be less effective over time. Thus, cognitive behavior modification (CBM) emerged as a newfound approach to motivation. Yet, limitations were found when students set their own goals and administered their rewards such as low performance standards and issuing rewards without reason. Consequently, for the purpose for this study, motivation
was defined by expectancy-value theory (Eccles, 1983; Wigfield and Eccles, 2000). This model of motivation was selected because it has been theoretically and pedagogically shown to explain not only motivation behaviors in elementary students but, more critically, the relationship between motivation and academic achievement (Wigfield and Eccles). Achievement motivation theorists have attempted to explain choice, persistence, and vigor related to achievement task completion. Expectancy-value theory argues that individuals’ choice, persistence, and performance can be explained by their self-efficacy or ability related to the task and the extent to which they value the activity (Wigfield and Eccles). Ability beliefs are defined as an individual’s perception of his or her current competence at a given ability. Achievement values are described as the importance of doing well on a given task leading to a willingness to spend time and effort to engage in that task regularly or in the future (Eccles, 1983).

Expectancy-value theory has been used as the theoretical model for numerous academic achievement investigations. Eccles’ (1983) original research found that fifth grade students could differentiate interest, importance, and usefulness related to mathematics. Eccles, Wigfield, Harold, and Blumenfeld (1993) demonstrated that competence and task values could be reliably assessed for mathematics, reading, sports, and music by first, second, and fourth grade students. Marinak and Gambrell (2009, 2010) used expectancy-value theory to study elementary reading motivation. In two studies, Marinak and Gambrell (2009) found developmental differences in grades two through six for both self-concept about reading and value of reading as well as gender differences for value of reading in grade three (2010). And, expectancy-value theory informed a recent study of science achievement in primary students. Patrick, Mantzicopoulos, and Samarapungavan (2009) found that kindergarten students were able to discriminate competence about science and “liking” (valuing) science.

Several instruments used to reliably measure achievement motivation in various disciplines also draw from expectancy-value theory. The Motivation to Read Profile (MRP) (Gambrell et al., 1996) is a self-report, group-administered instrument that measures existing reading motivation based on two subscales – self-concept as a reader and value of reading. Each subscale contains 10 items. Internal consistency was calculated for the two subscales. Cronbach’s alpha (1951) revealed a moderately high reliability for both subscales of the MRP (self-concept = .75; value = .82).

Patrick et al. (2009) used expectancy-value theory in the development of the Puppet Interview Scales of Competence in and Enjoyment of Science (PISCES). The PISCES, also comprised of two subscales, contains descriptive items about various aspects of competence in and liking science. The perceived science competence subscale has seven items and the science liking (value) subscale contains six items. Cronbach’s alpha (1951) yielded moderately high reliability for the two subscales (perceived science competence = .85; science liking = .82).

Research indicates that students are interested in digital literacies (McDonald and Hannafin, 2003; Seymour et al., 1987). Therefore, it is hypothesized that digital literacy instruction can nurture intrinsic motivation by providing students with an opportunity to engage in real-world problem solving (Lankshear and Knobel, 2008) as well as analyze and synthesize information that can be applied to new learning outcomes.

Review of Literature

History of Technology Advancements in Education

Edgar Dale’s (1946) Cone of Experience reveals that people will retain more of what they see and hear when presented together in a concrete form. With the advancement of the microcomputer in the 1980s, computers capable of providing information via multisensory methods were predicted to have a huge impact on school instruction (Tyner, 1998). However, Anderson and Ronnkvist (1999) found that elementary teachers primarily used computers as skill and drill instruction and secondary schools were teaching word processing and computer skills. Although technology was being utilized, educators were not necessarily using the advances in technology in their instruction. Kulik, Kulik, and Bangert-Drowns (1985) found that students who received technology-based instruction obtained higher achievement scores. Clark (1997) challenged those increases in achievement scores, proclaiming that they could be attributed to other variables like instructional method, content, or the excitement from a new medium. He further suggests that while computers may enrich understanding for struggling students, the main contributing factor to any change in learning is relation between the student, teacher, and the assignment.

One prerequisite to student engagement is developing and maintaining the motivation to learn. Seymour et al. (1987) found that 97% of the students surveyed would do more computer-based activities than in pencil and paper format. They also found that students, who rated
themselves higher on the activities, were more interested in the material and thought the assignment was easier than the students who did not work on the computer (McDonald and Hannafin, 2003).

Teaching Digital Literacies

Gee and Levine (2009) suggest that students not only develop reading skills, but become storehouses of knowledge across multiple contexts of home, community, and school; in turn, they are better prepared for working in an adult world. The realm of teaching becomes less of a lecturer and functions more as a facilitator or guide to using digital media, requiring feedback to increase student-initiated learning (Rivoltella, 2008). Mistakes and misjudgments have fewer negative ramifications within virtual worlds that allow for corrections rather than immediate failures, labels, and interventions.

The definition of digital literacy has evolved dramatically over the past four decades. Kinzer and Leu (1997) refer to the medium as a “great transformation,” suggesting that new technologies are rapidly redefining the nature of literacy. Dobson and Willinsky (2009) posit that digital literacy is comprised of four technologies including word processing, hypermedia, literary hypermedia, and computer-mediated communication. These new technologies have served as the impetus to the development of three new domains of literacy research: (a) the use of digital archives and open source content, (b) information literacy- whereby readers need to search out credible sources of web-based knowledge, and (c) the creation of collaborative knowledge on shared sites such as Wikipedia, Facebook, and Twitter. The vocabularies of content areas are now reflecting new technologies and expecting students to be digitally literate. A wide variety of content is being provided via visual and auditory stimulation to reinforce reading skills. Learning venues have become YouTube, blogs, videoconferencing, and instant messaging. Gender, race, and culture take a back seat when students from around the world collaborate to study themes like globalization and novels that have current relevance (Weigel and Gardner, 2009). The world becomes smaller and larger at the same time through digital media use.

Technology incorporates constructivist, informal, and social literacy learning theories (Weigel and Gardner, 2009). As Freire and Macedo (1987) encourage us to transform the old society, technology is altering the old society to the new society of multiple literacies (Woods, 2011). Response to text writing moves from a cumbersome typewriter or handwritten style into easier composition and editing. Students have the opportunity to personalize responses through searching for additional information on the Internet, allowing for the co-construction and sharing of viewpoints with other authors through online submission systems like Blackboard or WebCT. Technology extends literacy learning of the school into home by increasing motivation to read online texts that appeal to the student. Students can also extend school learning through technology by contacting classmates and world-wide peers for assistance on problem-solving or critical analysis (Stergioulas and Drenyianni, 2011).

Previous investigations have examined the at home digital technology use of students (Brown, 2005; Mossberger et al., 2003; Thomas, 2008), but have not sought to compare those uses with students’ interest and motivation towards digital literacies versus printed literature. The essence of learning lies in one’s motivation to do or seek out; in turn, the identification of students’ interest and motivations towards texts, both digital and print, is quintessential. Assessment data from such an investigation could be used to plan effective instruction and inform future curriculum development. The premise of this preliminary investigation was to survey third grade students to determine their digital literacy usage as well as their motivation levels towards digital literacy. Researchers postulated that there would be no difference in value associated to digital literacies or in self-confidence related to using digital literacies between students who prefer reading traditional, hard copy books to those who prefer reading digital texts.

METHODS

Setting

There are seven elementary schools, grades PK-5, in this rural southeastern school district. The county is responsible for the learning of 4890 students with an average student-to-teacher ratio of 17.5. Each of these schools met Adequate Yearly Progress requirements as set by the No Child Left Behind Act. In 49 of 50 statewide assessments, this county exceeded the state average. Scores were an average of 7.7% above the mean state scores on statewide assessments. Pseudonyms will be utilized to preserve anonymity.

Southside Elementary School was the site of this investigation. Though the school’s student population is composed of 770 students in grades PK-5, 110 students were enrolled in third grade. Thirty five students (32%) receive free or reduced price lunch. The students are
predominantly Caucasian (62%), while there is a minority of African-American (18%) and (16%) Hispanic students. All other ethnicities, such as Asians and American Indians, make up less than four percent of the population. Students live in sparsely populated areas within the outskirts of a small city. Students are bused in from low, mid, and high socioeconomic neighborhoods.

Measure

A digital literacy survey, informed by research in digital literacy (Dobson and Willinsky, 2009; Kinzer and Leu, 1997) and expectancy-value theory (Eccles, 1983; Wigfield and Eccles, 2000), was developed (see Figure 1). A pilot study was conducted using a sample of third grade students to establish the efficacy of the survey instrument. As a result, the survey instrument was revised to clarify items that seemed either repetitive or ambiguous.

The survey was comprised of three sections: (a) demographic information, (b) access and use items, and (c) 4-point Likert scale inquiries related to digital literacy motivation. Gender, age, and race were the demographic variables collected. The access and use items included 10 yes/no questions related to hypermedia, literary hypermedia, and computer-mediated communication (Facebook, Twitter, text messaging), as well as technologies that allow for the creation of collaborative knowledge (Facebook, Twitter, SMART Boards). Ten
Likert scale items concluded the survey. The number of motivation items on the survey is consistent with previous expectancy-value survey research that incorporated 5-10 items (Mazzoni et al., 1999; Patrick et al., 2009). Also, consistent with other expectancy-value instrumentation, (Gambrell et al., 1996) three of the motivation items were related to self-concept about digital literacy and three probed value of digital literacy. The six motivation items were positively worded, thereby resulting in scoring that ranged from four points for a strongly agree response to one point for a strongly disagree.

**RESULTS**

More students (both female and male) did not use computers at home every day (50) compared to those did use computers at home each day (40). Eighty of ninety students responded that they play educational games on the computer. Whereas, only 37/90 responded that they used a computer to complete homework. Only eight students (3 female/5 male) reported that they used a computer to complete homework. All but one student (89/90) reported that their teachers regularly use technology like the SMART Board during instruction; additionally, 76/90 stated they also use the SMART Board in the classroom.

Those who recorded using a computer to complete homework also stated they played educational games on the computer, \( r(87) = 0.29, p<0.01 \). A significant relationship also existed between students who use a computer at home every day and those who have an e-mail account, \( r(90) = 0.40, p<0.01 \). The 12 students who reported using instant messaging services or chat rooms to talk to their friends. All but one student (89/90) reported that their teachers regularly use technology like the SMART Board during instruction; additionally, 76/90 stated they also use the SMART Board in the classroom.

Participants were classified according to preference of reading traditional texts (37) or reading on the computer (51), with two students failing to answer the survey item. Their responses to the following statements related to value on a 4-point Likert scale were summed:

1. I enjoy using the computer at school.
2. I enjoy reading on the computer.
3. I enjoy playing games on the computer.
Table 1. Value and self-confidence data by group.

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<th>n</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
<th>95% CI</th>
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<tr>
<td><strong>Value Sum</strong></td>
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<td>Group 1</td>
<td>37</td>
<td>5.59</td>
<td>2.882</td>
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<tr>
<td>Group 2</td>
<td>51</td>
<td>8.29</td>
<td>2.452</td>
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<td><strong>Total</strong></td>
<td>88</td>
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<td></td>
<td>86</td>
<td>0.0001</td>
<td>-3.83357 to -1.56643</td>
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<tr>
<td><strong>Self-Confidence Sum</strong></td>
<td></td>
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<tr>
<td>Group 1</td>
<td>37</td>
<td>6.22</td>
<td>1.902</td>
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<tr>
<td>Group 2</td>
<td>51</td>
<td>6.67</td>
<td>2.151</td>
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<tr>
<td><strong>Total</strong></td>
<td>88</td>
<td></td>
<td></td>
<td></td>
<td>86</td>
<td>0.3124</td>
<td>-1.33025 to 0.43025</td>
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Additionally, responses to self-confidence statements were summed:

1. I know a lot about computers.
2. It is easier for me to read something when it is on the computer.
3. It is easier for me to learn when I use a SMART Board instead of a regular board.

**Value**

Among 3rd graders at Southside Elementary School taking the digital literacy survey (N = 90), there was a statistically significant difference in value towards digital literacies between those who prefer reading traditional texts (group 1: M=6.22, SD=1.902) and those who prefer reading on the computer (group 2: M=8.29, SD=2.452), t(86)=4.735, p < .0001, CI, .95 = 3.83, -1.57 (see Table 1). In other words, the group of students who preferred reading on the computer also reported valuing digital literacies more than students who preferred reading traditional texts. Therefore, we reject the null hypothesis that there is no difference in value associated to digital literacies between those who prefer reading traditional texts and those who prefer reading online.

**Self-Concept**

Unlike sums from value-related survey items, there was no statistically significant difference in responses to self-confidence related to using digital literacies between those who prefer reading traditional books (M=6.22, SD=1.902) and those who prefer reading online (M=6.67, SD=2.151), t(86)=1.02 p ≥ 0.3124, CI, .95 = -1.33, 0.43 (see Table 1). Therefore, we fail to reject the null hypothesis that there is no difference in self-confidence related to using digital literacies between those who prefer to read traditional texts and those who prefer to read on computers.

**DISCUSSION**

Findings from the digital literacy survey revealed pertinent information regarding interests, value, and self-concept when engaging in digital literacies. A significant relationship was determined in value associated to digital literacies between those who prefer reading traditional texts and those who prefer reading online. Those who prefer reading online were more likely to value digital literacies. This revelation adds to the common understanding that those who value reading traditional books read more often. As a result, more investigation is needed to determine if elementary students who value reading online, read digital texts more often than those who do not value it.

Although all student participants were in grade three, their usage and value of digital literacies escalated with age (10 years old > 9 years old > 8 years old). In addition, students who preferred completing their homework on the computer were also more likely to play educational games online and utilize personal email accounts. Survey results indicate escalating rates of digital literacy usage with age at the third grade level and provide a greater evidence base for embedding digital literacy instruction prior to secondary schooling.

Few students reported the use of instant messaging services and chat rooms; however, about one fourth of the total student participants did report enjoying the use of text messaging on cell phones. The applicability of cell phones within teaching and learning environments will continue to blossom; multi-functional devices serve as an academic resource and a line of communication (O’Brien and Scharber, 2008). To ensure success in the 21st century, digital literacy skills must not only be taught, but also embraced by the educational community.

Findings from the digital literacy survey found no statistically significant differences related to self-concept. Regardless of whether students preferred reading traditional texts or digital texts, students were equally confident in their abilities. Students’ self concept was not enhanced as a result of engaging in digital literacies.
Further investigation is needed regarding how self-confidence might be nurtured by providing opportunities to interact and communicate digitally.

This study contained multiple limitations. The primary limitations were a convenience sample of a single site in a rural southeastern United States, and the assessment was of one grade level. Consequently, generalizability is limited to grade three students in schools of similar demographics. Secondarily, the number of items (20) on the digital literacy survey may have resulted in information overload for students in third grade.

Still, the digital literacy survey yielded important preliminary findings. It indicated that third grade students were able to self-report digital literacy usage and motivation information; in addition, it revealed that third grade students could discriminate motivational differences based on expectancy-value theory. This was seen in the statistically significant differences found in the relationship between reading preferences (online versus traditional) and the perceived value of digital literacy. Third graders who prefer reading online also self-reported valuing digital literacy more than their peers who reported a preference for traditional reading.

Though the motivation items on the survey provided important preliminary data, a more comprehensive instrument is needed to fully assess digital literacy motivation. Given the complexity of both digital literacy and achievement motivation (Eccles, 1983; Wigfield and Eccles, 2000), two subscales (self-concept and value) each containing items related to hypermedia, literary hypermedia, and computer-mediated communication are necessary to fully explore the literacy motivation of elementary students as they interact with digital technologies.

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