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A Comparative Analysis of iPad and Other M-learning Technologies:

Exploring Students' View of Adoption, Potentials, and Challenges

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Abstract

Mobile learning is currently trending toward rapid expansion within the classroom. This study employed survey methodology to specifically target students' perceptions of adoption potentials, and challenges. Potentials for the technology offered a number of mobile learning findings including a hierarchy of devices, educational work, and goals. Challenges included the symbolic view of devices, sustainability, and more accessible curriculum. Adoption interest revealed a fairly homogenous population in terms of gender, socioeconomic status, and innovativeness. iPads and eReaders shared the same penetration rates but differed greatly in initial adoption indicators, with the former being viewed much more favorably.

The term M-learning or mobile learning refers to learning in specialized contexts. These contexts are entered into in a number of ways. One way is when the learner is not at a fixed or a predetermined location. Another is when the learner may access the content of class materials from a variety of locations. Still another is device dependent when the learner takes advantage of learning opportunities offered by mobile technologies (O'Malley & Vavoula, 2003). The communication process of mobile learning usually occurs via computer-mediated formats, including instant message, e-mail, and chat room etc. A great deal of the historical communication research exploring these conditions has been subsumed under the term computer-mediated communication or CMC (Wallace, 2008). CMC is defined as any communicative transaction that occurs through the use of two or more networked computers (McQuail, 2005). Clearly, smart phones, laptops, advanced personal digital assistants, PDAs, and tablet computers such as iPads would fit this definition.

Connections and M-Learning

Pownell and Bailey (2001) identify four major "technological trends" in the relationship between information, communication technologies, and educational environments. One of them occurred in the 1990s' was the large-scale diffusion of Internet and the World Wide Web, which led to a huge number of people who communicated through Computer-mediated communication.

Computer-mediated communication describes the human facilitated intercourse that is augmented by "computer like" hardware and applications. Examples include electronic mail, computer conferencing and electronic bulletin boards (Luminita, 2010). Electronic bulletin boards currently include a number of reifications such as Twitter and Facebook.

It is not surprising there is a "prevalence of computer-mediated communication (CMC) in education" (Sherblom, 2010. p. 479), while technology has been a part of education throughout

history. CMC "plays an essential role of online collaboration for educational purposes" (Liu, Tao,& Nee, 2008, p. 127). The applying of CMC in education also adds the relatively new concept of portability. Universities and schools use to localize around libraries so that information, resources and research were easily obtainable. Now the nature of computers has made many of those same resources more easily accessible from a variety of locations because of the way that we access them. Milks and Bloxham (2010) describe M-learning devices as lighter, less bulky, easier to carry around and having lower requirements for the working environment than laptops.

This new dynamic in communicating with people and accessing information shifts many educational dynamics of the past. Community, connections, and communication are being reexamined in educational venues. Some of the proponents offer a number of ways that mobile learning may be advantageous to education.

First, by constructing flexible learning environments mobile technologies may be able to bridge the gap between the classroom and traditional community members (Luminita, 2010). Mobile technology (m-technology) can effectively bring communities instructional resources and activities from the outside into the classroom (Liu, et al., 2008). Beyond that, the social interactions that are provided by handheld computing devices offer a simple and straightforward learning environment. Furthermore, M-learning provides more open access. Rappa & Baey (2009) argued that with M-learning capabilities, all learners should have access to information that can improve their own quality of life regardless of location, status, and culture. Luminita (2010) echos the point indicating that mobile technologies may indeed provide educational access to learners normally excluded from education based on location, social status, or technology infrastructure.

However, a number of impacts and effects of applying mobile learning in classroom have yet to be determined. Some scholars express concerns. One is that the M-learning environment built to support collaborative learning should not only enable learners to carry out activities, but also need to facilitate favorable collaborations. Clearly this is not always the case. Luminita (2010) argued that CMC learning decreases the direct interaction and immediate feedback between students and professors, and increases the rate of failures and drop-outs. CMC has also been reported to create a time-place displacement that decrease communication, erodes social connections, and increases feelings of personal loneliness and depression (Breen, Lindsay, & Smith, 2001). Additionally, there is a concern that the quality of the learning may be reduced by encouraging plagiarism because some students might take materials from web without thought (Banyard, et al., 2006). Moreover, identity construction within these CMC interactions might be more complex than daily face-to-face interactions. Individuals can easily maintain relative anonymity in CMC environment. According to Rumbough's (2001) research, this anonymity can prolong decision-making processes, increase the potential for interpersonal deception and boost antisocial communication. According to Anderson and Emmers-Sommer (2006), in face-toface contexts, communicators use active, passive, and interactive strategies, but these are not equally available in CMC. Similarly, Sherblom (2010) also contends that in CMC, uncertainty reduction strategies are altered, both restricted and expanded, in ways that affect interpersonal impressions, communication, and relationships.

Beyond these psychosocial concerns, there are restrictions and challenges placed on Mlearning devices themselves. A number of these have to do with current uses, size and price. Mlearning devices are currently perceived as "expensive toys," that will be out of date quickly in a fast moving market (Veerasamy, 2010). The M-learning devices also have high requirement for

the system, and access speeds that may reduce effectiveness (Mahnoud, 2008). Chen-Chung et al. (2009) express concern that "the screen on handheld devices are designed for individual-user mobile applications and may constrain interaction among group learners" (p. 127). Chen-Chung et al. (2009) also summarize a recent review on mobile learning stating, "whether handheld devices facilitate or impede face-to-face social interaction is an important research issue" (p. 128).

With the fast development of new technologies applied in mobile learning, a technological proficiency barrier may have an impact on the ability to learn. Banyard et al. (2006) mention that particularly entry-level skills for some enhanced technologies can be a barrier to effective learning in CMC environments. Previous research is also clear that there are some serious concerns regarding the potential for these tools to inhibit or distract from learning (Luminita, 2010). So while there are a great many potentials and challenges surrounding the application of mobile learning, further study is appropriate and necessary. This paper intends to extend this discussion by applying how students perceive many of these potentials and challenges.

Theoretical Heuristics for M-Learning and Communication

Much of the research concerning mobile learning is data driven without any theoretical guidelines. However there are decades of technological applied theories that may provide heuristics that will help contextualize data findings. Additionally, data concerning previous technological innovations may also provide some lenses to examine current technologies. Sherblom (2010) identifies five of the more dominant streams of scholarly thought that have had historical resonance within the communication discipline. These include media richness, social presence theory, social information processing (SIP), social identity, and the hyperpersonal

perspective. Following are historical foundations of each of these with the addition of Sherblom's summary of more recent literature.

Original conceptualization of media richness theory defines richness as:

"Based upon a blend of four criteria: (1) the availability of instant feedback, making it possible for communicators to converge quickly upon a common interpretation or understanding; (2) the capacity of the medium to transmit multiple cues such as body language, voice tone, and inflection, to convey interpretations; (3) the use of natural language, rather than numbers, to convey subtleties; and (4) the personal focus of the medium" (Trevino, Daft, & Lengel, 1990, p. 75).

Social presence theory strongly asserts that, in the organizational environment, the characteristics of the media and the equivocality of the message need to be considered for communication effectiveness (Conger, 1992; Trevino, et al., 1990). Sherblom (2010) likewise summarizes current thinking regarding the theory. Briefly stated, a leaner medium, like CMC conveys more limited information, cues, feedback, and language is more efficient for unequivocal communication, but less suited for equivocal ones.

Similarly social presence theory has a long historical resonance within the discipline. Seminal conceptualizations contend that social presence is the degree to which other communication participants are believed to be jointly involved in the communication process (Short, William, & Christie, 1976). They state that media vary "in their capacity to transmit information about facial expressions, direction of looking, posture, dress and non-verbal, vocal cues" (p. 65).

Olaniran (1993) elaborates on this theory in terms of CMC and points out that,

> The proponent of this theory subscribes to the notion that CMC systems are low in capacity to convey information about facial expression, posture and nonverbal cues. The lower availability of such cues is believed to influence users' views if the communication medium, contexts, performance, and message interpretation. Specifically, CMC, with its few nonverbal cues, is said to be lower in comparison to FTF communication. (p. 1)

Russo et al. (1999) took these thoughts a step further. They apply them to the online class and make the claim that social presence was the key objective to the development of early online classes.

Specifically course developers sought to incorporate four key elements in this trial course: (1) to present pertinent and engaging content in a way that would support learning and sustain learning (2) to evoke reflection by students about the material (3) to support the establishment of social presence for each participant, and (4) to foster connection among participants. (p. 3)

Having students engaged in the course, engaging the material, and establishing social presence seem to point to characteristics that could have an impact on how to achieve immediacy in online environments. Sherblom (2010) summarizes subsequent findings contending that the reduction in cues restricts the communication of social information about the person and can generate a vaguer impression reducing social presence. This is important because it is also suggests that a loss of social presence may reduce learning.

Walther's (1992) award winning article lays out many of the propositions regarding social information processing theory (or SIP theory). Particularly of note is the proposition that

social interactions in the CMC environment may be impacted by temporal barriers because "the functions accomplished through a variety of face-to-face cues are undertaken via fewer codes in CMC, and any single message exchange may not carry as much social information as would the exchange of the same qualities in a nonmediated setting" (p. 71). Sherblom (2010) further contends that training, development, and practice are keys to effective interactions.

Early research regarding social identity predates the modern Internet by decades (Tajfel,

1975). However later literature has embraced the theory and its intuitive application to computer accessed environments. One article contends:

As applied to CMC, the relative anonymity associated with this medium provides a context in which individual differences between group members are sometimes less visible. As a result, the salience of group memberships is likely to be accentuated in depersonalized settings as found on the Internet, which has consequences for how people perceive in-group members, out-group members, and themselves. (Postmes, Spears, & Lea, 2002, p. 4)

While all of these theoretical positions are interwoven, social identity and social presence may be more so. One particular example related by Sherblom (2010), is that students who have difficulty using technology early in a course experience a frustration level, a tendency toward social withdrawal, and a general dissatisfaction with the course. Specifically, computer anxiety, social anxiety, and communication apprehension are suggested to affect a CMC participant's experience of social presence (Sherblom, 2010).

Lastly, the hyperpersonal nature of technology has been a characteristic of interest. Simply put, technology impacts communication in a way that surpasses the capabilities and characteristics of face-to-face interpersonal communication (Walther, 1996). To be sure, there

are negatives to this effect. For example, the anonymity in CMC environments may allow students to engage in negative behavior that would not be typical in a face-to-face setting (Postmes, et al., 2002). However the flip side of this, as related above, may be that people with high levels of communication apprehension may be able to perform better. Other characteristics that are included in the hyperpersonal category include its ability to connect across time and space in a way that are difficult to do face to face (Sherblom, 2010; Walther, 1996).

So clearly the nature of mobile learning's pedagogical and technological characteristics provide a warrant to study learner technology interaction. Even without regard to the device being used, the nature of the Internet provides a very unique communication medium, allowing communication to be interactive, visual, and elastic (Zurita, et al., 2004). Furthermore, some of the differentiations between various devices need to be examined for their communication and adoption characteristics to help determine levels of impact. For these reasons, this study posits the following three research questions in regard to students' perception of mobile learning technologies:

RQ1: What are potentials for M-learning?

RQ2: What are challenges for M-learning?

RQ3: What characteristics are impacting the adoption of M-learning?

Methodology

This study was conducted by a team of three researchers who were involved in an in depth study of mobile learning. The survey instrument was designed by a focus group of five graduate students, two of which were contributing researchers. This was considered key since it focused on the student perspective to examine the potentials and challenges of using M-learning. Some of the content was modified from a previous study conducted by Ball State University in

their preliminary analysis of iPad characteristics (Milks &Bloxham, 2010). The survey was then reviewed for prima fascia validity by a CMC subject matter expert who was also a part of the research team. Adjustments were made and the survey was distributed electronically using a snowball sample technique through e-mail (Reinard, 2007).

Participants were informed that the survey was both voluntary and anonymous aside from holistic demographic categories. The majority of questions used Likert type categories. These kinds of questions were noted for their ease in construction and interval level data return (Shurville & Browne, 2006). There was one ranking question used on the survey. Rankings have been viewed as a more robust estimator of survey values even though they may produce some analytical difficulties (Krosnick & Alwin, 1989).

This was part of a larger study that included faculty from a number of institutions. Students were solicited from a medium size private university in the southwest of the United States. A total sample size of 76 was obtained. The overwhelming majority of students and half of the faculty participants were from the southwestern university. The completion rate was roughly 90% with 67 completing the entire survey. Out of all respondents, 57 were students, of which 6 had high school degrees, 36 had finished some college, 4 had associated degrees, 6 had bachelor degrees, and 4 had graduate degrees. Gender distribution of the students was 44.6% male to 55.4% female. The majority of the students aged between 18-24 (94.7%), with three aged above 24 (5.3%). Twenty-eight of the surveyed students reported a household income below \$35,000, while 26 reported a household income above \$35,000. While differences between devices are often blurred, survey takers were allowed to self-define based on their own definitions. So while it is arguable that an iPad can also be an e-reader at the time of this survey the descriptions were fairly distinct.

Results

The research questions were addressed in several ways. The students were examined for the level of experience with various mobile learning devices in regard to classwork. Respondents were also asked about their likelihood to use digital technology in the classroom weekly as well as their likelihood of engage in certain behaviors and attitudes. Perceived challenges of Mlearning were examined included overpricing, ease of use, distraction while learning, and having the devices be more for entertainment than for education. Responseware devices were included for both comparative and complimentary reasons. While they can be used for a number of purposes, most often they are used for anonymous polling and temperature type questions given in class. Students have the devices distributed and then the percentage of agreement is generally projected to spawn discussion. The university researched has an almost immersive environment regarding these and the other devises, so most students have a high degree of familiarity.

Perceived potentials of M-learning that were examined included providing a motivating learning experience, reducing gender biases in the classroom, delivering curriculum to remote or nontraditional sites, and better delivery of classwork etc.

Table 1 reflects a list of items where participants had a class learning experience. Data ranged with the majority having experience with laptops (66%), smartphones (56.6%), and iPod Touch's (37.7%) to five items close to single digit responses. These included Tablet Computers, eReader, Responseware device, iPod Family (except touch), and others etc.

Table 1: Learning Experience in Classwork

	Percent	Ν
Smart Phone	56.6%	30
iPod Touch	37.7%	20
iPad	18.9%	10
iPod Family (Except Touch)	5.7%	3
Laptop	66.0%	35
Tablet Computer	5.7%	3
eReader (e.g. Kindle)	3.8%	2
Responseware devices	3.8%	2
Other (please specify)		1
Total		53

Table 2 reflects the likelihood of weekly M-learning devices usage by students for classwork. The answers ranged from 1 meaning "extremely often" to 5 meaning "never." Laptops were perceived as having the highest usage frequency with a mean of 1.81. eReaders were perceived to be used the least with a mean of 4.09.

Table 2: Likelihood of Weekly Usage

	Ν	Mean	Std. Deviation
Smart Phone	49	2.84	1.559
iPod Touch	50	3.36	1.411
iPad	52	3.19	1.633
iPod Family (Except Touch)	46	3.85	1.299
Laptop	53	1.81	1.057
Tablet Computer	46	3.70	1.314
eReader (e.g. Kindle)	47	4.09	1.158
Responseware devices	48	4.06	.932

Table 3 reflects respondents forced rankings for various devices that they preferred to use in the classroom. The top and bottom mean rankings were fairly consistent with some general trends in between. In terms of which technology the respondents prefer to use in the classroom environment, the laptop was the most preferred technology, with iPad and Smartphone in the second and third place respectively. These were followed by the iPod family (touch and others). Tablet computers and eReader came next with Responseware and other devices trailing in the technology list.

	First	Second	Third	Fourth	Fifth	Sixth	Sev.	Last	Mean
Smart Phone	20.4%	18.4%	24.5%	14.3%	10.2%	4.1%	4.1%	4.1%	3.24
	(10)	(9)	(12)	(7)	(5)	(2)	(2)	(2)	
iPod Touch	3.8%	19.2%	17.3%	26.9%	17.3%	11.5%	3.8%	0.0%	3.85
	(2)	(10)	(9)	(14)	(9)	(6)	(2)	(0)	
iPad	17.0%	35.8%	24.5%	7.5%	3.8%	1.9%	5.7%	3.8%	2.92
	(9)	(19)	(13)	(4)	(2)	(1)	(3)	(2)	
iPod Family	0.0%	2.3%	9.3%	27.9%	23.3%	9.3%	14.0%	14.0%	5.26
(Except Touch)	(0)	(1)	(4)	(12)	(10)	(4)	(6)	(6)	
Laptop	62.3%	17.0%	7.5%	3.8%	9.4%	0.0%	0.0%	0.0%	1.81
	(33)	(9)	(4)	(2)	(5)	(0)	(0)	(0)	
Tablet Computer	0.0%	8.3%	14.6%	14.6%	16.7%	29.2%	10.4%	6.3%	5
	(0)	(4)	(7)	(7)	(8)	(14)	(5)	(3)	
eReader (e.g.	0.0%	0.0%	6.3%	4.2%	10.4%	37.5%	33.3%	8.3%	6.13
Kindle)	(0)	(0)	(3)	(2)	(5)	(18)	(16)	(4)	
Responseware	0.0%	0.0%	0.0%	4.3%	10.6%	8.5%	27.7%	48.9%	7.06
Devices	(0)	(0)	(0)	(2)	(5)	(4)	(13)	(23)	
Other	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0	8
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	% (7)	

Table 3: Most Preferred Technology

The respondents were also asked to indicate what kind of technology that they would prefer to learn more about. These included Smartphone, iPod Touch, iPad, iPod, Laptop, Tablet Computer, eReader, and Responseware devices. The respondents were allowed to choose multiple options that applied for them. The result showed iPad as the leading technology among

others, because 73.1% of the respondents indicated they would like to learn more about it. This was followed by the Smartphone (28.8%), Laptop (23.1%) and eReader (23.1%).

Table 4 reflects the likelihood of a list of engaging in technology behaviors or attitudes by respondents. The answers ranged from "1" meaning "extremely likely" to "5" meaning "extremely unlikely." The answer reflects an extremely positive trend. Since laptops were the only device that was significantly used on a weekly basis, it is reasonable to extrapolate that in the majority of cases this is most likely the technology that is being considered. Engaging in individual projects was perceived to be the most frequent technology behavior followed by engaging in group projects.

Table 4: Likelihood of Engaging in Technology	Behaviors or Attitudes
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	Ν	Mean	Std. Deviation
Carry Laptop to Class	53	1.91	1.061
Group Project	53	1.70	.799
Individual Project	53	1.60	.689
More Technology Driven Curriculum	53	2.15	1.026

Table 5 reflects a list of students' attitudes towards mobile learning technology. They were asked about their general impression. The answers ranged from "1" meaning "strongly agree" to "5" meaning "strongly disagree." Almost all items had a positive valance including "outdated too quickly", "more for entertainment than for education," and distraction questions. The only items that were negatively valenced items were related to the devices being difficult to use and plagiarism.

Table 5: Attitudes towards Mobile Learning Technology

			Std.
	Ν	Mean	Deviation
Provide a motivating learning experience	53	1.94	.864
Reduce gender biases in the classroom	53	2.64	.901
Deliver curriculum to remote or	52	0.15	744
nontraditional sites	53	2.15	.744
Better deliver classwork	53	2.34	.939
Are supported by instructors	53	2.42	.969
Hard to use	52	3.77	.831
Outdated too quickly	52	2.60	1.159
Encourage teamwork	51	2.82	.888
Encourage plagiarism	52	3.33	.964
Enable more convenient studying	52	2.06	.998
Encourage communication with the professor	52	2.06	.895
Simplify communication	52	2.00	.950
More for entertainment than for education	52	2.46	1.075
Distraction	52	2.81	1.155

Additionally, several significance tests were conducted to determine if there were differences in perceived users regarding challenges and potentials. iPad experience was used as indicator of early adoption. It also was used as an indicator to see if there were some initial differences between how iPad experienced students related to mobile learning as compared with other students who had not had this experience. All items in table 5 were compared. Because of

the expected deluge of iPad adoption, this is considered a critical comparison while these groups can be clearly identified without cross contamination. Nine iPad experienced subjects were compared to the other 43 subjects using a t-test for unequal variances.

There was no significant difference between iPads regarding mobile learning technology in general, comparing with smart phones laptops, iPods, and eReaders. Additionally the individual technologies were examined for being overpriced, ease of use, distracting while learning, and being more for entertainment than for education. Again there was no significant difference between early adopters with iPad experience and those without.

The subjects were also examined for gender differences in the above areas. There was no significant difference in terms of likelihood of using a particular technology (Table 2). Males' N size ranged from 21 to 24. Females' N size ranged from 25 to 29. There was no significant difference for likely hood to engage in certain technology behaviors (Table 4). Attitudes toward the respected technologies yielded similar results (Table 5). However, because of sample size, it is worth noting that the category "encourages communication with the professor approached significance (t= 1.745, df 38.991, p< .09). Females (N=29, M=1.86, sd= .743) agreed more strongly than males (N=23, M=2.30, sd. 1.043) that the technology encouraged communication with the professor.

The subjects perceived socioeconomic status was also examined. There were 24 subjects reported their annual household income below 35 thousand dollars and 28 that reported that it was above. Once again there was no significant difference in any of the above categories regarding income.

Overall adoption characteristics concerning M-learning were examined with overall means tables being used as indicators. T-tests were used to compare differences among various

demographic characteristics regarding early adoption, gender and socioeconomic status. No significant differences were found in this range of categories. As such the subjects appear to be fairly homogenous regarding their perception, making means fairly robust indicators across the above demographic profiles.

Discussion

The above results suggest a number of findings that may help users of M-learning contextualize their audience. Also, potentials for the technology offered a number of findings. Laptops appear to be the dominant technology with a great deal of interest expressed toward other mobile technologies, most notably the iPad. Various kinds of student work and educational goals were positively viewed. Also a number of challenges were examined. Most notable among these is that over half the respondents considered the devices as more for entertainment than for education. Also, students indicated that their desire for technology friendly curriculums was not being met. Lastly, the sustainable value of the devices was an area of concern. Regarding adoption different technologies had different levels of penetration. iPads and eReaders shared the same penetration rates but differed greatly in initial adoption indicators, with the former being viewed favorably and the latter not. While speculative, this may be due to the iPad's better fit for both higher social information processing and social presence (Sherblom, 2010). RQ1: What are potentials for M-learning?

The results of this study show that laptops, among other M-learning technologies, are perceived as the most prevalent technology accepted by students and the most preferred technology chosen by students to be used in the classroom. However, the results also indicate that large majority of students (73.1 %) prefer to learn more about iPad technology. This may suggest a degree of demand that has the potential to drive adoption for the technology in a fairly

abbreviated time frame. This survey was conducted in November of 2010, and the expansion of support for iPad and Apple products seems to be positioning for greater demand. For instance, Verizon Wireless, a venture of Verizon Communications and Vodafone just started selling Apple's iPhone in February 2011, which ended AT&T's more than three-year monopolized holding on U.S. iPhone sales (Gamet, Mar 10, 2011). Also, Apple has expanded their product distribution network to include retailers like Walmart, Target, Best Buy, and the aforementioned phone carriers. These expansions are expected to better meet demand that has been historically substantial for Apple's new technology roll outs (Staff, Mar 14, 2011).

The survey also indicated several kinds of class work that were viewed favorably. At this point the reflexive nature of the various technologies and its relationship to student work makes it difficult to determine which, if either, is more contributive. Regardless, engaging in individual projects and group projects are perceived to be the top two frequent behaviors by the respondents.

There were also a number of potentials regarding educational goals. First among these was the perception that it would enhance communication with the instructor. Other goals included simplifying communication, providing a motivating learning experience, enabling more convenient studying, and delivering curriculums to remote or nontraditional sites.

Theoretically these results are not surprising. Both from a hyperpersonal and media richness perspective one would expect that the richer and more interactive technologies should be the ones that would be preferred in the classroom (Trevino, et al., 1990; Walther, 1996). Additionally, M-learning appears to be on the verge of transcending or at least providing greater porosity to barriers of social presence (Russo, 1999; Sherblom, 2010).

The perceptual nature of this data links it to the symbolic nature of the technology. Trevino, et al (1990) include symbolic value as one thing that contributes to media richness. Specifically:

"In organizations the choice of a particular media carries with it symbolic meaning beyond the explicit message being transmitted. Organizational and subgroup norms for media usage create pressure to choose or not to choose a particular medium. These norms can have a powerful choice on media choice behavior (p. 88)

Certainly, this provides a reasonable frame to view the 71% of the students who want to know more about iPads, surpassing all other mobile learning technologies examined. It also, may help explain why 53.4% of the subjects thought that iPads were easy to use despite that only 17.3% of the subjects had actually used them. Similarly, 52.8% ranked the iPad as their technology of choice in the classroom, only being surpassed by laptop computers. Whatever one might think about a particular technology symbolic attributions this study appears to suggest it is a contributing factor in terms of future potential.

RQ2: What are challenges for M-learning?

There are a number of perceived deficiencies that emerged from our data. Realize that these results came from a population that viewed M-learning positively. Perhaps, one of the biggest challenges of M-learning is what the devices have come to symbolize. More than half of the respondents (53.9%) considered mobile learning devices to be more for entertainment than for education.

For students who had a preference, two areas represented the largest valence of opinion (positive, neutral, negative). The largest group (42.3%) contended the devices were a distraction to learning, while only 28.9% contended that they did not and 28.8% were neutral. Similarly,

46.1% stated that M-learning technologies encouraged plagiarism. This is contrasted with only 21.1% of students that did not and 32.8% were neutral. The percentages indicate that both distraction and plagiarism continue to be challenges regarding M-learning.

Perhaps some of the less apparent by equally important deficits were derived in students more tacit feedback. One of these areas was the desire for more technology driven curriculum. Sixty-two percent of students expressed a desire for more technologically driven curriculum. This point may also be embedded in some similar findings where roughly, 49% of students were either neutral or in disagreement that M-learning technologies were supported by instructors. Even though it is not a majority, this indicates that instructor support is seen by students as an area of concern.

Lastly sustainable value of the technology itself continues to be challenging. The results of this research supported speculations on the negative impact of price point and outdatedness (Veerasamy, 2010). Roughly, 80% of students in this survey thought mobile learning technologies were overpriced. Multi-generation products do help students in terms of being able to acquire previous generation products at reduced prices but at a substantial cost in terms of student satisfaction. Most of the students (53.8%) stated that mobile learning technologies were outdated two quickly.

RQ3: What characteristics are impacting the adoption of M-learning?

Many of the adoptions issues are somewhat embedded in RQ1 and RQ2. The sustainable value of various technologies tends to suggest that iPads are poised for initial adoption behaviors while eReaders are not. Cell phones, iPod products, and laptops already enjoy a high degree of penetration, while iPads and eReaders are in single digits. One large scale survey had percentages of ownership for those between the ages of 18-34 at 95% for cell phone, 74% for

iPod products, 70% for laptop computers, while tablet computers like iPads and eReaders only had 5% (Zickuhr, 2011). Certainly the high number of students that wanted to learn about iPads is an opportunity to initiate the first stages of the technology diffusion process (Rogers, 2003, 2004). Low numbers for other technologies might reflect various combinations of three dynamics. These are relevancy, symbolic value, and experience.

Since the majority of the students did not have experience with the iPad, it seems that either relevancy or symbolic value of the iPad is driving the initial knowledge acquisition stage of the adoption process. Contrast this with the eReader. Almost identical numbers were reported in terms of ownership and yet only 23% of students wanted to learn more about this technology.

Future research

This research did not differentiate between perceptions and actual use. While this helped provide a frame amplifying symbolic associations, linkages to actual behaviors needs to be more strongly established. Future research should expand the granularity of this examination in terms of actual behaviors.

Findings were consistent with a growing number of studies that are concerned about the non-learning dynamics of M-learning devices (Milks, & Bloxham, 2010, Turkle, 2011). Reasoned research should continue to focus on the potentials but also find out challenges such as devices distraction and also at what level devices are they being used for personal entertainment during instructional time. Also, plagiarism concerns are a constant struggle and should be monitored for longitudinal trends. Lastly, M-learning experiences were considered positive. Larger samples and more longitudinal analyses need to be conducted in the future to establish

trends. Particularly of interest would be to establish whether this is a general trend or merely an

artifact of early adopters as M-learning is maturing as an instructional environment.

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Improving Parent Involvement in Secondary Schools through Communication

Technology

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Abstract

Parental involvement can have a tremendous effect on the academic achievement of students. Technology has given parents and teachers the opportunity to explore new ways of communicating. New technologies have the power to improve the parent-teacher relationship by providing easy, efficient, and effective methods of transferring information. Parents that know what is going on in the classroom can more effectively support their children in learning and achieving in all aspects of their education. Specifically, over the past few years, online gradebooks have become widely used in many school districts, giving parents and students 24- hour access to their grades and information about upcoming assignments. The results of this study found that if given access to information through an online gradebook, most parents will use the opportunity to communicate to their children about their grades and in many cases, will prompt communication with a teacher as well. Nearly all parents surveyed had used the online gradebook and most parents used the online gradebook system at least weekly. Simply having access to and using an online gradebook changed the nature and frequency of communication between parents and teachers.

Parental involvement can have a tremendous effect on the academic achievement of students. The importance of communication between parents and teachers has been studied and stressed for many years as shown by research conducted decades ago by Bronfenbrenner (1979). Bronfenbrenner found that as schools have become larger and further away from neighborhoods where the students are living, they have become "alien" to the students and parents. Teachers in schools are also often well-educated and do not live in the communities that they work, increasing the need for meaningful and frequent communication. He states that:

The school has become, over the past two decades, one of the most potent breeding grounds of alienation in American society. In my view, it is the alienation that underlies the progressive decline in achievement test scores that has been recorded over the past dozen years both for the college bound and for the general population of students at the elementary and secondary levels. (p. 848)

Fan and Chen (2001) found a correlation of 30% when studying the link between parental involvement and academic achievement. Epstein (2008) found similar results that showed "more students earn higher grades in English and math, improve their reading and writing skills, complete more course credits, set higher aspirations, have better attendance, come to class more prepared to learn, and have fewer behavior problems..." when parents are involved (p. 10). Ferrara (2009) found that the most often reason for lack of parental involvement was "parents' work schedules or other events prevented parents from participating" (p. 134).

Unfortunately, communication initiated by teachers usually occurs only when the teacher feels there is a difficulty with a student. Blackerby (2005) found that teachers will

find the time to communicate with parents of students that have an academic or behavior plan in place, but the rest of the parents are often not contacted and without a school-wide plan to reach these parents, "schools may unintentionally isolate the students' parents" (p. 6). Ferrera (2009) discussed similar ideas in her study that parents tended to be reluctant to call schools, but would call "more often if their children were in trouble of failing their subjects" (p. 133).

Technology has given parents and teachers the opportunity to explore new ways of communicating. New technologies have the power to better the parent-teacher relationship by providing easy, efficient, and effective methods of transferring information (Lunts, 2003). Parents that know what is going on in the classroom can more effectively support their children in learning and achieving in all aspects of their education.

The majority of the communication that teachers and parents typically engage in is purely informational, such as the reporting of grades or attendance. Traditionally teachers provide four marking period grades per year to parents; occasionally an interim is also provided at a halfway point in each marking period. Current methods of printing paper copies and mailing each home (or sending it with the student and hoping that it reaches parents) is both expensive and untimely because once the information reaches a parent, it is commonly two weeks old and no longer relevant. Over the past few years, online gradebooks have become widely used in many school districts, giving parents and students 24-hour access to their grades and information about upcoming assignments. Parents are no longer left in the dark about their students' grades, only to be surprised eight times a year when interims and report cards are sent home.

Digital Communication

Online gradebooks have a variety of features depending on the system, but all systems allow teachers to create assignments that have distinct dates for when an assignment was assigned and due. The information that the teacher inputs is transmitted to the parent and student so grades can be seen in real time, eliminating the delay in information that a paper report card can sometimes have. Beverly points out that "paper report cards take a week to 10-days to process and mail... and report cards [can] mysteriously 'disappear' in the mail" (2003, p. 16). The online gradebook system also allows for easy and accurate calculations within the system that teachers do not have to set up on their own. The software provides options for calculating with points, percentages, or a combination of both.

Parents and students can easily track and interpret the information in a gradebook. For example, they can see if a student in a class is doing poorly because he or she does not complete homework or because he or she struggles with assessments. These two situations could amount to the same poor grade but would require completely different strategies for obtaining an improved grade. Being able to see the actual gradebook with different assignments and grades allows for clarity for both students and parents; a letter grade at the end of a marking period gives little information, with virtually no way to improve the grade once it has been recorded.

While online gradebooks provide a substantial amount of previously unavailable insight into the classroom for parents, grades in a gradebook are simply a numerical representation of the student. While there are options in the gradebook for adding comments for each assignment, much more information about the student should be

communicated to the parents. Furthermore, an online gradebook is only a one-way communication tool where all information is provided by the teacher and parents can only receive this information and interpret it on their own. Beverly (2003) stresses that parents should not use an online gradebook to spy on their children, but rather, should use it to open communication with children about what happens in school.

The option for communication from school to home is email, and conveniently, email has become a ubiquitous part of nearly everyone's lives where virtually everyone has an email address or can create one for free. Email can open up the two-way conversation between parents and teachers that needs to occur for many students to succeed. Teachers can use email in a variety of ways that range from general group emails that simply inform the parents about general activities in the classroom to personal emails about a specific student on a weekly basis. Nearly all school districts provide email addresses for teachers to be used professionally so that teachers do not need to use a personal email address and the email address can be posted on a school website to be easily found. Davenport and Eib (2004) point out that emails can be translated into virtually any language through the internet for students and parents that are English language learners to reach a group that is most often left out of school to home communication.

Another benefit to email is its asynchronous nature which allows for parents and teachers to communicate without having to be available at the same time. Parents and teachers can often miss each others' telephone calls for several days before getting a chance to talk to each other, which can become useless with time-sensitive information. Both parents and teachers can become frustrated and give up on communicating. Lunts says that email can be a solution to this problem:

Well organized, email messages sent by the school or a teacher can reach a vast number of parents. Parents can also respond at a convenient time, not necessarily when the school operates. If parents find that their messages are read and responded to in a timely manner, they might choose to use this type of communication more frequently. (2003, p. 4)

Thompson (2008) studied the characteristics of emails between parents and teachers including common topics and the frequency of emails. The most common topic, by far, was grades and how students could improve. Thompson explains, "Parents and teachers indicated that emails worked most effectively to communicate about grades because the messages involved simple, concrete information" (2008, p. 208). A topic discussed relatively less was the behavior of students and Thompson found that "teachers were extremely hesitant to use email to communicate about student behavior because of the sensitive and sometimes complex nature of this communication" (2008, p 209). Minor infractions were often reported in email such as using a cell phone during class which is against the school rules, but for more serious issues both parents and teachers preferred oral communication "to better regular the tone of the discussion and to elaborate on more complex issues" (2008, pg 209). The biggest exception to this is when a behavior issues has already been discussed orally and email is used to simply follow up on ongoing behavior.

Unfortunately, there are also many complaints about email as a form of communication. The asynchronous nature of email can be both its best and worst quality because some conversations about students simply need quick interaction and feedback that can only be found in a synchronous conversation. Lunts (2003) provides a solution to this problem that both solves the problem of the asynchronicity of email and the difficultly

of having parents and teachers in the same place at the same time to have a face to face discussion. She suggests the use of chat rooms through a school/classroom website which also allows a discussion of "many-to-many" at designated times during a month.

Even with a synchronous form of communication like chat rooms, there is still communication that can be lost when the conversation is not face to face. When the internet was first becoming popular as a form of communication Wilkinson and Buboltz (1998) found that social cues that were normal parts of face-to-face communication such as facial expressions, gestures, and tone of voice, were not able to be conveyed through email and other electronic media.

Parental Involvement

Rogers and Wright (2008) found that the main reasons that parents did not use technology to communicate with schools was that they either did not have the technology at home or they did not have the skills needed to use the technology to communicate. While there are many programs in place to help put computers and appropriate training into schools, without the same programs to help parents and families at home, technologybased communication will never be able to expand and become effective. As Rogers and Wright point out, "technology has been heralded as a tool that can provide new avenues for communication, but studies show that parents and teachers are not embracing them" (2008, p. 4-5).

Email or online gradebooks provide instant feedback to parents if, and only if, both teachers and parents are proactive in their usage of these technologies. According to the U.S. Census Bureau (2009), 76.7% of households have access to internet as of October 2009, as compared to only 41.5% in 2000. Furthermore, Wells and Lewis (2006) found

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that 94% of public schools had internet access in 2005 after steady increases over the past ten years. The majority of both teachers and parents are able to partake in some form of computer-mediated communication (CMC) if only to receive the same information they would have in a traditional way, with a substantially lower cost and more timeliness.

According to research conducted by Rogers and Wright (2008), parents and teachers sometimes felt that the other should be doing more to open the lines of communication and that they, themselves were reaching out to the other. This apparent disconnect could come from the fact that teachers strongly prefer to use email for communication while parents prefer a phone call, newsletter, or note.

Anderson and Minke (2007) conducted a study to analyze the nature of parents' involvement in their children's education. They categorized involvement into two categories: involvement at home, such as helping with homework, or involvement at school, such as attending meetings at the school. They found that "parents make an initial decision to be involved in their children's education according to their beliefs (i.e., role construction, sense of efficacy) and the general opportunities and demands for involvement from the school and their children" (2008, p. 312). They define role construction to mean what parents feel they are expected to do as a parent for their children and the sense of efficacy as the parents' belief that what they do will have a positive effect on their children's learning.

Using these parameters, Anderson and Minke (2007) found that when parents are specifically invited to participate in any school-related activity, their perception of their role in the education of their child changes both at school and at home. They feel that they now have an effect on their child's learning and will strive to participate in a positive way.

Though Anderson and Minke were not able to determine direct causation, the correlation is enough to warrant more research.

Walker, Wilkins, Dallaire, Sandler, and Hoover-Dempsey (2005) found that the perception of an invitation can be just as important as the invitation itself. If the school is able to "convey to the parent that his or her involvement is welcome and useful in supporting student learning and success" then this will "influence parent's decisions to become involved" (2005, p. 94). Email and other technology-based communication such as a school website can be an easy and effective way to reach out to parents. Even taking something that is traditionally not technology-based such as a newsletter that is sent home with the students to the parents can be made into something electronic to help ensure that parents actually receive the information and can be easily translated for parents that do not speak English as a primary language.

Rogers and Wright (2008) point out that as students grow older, parents must make the same transitions that their students must from elementary school where contact is limited to a single teacher who really knows the student to middle school where there are now several teachers that only interact with the student for a short amount of time in the day. Demands increase for both parents and teachers and it becomes even more important for one of them to initiate contact. CMC allows parents to send a single email to all of the student's teachers to ask how their student is doing instead of attempting to call each teacher separately. Of course the reverse is also true for a teacher if the teacher can determine an easy and effective way to gather email addresses from parents early in the year.

Anderson and Minke (2007) found that parental involvement is defined differently by parents and teachers. Teachers tend to define parental involvement as actual contact, whether it be face-to-face or technology-based, because they are able to acknowledge it. However, parental involvement can also be unknown to teachers, because it takes place in the home. Parents who have difficult work schedules may not seem as involved since they are not able to attend events like back-to-school night, but in reality could be involved with helping students with school work at home.

Parents who actively use the online gradebook to monitor their student's academic progress may not often contact teachers because they feel that they already have all the information that they require. Unfortunately, this lack of communication between parents and teachers may be perceived as a lack of involvement by teachers when the reality is that they are simply unaware of it. The reverse can also be true, where teachers feel that because they are posting their grades online that further communication may not be necessary.

Case Study Discussion

A case study was conducted to compare the difference in parent response to traditional methods of communication and to electronic methods of communication. Participants included parents who have a child in the 9th grade. The researchers sought to determine if electronic communication increases parental involvement and, if so, why. Parents were asked to participate in a survey about their use of a district online gradebook.

A survey was sent to approximately 400 parents of students in the 9th grade of a single suburban high school. There are nearly 1600 students enrolled in the high school with 15.5% of the students enrolled in free or reduced lunch. Parents of students in the 9th

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grade were mailed a survey about their use of the online gradebook system. The primary purpose of the survey was to determine if parents had initiated contact and communicated with a teacher because of information that was posted on the online gradebook. The nature of the survey also allowed a wide range of data to be gathered about related topics, such as how parents choose to communicate with teachers and if parents were aware of all of the features of the online gradebook system.

The responses to the survey were designed to determine if parents know about the online gradebook system and what reasons there may be for parents to not use the system. The remainder of the data collected from the survey allowed the researchers to determine if parent involvement has increased from the online gradebook system.

The researchers mailed 395 surveys and received 89 responses (23%), 48 (54%) from parents or guardians of a male student and 41 (46%) from parents or guardians of a female student. Eighteen (20%) of the responses were from single-parent families, while 71 (80%) of the responses were from double-parent families. This is fairly consistent with the known demographics of the school population. The majority of families, 72 (83%), had been living in the district for four or more years and because the online gradebook system became fully operational three years prior, most respondents would have experienced the school district without this technology for at least one year.

The results of the survey showed that the majority of respondents 70 (85%) use email as their primary form of communication with teachers, with a small percentage still using the telephone, 7 (9%). One of the respondents did comment that he or she preferred to use the telephone but primarily used email at the request of teachers.

An overwhelming number, 87 (98%) of the respondents knew about the online gradebook system. Out of the 87 respondents that were aware of the online gradebook system, 80 (90%) had logged onto the system before. Out of all nine respondents that had not logged on before, 5 (56%) said that they did not feel the need to use the online gradebook system, 2 (22%) did not know how to log onto the system, 1 (11%) did not have a username or password, and 1 (11%) did not have a chance to log on yet. None of the responses stated that they did not have consistent access to the internet.

Parents or guardians who had used the online gradebook system were then asked about the frequency of their use and how their use may have affected their communication with teachers. Sixty-five percent of parents or guardians log into the online gradebook system daily or weekly, out of the 80 that have ever logged in. Table 1 indicates the reported average usage.

 Table 1: Reported Use of Online Gradebook System

Daily	Weekly	Biweekly	Monthly	Rarely
20	32	8	11	9
25%	40%	10%	14%	11%

Parents were asked if a poor grade or a "missing" on an assignment had ever prompted them to contact the teacher. To this question, 58% responded that they had, while 42% responded that they had not. The respondents that reported contacting a teacher about a poor grade were asked about the frequency of contact because of the poor grade. Out of the parents or guardians that had contacted a teacher regarding a poor grade on an assignment, 73% stated that they only contacted the teacher if the student's overall grade was poor, while 13% stated that

they only contacted the teacher if the poor grade was on a major assignment. Finally, 15% stated that they contacted the teacher every time there was a poor grade posted.

Another important feature of the online gradebook system is that parents can sign up for "missing assignment" alerts that automatically send an email to the parent if an assignment is marked missing. Parents were asked if they were aware of this feature and if so, if they used it. Table 2 indicates that the majority of parents were unaware of this feature. Table 3 demonstrates that parents, who are aware of the feature, generally use it.

Table 2: Are Parents or Guardians Aware of the Missing Assignment Alert?

Yes	No
30	52
37%	63%

Table 3: Do Parents or Guardians Use the Missing Assignment Alert Feature?

Yes	No
22	7
76%	24%

Comparing the data by gender, the researchers can make comparisons in the use of the online gradebook and subsequent contact with teachers. Figure 1 shows that parents or guardians of male students were more likely to check the online gradebook system more frequently with 69% responding that they checked at least weekly, while only 60% of parents or guardians of female students did so.

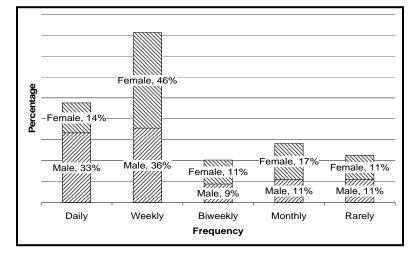


Figure 1: Comparing frequency of gradebook use by parents and guardians based on gender of student

This trend continued as parents or guardians were asked if they contacted teachers about grades posted online. About half of parents or guardians of female students had contacted a teacher, while 65% of parents or guardians of male students had. Figure 2 shows that parents or guardians with a male student were more likely to contact the teacher about a poor grade.

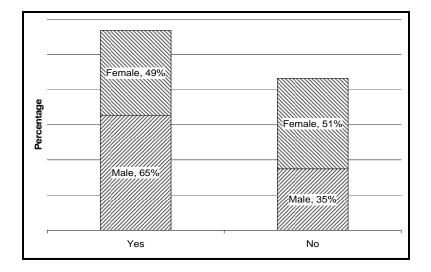
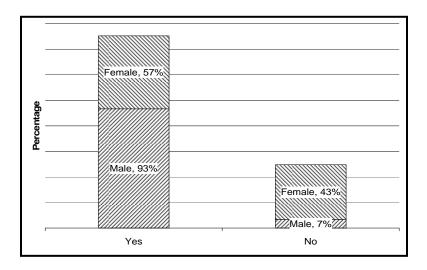
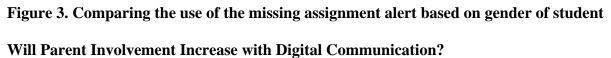


Figure 2. Comparing parent or guardian contact based on gender of student

Finally, Figure 3 shows that out of parents or guardians that know about the "missing assignment" alert, 93% of parents or guardians of male students used the feature, while only 57% of parents or guardians of female students did. This clearly shows a trend of parental involvement based on the gender of the student. Further study is warranted in this area.





If parents are aware of and use the online gradebook system, they have increased involvement in their children's learning immediately. Logging into the system affords parents an opportunity to access grades that were previously only available four times a year with a report card. Sixty-five percent of parents who use the online gradebook system log on daily or weekly. With about 40-weeks in an average school year, this effectively increases the frequency of grade access ten-fold. Even if parents do not use this information to contact a teacher, simply knowing information about their children's grades allows more active involvement in the students' academics. Thompson (2008) also found that the fact that students know that their parents have easy access to their grades,

whether it be through an online gradebook system or emails between parents and teachers, can drastically improve their effort in school.

Online gradebooks also allow for better understanding of how an overall grade is earned over the course of a marking period or entire school year. Traditional report cards only show final averages, but they do not show specific strengths and weaknesses of a student. A student earning a C in a class could be a student that does well on quizzes and tests in class but does not complete any work outside or school. Likewise, a student could do poorly on quizzes and tests, but earn a C from other work for the class. Both of these students would need to focus on vastly different skills to improve their grades, but with only a letter grade, a parent or student would not be able to determine what needs to be done. While this is not guaranteed, a parent who has access to this information could be more likely to start a conversation with his or her child about academics.

The online gradebook system also has a feature that automatically sends an email notification to parents when an assignment is marked as missing by a teacher. Simply using this feature shows an increase in parent involvement because it automatically reaches out to the parent. A surprisingly large percentage, 63% of parents or guardians, are not aware of the "missing assignment" alert feature, but out of the parents or guardians who are aware of it, 76%, use the feature. This leads the researchers to believe that if parents were aware of the "missing assignment" alert feature, most would use it. **Will Digital Communication Such as an Online Gradebook Prompt Parents to Initiate**

Communication with Teachers?

The researchers found that 58% of parents who use the online gradebook system have contacted a teacher because of a grade that was posted. This shows that if parents are given access to the information, many of them will use it to initiate contact with a teacher. Benoit (2008) found similar information in her study where parents who were sent progress reports felt more involved with their child's academics and would, therefore, be more likely to initiate and continue conversations with teachers.

Of the parents who had contacted a teacher because of a grade that was posted, 15% of these parents contacted the teacher every time a poor grade was posted and 13% contacted the teacher if the poor grade was a major assignment, showing a definite increase in parent-teacher communication. Even the remaining 73% who only contacted a teacher if an overall grade was poor communicated with teachers more often than they would have if this information had not been available. Thompson (2008) found that grades were the most common reason that parents emailed a teacher. This correlates to the information collected by the researchers; parents were prompted to contact a teacher because of the information they were able to find through the online gradebook system.

Thompson (2008) also found that parents tended to initiate communication with teachers because they were responsible for fewer children. Though they recognized that it was unreasonable for a teacher to contact every parent for every poor or missing assignment, they did wish that teachers would initiate contact more often. Similarly, the researcher found that the online gradebook allows for that information to be available to a parent, essentially initiating a conversation.

Which Form of Communication is Most Preferred by Parents?

An overwhelming 85% of parents responded that email is the most common method of communication used to contact teachers. With free and easily available email services, this is not a surprise, especially because teachers are provided with an email address through the school district. This allows for both parents and teachers to communicate at any time of day without teachers having to give a personal phone number to students or parents.

Many parents may use email primarily because they prefer it, but the researchers found that several parents specified on the survey that they preferred a telephone call, but they used email because it was the teacher's preference. Furthermore, teachers may not have explicitly stated that email was preferred, but parents found a better and faster response to an email because each party could respond when they had the time. Also, if a parent was already online to check the grades, then it would be easier to simply email the teacher than to find the telephone extension and leave a message. This coincides with the study conducted by Rogers and Wright (2008). They found that nearly all teachers preferred email, while most parents preferred more traditional methods of communication because they seemed to be more personal.

Are Parents Aware of the Online Gradebook System and if so, What Other Factors Might Deter Them from Using It?

Ninety-eight percent of parents who responded to the survey were aware of the online gradebook system, which was expected as the online gradebook has been in use for two school years. But out of that 98%, 8% had never logged into the system. The most common reason for not using the online gradebook system was that parents did not feel the need to use it because they trusted their child and felt that it was their child's

responsibility to keep track of his or her grades. One participant even stated that "If I am always checking up to see if my child did his/her work, he/she won't learn responsibility or consequence." Thompson (2008) found that while most students had a negative view of communication between parents and teachers, the ones who had a positive response often did because it passed the burden of responsibility to the parent.

The second most common response was that the parent did not know how to log onto the system or did not have a username or password. This shows a breakdown in the communication process from the school to the home. While it is possible that the school inadvertently missed these particular families when sending home information, it is more likely that the information was somehow lost, intercepted, or misunderstood by the parent.

Finally, no parents responded that they did not have consistent access to internet. While this does not mean that every family has consistent access to the internet in the entire school district, it is safe to assume the responses to the survey are a representation of the district and that the percentage of families without internet is relatively low. This is in contrast to what Rogers and Wright (2008) found in their study. They found that parents were not using technology based methods of communication because they did not have access to the internet. This can be explained by the difference in socio-economic status of the families surveyed for each study.

Summary

The purpose of this study was to determine the effects of the online gradebook system on communication between parents or guardians and teachers. The inherent nature of the online gradebook system leads itself to opening conversations within the family about academics and has been shown to extend that conversation to the school as

well. While some parents still elect to not use the technology that is being offered to them, the parents who do have increased communication with teachers and have also become more involved in their child's education. Not all parents are aware of all of the features of the online gradebook system such as the "missing assignment" alert, but most who do know about it use it.

After completing the study, the researchers propose the following

recommendations:

For Administrators

- Provide more professional development throughout the entire year when implementing new technology so teachers have an opportunity to learn how to use the system over time
- Provide parents with workshops to assist them in using the online gradebook system and the features it offers.
- Create school-wide standards for grade and assignment posting and using the online gradebook to create uniformity and common expectation.

For Teachers

- Use the online gradebook consistently and communicate habits to parents such as always updating the grades at certain time intervals.
- Do not replace effective communication with the online gradebook; rather, use it to enhance communication.
- Encourage parents and students to check the online gradebook frequently by providing incentives such as extra credit.

 Update the online gradebook to reflect present and future assignments, not just graded assignments, so it can be used to plan ahead.

If parents simply log into the online gradebook system, then they have already increased their involvement in their child's learning. Having the information readily available is the first motivator to opening discussion both at home and school. The researchers found that more than half of the parents, if given access to academic information, will initiate communication with a teacher, though the amount of communication varied quite a bit. Similar to the information found in previous studies, parents preferred online communication for straightforward information, such as grades but continued to prefer more personal methods of communication for sensitive issues, such as behavior or learning issues.

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Multiple Literacies in the Technical Editing Classroom: An Approach to

Teaching Copyediting

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Technical editors negotiate intensely complex rhetorical situations on a daily basis. Not only must they edit documents on behalf of multiple stakeholders (readers, users, authors, supervisors, and organizations), they often must design their responses to specific texts with multiple audiences in mind—some of whom are also stakeholders (authors, supervisors, and compositors, for example). Given this, and because what is at stake in technical documents can be substantial, technical editors need a range of functional, critical, and rhetorical skills if they are going to navigate their complex rhetorical situations confidently and effectively. Money, employer credibility, or someone's life could be at stake if an editor fails to catch an error. A drug recipe could be communicated incorrectly, a contract could be missing a comma that clarifies a monetary commitment, or a key image could be missing from a manual designed to help an engineer on a submarine fix a problem while submerged. Though it has not received a great deal of direct attention in editing literature in recent years, the claim that rhetorical contexts are vital to effective editing is nothing new. Originally published in Technical Communication in 1980 and republished in 2003, Mary Fran Buehler's article, "Situational Editing: A Rhetorical Approach for the Technical Editor," asserts that "the editor faces a set of unique rhetorical situations because [s/he]—unlike the author—is squarely in the middle of each situation" (Buehler 462). Because of this, Buehler advocates for a rhetorical approach to technical editing that is "based on a situational approach to an individual task" (Buehler 458). Buehler cites Lola Zook's 1976 article,

"Training the Editor: Skills Are Not Enough," as strongly influencing her theory and her emphasis on a "situational approach" (Buehler 459).

More recently, Lori Allen and Dan Voss proposed that the complex rhetorical positions that technical editors often find themselves in require they are prepared to negotiate "multiple loyalties" (Zook 58) in order to make ethical judgments. The authors explain that, because editors are often situated among the varied interests of stakeholders—all of whom they are expected to advocate for to some extent—their subject positions are uniquely challenging and complex. Allen and Voss propose instructors address this challenge with students by teaching them how to use a "Value Analysis Process," which is designed to help them sort out ethical "twists and turns" (Buehler 60). Having access to such a flexible, adaptable process is vital for technical editors who, Allen and Voss note, "bear a commensurably greater responsibility to use language skills carefully. Unusual capability carries with it higher responsibility" (Allen 64).

The complex rhetorical position of technical editors acknowledged by these approaches is also one of the most compelling arguments for a pedagogical approach to technical editing courses that support the development of multiple literacies in our students. As Stuart Selber and others have argued with regard to the relationship between technology and literacy, technical editing instructors can best serve students by developing pedagogical approaches that help them develop a range of functional, critical, and rhetorical literacies. Indeed, because most technical editing courses that are

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taught as a part of humanities-based professional writing (PW) curricula are filled with students who have had a good bit of exposure to critical analysis and rhetorical processes in the writing courses they have taken—and so already have some of the skills necessary for such an approach—adopting a pedagogical approach to teaching editing that puts greater emphasis on developing the multiple literacies required to effectively navigate complex rhetorical contexts can be seen a logical extension of what most of us are already doing in our PW courses.

Certainly, many of us teaching technical editing likely do already have students work to develop their critical and rhetorical abilities as well as learn the functional skills required of professionals editing technical documents. To some extent, Carolyn Rude's widely-adopted *Technical Editing* textbook, now in its fifth edition, encourages students to think about their professional relationship to authors and readers and includes many "Discussion and Application" questions at the ends of chapters that ask students to practice, reflect on, and discuss all of the editing skills covered. The purpose of this article is to build on this: to advocate for a more explicit focus on developing multiple literacies when teaching hardcopy marking. I will, therefore, explain how I have accomplished this with some success in the on-site versions of the technical editing courses I teach and, though a good bit more challenging, in the 100% online version. In so doing, I hope to show how teaching copy marking can serve as a solid foundation for helping students to develop their functional, critical, and rhetorical skills in other areas of the course.

The Technical Editing Classes I Teach and the Students Who Take Them

The technical editing courses I teach at my home institution fulfill requirements for our graduate and undergraduate Professional Writing and Editing (PWE) programs. Students just starting these courses most often report on the first day of class that grammar/mechanics/punctuation review, copyediting, and copy marks are the aspects of the course they are most excited to learn and/or expect to leave the course having mastered. Indeed, I find that students in both the on-site and 100% online technical editing courses I teach begin the term with an unmatched (compared to other PWE courses I have taught) energy for learning in the course, in very large part, because of this excitement they have for learning what they think of as a functional, reproducible skill: how to copyedit and, therefore, how to "correct" texts. More specifically—and not insignificantly—most students are excited to learn this skill because they believe it will help them improve their own writing, making them more successful both during school and once they leave and become working professionals, no matter what their profession. According to them, their initial enthusiasm for the course can also be traced to the fact that many are English majors and, as such, feel that they rarely get to take courses for which there are clear "right" and "wrong" answers. Quite simply, when I ask them about their expectations for the course at the beginning of each term, my students most often report that they expect to learn "how to" correct grammar and punctuation mistakes; they never even imply that developing their critical thinking skills and

negotiating complex rhetorical contexts is something they expect to or want to take away from the class.

Because I so appreciate the enthusiasm that students bring to the course, one of my top priorities each term is to help them channel some of that enthusiasm towards developing critical and rhetorical perspectives on editing—to help them become as enthusiastic about that as they are about getting a refresher course in how to use a comma or semi-colon appropriately and help them see why it is important for them to think of editing as more than a neutral mechanical process, devoid of values and assumptions. Helping my editing students appreciate the fact that editors don't just correct but *participate in* professional discourse begins, in my courses, with copy marking. If I can get them to realize the complexities of copy marking as a form of communication—a skill, as Douglass Nobel wrote in the mid 1980s of computer literacy, that is not just "something to learn" but "something to think about" (Noble 610)—I can engage them in a way that provides them with a strong foundation for such interaction in the rest of the course.

My Basic Approach

I teach three distinct versions of "Technical Editing" at my home institution: undergraduate on-site for PWE minors and concentrators; graduate on-site for MA PWE students, as well as students working towards MFAs and MAs/PhDs in Literature; and undergraduate online (also with some PWE minors and concentrators, though usually non-traditional undergraduate students who are older and working full-time). Teaching copy marking as a form of communication that requires students to develop their critical and rhetorical as well as functional literacies presents a different set of challenges and opportunities in each of the courses. I have, in both the graduate and undergraduate courses (both on-site and online), had students read some or all of Martha Kolln's Rhetorical Grammar: Grammatical Choices, Rhetorical Effects to give them a sturdy review of grammar and mechanics and to help them see that the choices we make at the sentence level are, in effect, rhetorical choices. In the undergraduate and graduate on-site versions, I start specific class sessions dedicated to copyediting with the proposition that they think of copy marks as a language and approach their process of learning and articulating the marks as thoughtfully as they might were they writing in any other new professional genre. I remind them that their ability to do this will require a great deal of work mastering the new (to them) vocabulary of copy marks, as well as an attention to how their marks will be seen by their audiences: as suggestions? obligating? To better prepare students for this discussion, I will either talk to them about or (with graduate students, for example) have them read relevant articles like Eaton, et. all's article, "Examining Editing in the Workplace from the Author's Point of View: Results of an Online Survey" in which they test some working hypotheses and report what authors find "obligating," etc. I try to help them see that issues of articulation (how and what to say/mark) and confidence (whether or not to speak up/mark) that may have come up for them in language classes they have taken in past may play out similarly in their learning process with copy marks as well—that it is very

common and something we will work through together. I also tell them that, as a part of this process, because copy marking is a form of communication, I will ask them to reflect on and discuss not only *what* they choose to respond to (what they have decided was an error, weakness, or inconsistency in the text) but, as carefully, *how and why* they articulate their responses as they do.

To this end, we spend a good bit of class time discussing their answers to questions about different in- and out-of-class low-stakes editing practice—with me in one-on-one conferences and with each other in pairs, small groups, and as a class. The first set of questions I list below are some of those I introduce and were designed to give them lots of practice thinking about and explaining their choices and to build a foundation for critical reflection on other parts of the editing process. Often, when they are first learning which marks to use, they will ask me questions about possible inconsistencies in what they have read in the textbook or heard/seen in class. Many of the questions below build logically on the questions they bring to me, and so often my job is simply to extend the conversation they have already begun in productive ways.

The following questions were designed, therefore, to help them see editing as something worth thinking *about* and discussing in ways that they are already prone to thinking about writing, ways that they have been encouraged to do so in their other PWE courses:

- What mark or combination of marks should they choose to use and why?
- Will their articulation speak loudly, softly?
- Will it appear vague or strong?

- What will their choice and style of articulation suggest about them as professionals? That they are confident? bold? professional? knowledgeable? detail-oriented?
- Will their marks appear to mumble on the page, perhaps revealing a lack of confidence to *their* reader(s)—the author or compositor?
- Will their choice of marks appear over-indulgent, arrogant, and demonstrate a desire to intervene excessively in the style or content of the writing?
- Or, will it appear to be supportive and helpful?
- How might their reader(s) response to what and how they mark affect their working relationship with them and their ability to edit effectively in future?
- To what extent can the choices they make support or undermine their ability to achieve the professional identity and be the kind of editor they strive to be?

Once students have had the opportunity to practice and develop a degree of confidence

in their ability both to copyedit and reflect on some of the choices they have made as

copyeditors, I introduce more questions that ask them to confront *why* they articulated

the response to the text as they did and how those choices might affect their

communication with their, perhaps, multiple audience(s). To better prepare them for

this line of questioning, in addition to what they will have read in their textbook (Rude),

I might also have them read or discuss with them Mackiewicz and Riley's "The

Technical Editor as Diplomat: Linguistic Strategies for Balancing Clarity and Politeness."

With the following set of questions, then, I hope to engage students in a discussion of

copyediting that asks them to think critically and rhetorically about their process and

the larger professional context for their editing:

- What was the decision-making process that led to your specific response to the text?
- What assumptions did you make/need to make in order to respond as you did?
- What values are implicit in your marks? That either grammar, style, content, accuracy is most important?

- In what ways do your responses participate in or challenge the prevailing discourse about the copyediting process (seen so far in the textbook and, for graduate students, in a range of academic articles)?
- What does the prevailing discourse say about editing as a profession? Its values and assumptions?
- What does your participation in or challenges to this dominant discourse say about you as an editor?
- Are there decisions you might make differently as a result of greater awareness of your process?

These are, essentially, questions of agency—questions about the power and choice that copyeditors have—and students often find them to be much harder to answer than the first set I list above. Because I know this going in, we always start with low-stakes, nongraded assignments for which they simply have to identify and mark differences in two texts and move, over the course of the term, to progressively more complex and higherstakes assignments requiring much more complicated and involved recommendations about style and content. I am also a proponent of collaborative editing as practice for students at every level since editing collaboratively requires that they negotiate, explain, and defend each of the choices they make. To give them ample opportunity for practice, then, students mark collaboratively and individually, and they practice oral, hardcopy, and electronic communication with writers and editors from a range of subject positions: those of both writers and editors.

Though the process of reflection and discussion is not necessarily a linear one (we return to questions in both lists frequently as is relevant), I do find it important to start with the questions that ask them to reflect on their own choices and work our way out to questions (like the second set I list) that ask them to connect those decisions to professional contexts. This is a lot to negotiate, a good bit more than most of the students expect when they begin the class thinking they would primarily learn to write and edit for more grammatically correct sentences. However, because, as I note, many of them are taking the editing course I teach as a part of one of our Professional Writing and Editing (PWE) degree programs, it takes very little prodding for them to see how this kind of discussion relates to what they are discussing in their other PWE other classes and the multiple literacies they are working to develop in those courses.

Teaching Copyediting Online

Though I have a great deal of experience with online course design and instruction, I have found that the great attention to copy marking articulation and rationale that I describe is relatively easy to communicate and reinforce in an on-site course is much more challenging to negotiate online. Before I discuss these challenges, let me note that—by virtue of the fact that it is 100% online—there are many ways that the online technical editing course prepares students for the challenges of editing electronically and communicating with writers at a distance in ways that simply can not be matched by the on-site versions of the course. Because students in our online sections rarely meet me or each other face-to-face, they must find a way to communicate through writing virtually everything they want me and others understand about their ideas. Each iteration of the online editing course has required that students work on editing skills that can be practiced just as easily online, to even greater effect in some cases, than can be in an on-site:

- Electronic editing and commenting,
- Developmental editing,
- Writing letters of transmittal, and
- Developing schedules for submission and feedback.

In the face-to-face technical editing courses, however, other skills are much easier to teach. Because the real-time conversation available has the benefits of spontaneity and flexibility, I can redirect our discussion from large to small group to one-on-one on the fly if I think it will benefit their progress on any given day and, similarly, students can ask for adjustments to the format for discussion if they think it is necessary (for example, asking for one-on-one help from me or another student in the middle of a small or whole class group discussion period). Somewhat ironically, then—since efficiency and flexibility are often thought of as the primary benefits of online courses—for this type of discussion, the on-site class is much more efficient and flexible than the online class.

However, I am as committed to teaching the hardcopy marking online in a way that will help students develop multiple literacies as I am on-site. The online version of the course has been offered for five years, and until fairly recently, I had struggled with the lack of flexibility and spontaneity that are so readily available in the on-site sections. I was also frustrated, for example, that I couldn't introduce them to the copy marks live—drawing them in their presence and talking about each one (acceptable variations in marks, the logic behind the design of the marks, etc.). On a purely technical/functional level, I couldn't as easily tell them what to watch out for and why: "Be careful not to cross through a letter when using the transpose mark—such a mark could be confusing for the author/compositor; make sure the ends of each transpose mark clearly extend between the letter or words meant to be transposed. Make sure to articulate your mark for deletion confidently; don't hide it so that the writer or compositor can barely see it above the lettering." These are small points to make, for sure, but they can be important for many students because they can help reinforce the ways that editing is a form of communication and they can, therefore, serve as the foundation of the process of engaging students in a discussion of critical and rhetorical editing issues and contexts.

Early incarnations of the online editing course had students practice copyediting in low-stakes assignments on their own, posting questions as they had them, responding to questions I posed for each, and getting feedback from both me and their peers asynchronously about how and why certain marks should be articulated. Because I try to be sensitive to the scheduling challenges synchronous discussion can pose to the non-traditional students in the course, this process had to take place asynchronously for the most part and was moderately productive as such—but incredibly timeconsuming and inefficient. In practice, we simply couldn't have nearly the extensive conversation and debate that was possible in the synchronous on-site versions of the course. Further, because I couldn't provide students with enough low-stakes practice opportunities for which they could get some immediate feedback as they do in an onsite class, our very active asynchronous discussion was primarily dedicated to this basic feedback and left very little time for extended critical and rhetorical debate. Because of how long it can take to have a discussion asynchronously, we were limited to more straight-forward, functional kinds of exchanges about a "right" way to copy mark and didn't have the luxury of exploring variations and grey areas as much. Moreover, graded assignments in the first version of the online course asked students to print .pdf documents, mark them with a green pen, and send them to me via postal service. For basic, rudimentary assessment purposes—so that I could make sure errors were identified and appropriate marks made and so students could get feedback before completing their next project—this worked fine for many. But some of our students were taking the course from as far away as China, France, and Iraq. Such students could not possibly get my feedback in time to learn much from it and ask many questions before the next assignment was due (usually two weeks later, as long an interval as possible) if I continued to use the postal service for these assignments.

Three New Course Elements Designed to Teach Copy Marking 100% Online

To redress these challenges, I worked with computer science graduate students through the Instructional Technology Resource Center at my home institution to create three new course elements. I came up with the design concepts, and together we worked to revise those concepts to work with what they understood to be possible technically. They then did all of the coding and technical design in regular consultation with me as each new element progressed.

These resulting course elements are just a start, really, but they have effectively introduced more useful low-stakes opportunities for the online editing students. These

elements allow students to practice and get immediate feedback about their copyediting skills and to be confronted with an editing environment that more effectively challenges and destabilizes their functional literacy. The new elements often lead more quickly to terrific conversation and debate that more efficiently raises and addresses many of the critical questions I cite earlier about how and why copy marks are articulated in different ways.

Element #1: Captivate Demonstrations with Voice-Overs

The first new course element (shown in Figure A) is a Captivate demonstration which shows my copy marks as they are made on the page and plays my voiceovers explaining anything I consider important for them to note about the marks. Students can stop, rewind, and replay the demo, and they have access to a .pdf of the "final" copyediting document.

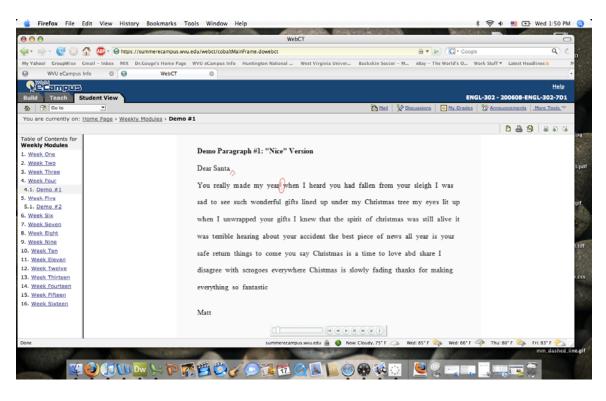


Figure A

Early in the term, students are asked to view these demos and post comments and questions about the articulation of the marks to the dedicated discussion board thread designated for this purpose. In the three online sections I have taught that include this element, left to choose the focus of their responses/questions, students tend to concentrate their comments on the way the marks are made and how it is different in any way from what their textbook suggests. For example, as you can see in Figure A, I have drawn an oval around the exclamation point inserted in the text. While voiceovers were not set up to comment on this, their textbook does not tell them to surround the mark with an oval. To push students to engage critically with the marks in the demo, I take advantage of this as jumping off point for a discussion of the effects of drawing an oval around the mark (emphasizing it, drawing greater attention to it on the page) vs. not drawing an oval around the mark. This simple apparent "digression" often leads, productively, to conversations among students about the roles, responsibilities, and expectations of the copyeditor, compositor, and proofreader (if the mark was not circled in some way and, perhaps as a result, remains uncorrected in the final document, has anyone "failed"? And, if so, who and why?).

Such micro-debates can be very productive for student learning because they introduce students to the important relationship between functional and critical literacy in technical editing and give them the opportunity to practice the rhetorical skills necessary to engage in such a critical examination (persuasion, reflection, and deliberation—to name a few that Stuart Selber cites (Selber 217) as likely familiar to student writers and, therefore, appropriate starting points for developing their rhetorical literacy).

Element #2: Self-Evaluating Practice Exercises in Flash

The second set of new course elements include self-evaluating, multiple choice copyediting exercises (Figures B and C). To complete the exercises, students identify and roll over errors in the text with a mouse. When they correctly identify an error in this way, they are given three options for marking the text and must choose the "most appropriate" correction. If they correctly choose, they see a green "Correct" response and the correct copy mark is incorporated into the text (Figure C).

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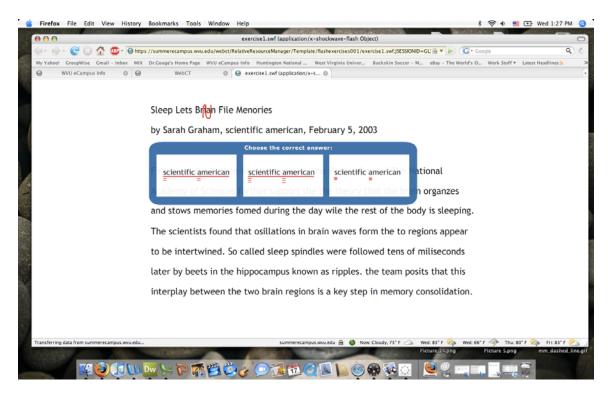
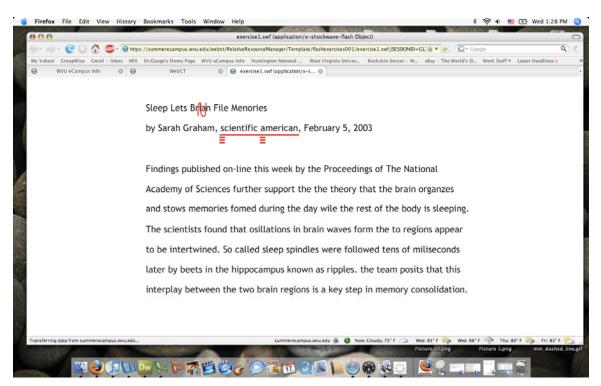


Figure B

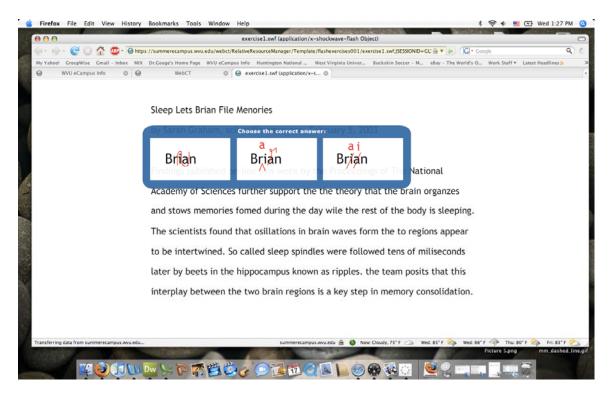




If they choose either of the two options I have designated as incorrect, students immediately get a red "Incorrect" response from the software and, unfortunately, due to a limitation in the design of the program, they are unable to go back to the error to answer a second time (which would be my preference).

The concept behind this set of interactive elements is to give students an opportunity to interact with a text in need of basic copyediting in a very low-stakes way. Of course, no one wants to see a red "Incorrect" response when interacting with software, so there is certainly something at stake here, even if it is not a course grade. Even so, this exercise has proven to be quite productive in many ways for students: It gives them the opportunity to identify errors and "mark" a text correctly without having to physically make the mark (a challenge for some). And perhaps because of the options students are given, it forces students to make a choice between what appear to be more than one correct response. For example, to correct the first error in the text ("Brian" should be "Brain"), students are given two essentially "correct" options, but I have intentionally made only one the answer for which they will get a green "Correct" response from the exercises (Figure D). And I tell students this up front—though I find it doesn't seem to register with many of them until they have had the experience of completing one of the exercises.

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This may seem like a cruel trick, but it isn't intended as such. It is intended to force students to be thoughtful about their choices beyond an easy correct/incorrect binary. It is designed to reinforce the notion that copy marking is a rhetorical act, which requires that they make a choice. Making one response officially "Correct" and the other "Incorrect" destabilizes students' sense of the clear right/wrong distinction and often sends them to the discussion board to sort out why one answer that "should" correct the text in the "right" is apparently "Incorrect." While it is somewhat uncomfortable for some students, as with most discussion on the class bulletin board, I try to stay out of the conversation initially and let students have their say and build off/respond to each other. My hope is that giving them time to negotiate the discrepancy without my intervention gives them a greater opportunity for discovery than my virtually hovering and trying to alleviate their concerns immediately.

In this instance, what I find is that students end up debating the three apparently correct responses to the Brian/Brain correction. The first option indicates that the compositor should switch the ordering of the letters—perhaps resulting in the deletion of only one letter (most likely the "i") and the insertion of it in the opposite position. The second asks the compositor to insert an "a" before the "i" and then delete the "a." The third marks the text by requesting the compositor responding to the direction of the copyeditor delete the "i" and replace it with an "a" and then delete the "a" and replace each with an "i." To many people—editors and students, alike—these distinctions might seem to be not worth making, but the effect of the discussion about them can be quite valuable for student learning. Often without any or much prodding, students will wrack their brains trying to come up with reasons why one is more appropriate than the other two. Usually, someone will reassure a couple of irritated students, who have decided that either the book or the software is wrong (and, either way, an injustice has occurred), that all of the choices are correct and suggest that maybe the reason that choosing the other one results in an "Incorrect" response is that the apparently "correct" mark is more appropriate given the nature of the error (transposition) and the difference in what the two choices ask the compositor to do: the number of operations the compositor is asked to perform to follow the editor's

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direction and, therefore, the number of opportunities for introducing another typographical error.

When I sense that student discussion has run its course in terms of the time available for the discussion or the lack of new content being introduced by students, I usually enter the discussion to emphasize further the conclusions that may or may not have arrived at on their own: that, as I told them before they tried the exercise, there can be more than one response that would result in correcting the text but that only one response, one that is arguably "most appropriate" will be considered "Correct" by the exercise. What I encourage them to do at this point, if they haven't already, is consider what makes one response "more appropriate" and beyond that, what they think *should* make one mark more or less appropriate. This can lead to what is essentially a question of the boundaries of their professional identities as editors: What are the criteria that should be used to judge the appropriate behavior of the copyeditor? What is at stake? What effect do the choices they make have on their professional identity?

Element #3: Flash-Coded Copyediting Assignments

The third set of new elements are assessments that allow students to digitally mark a text by manipulating the cursor/digital pencil with heir mouse or touch pad just as they would paper copy with a pen or pencil (Figure E). Students can submit the work simply by clicking the "Submit" button at the bottom of the page. I can open the image file sent to me, add marks via any draw program, and send it back to the student. I had hoped that, at the very least, this would make the submission and return time

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faster and allow students at a distance to receive their evaluated work in time to learn from it and post questions as they prepare their next assignment. The pilot of this course element was, however, essentially unsuccessful. The dexterity required to draw the marks on the screen was unreasonably challenging for some students and the faster submission process was undermined by an error in the path, which resulted in many students not being able to submit their work successfully.

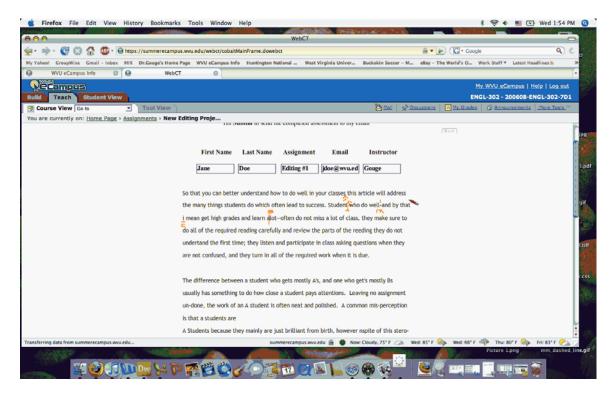


Figure E

Ideally, however, this element could be used to do more than speed up the submission/return process. When we are able to get it working more smoothly, I will likely use it to increase the number of submissions slightly, giving students a couple more opportunities for practice and personalized feedback from me. It could also be used to give students a way to share their edits with other students and discuss their choices as they do in the on-site course. Some day, to provide students with a unique opportunity to pratice their rhetorical and presentational skills, I would like for them to be able to experiment with using these Flash-coded documents to create simple Captivate demos of their marking processes and create voiceovers that go with their movies.

While one can come up with creative ways of using word processing programs to have students place or overlay copymarking symbols drawn in a simple paint or draw program and saved as small image files onto a text file, there are no commercial products I know of that approximate the first two of the elements I discuss here. WebMarker¹ is an application that allows for something very similar to the third, however. It allows users not only to highlight and save .html text, but a version embedded in the "educational management product" (e-portfolio platform), called TaskStream, that is excellent for the purposes of a technical editing class. This product allows for each digital marking of documents as if one were using a red pen on a hardcopy of a document. The program also allows users more control over adding boxed or circled comments than Word's comment function. Unfortunately, the product is only available through TaskStream, but one like it that could work independently would certainly be valuable for teaching hardcopy marking 100% electronically and would address the timing issues for students taking the course at such a distance as to make snail mail an obstacle to the instructor feedback being formative in their learning.

¹ (<u>http://www.taskstream.com/pub/InstitutionalServices.asp</u>)

Conclusion

As Stuart Selber explains, the challenges for instructors attempting to facilitate the development of multiple literacies in their students are not insignificant and include helping students to learn the specific skills relevant to the course, "discovering a framework that cultivates students as questioners" (Rude 95), and encouraging students to become reflective practitioners. Course surveys and anecdotal evidence suggest that students appreciate and are motivated by the approaches to teaching copyediting that I describe in this tutorial. And I have found that the greater and more explicit emphasis I place on the critical reflection and rhetorical praxis from the start of the course, the more prepared students are to do the hard work of negotiating complex rhetorical contexts later in the term when we work on developmental and comprehensive editing. As a result of approaching the material in this way, my students routinely debate what can and should constitute the "appropriate behavior" of the copyeditor and see this kind of debate as vital to their learning to be more successful professionals. Most accept the premise that copy marks constitute a new language and professional genre for them to negotiate, as such, should be subject to the same reflection as the other professional writing they study and produce. With such an appreciation of the complex rhetorical position of the editor, students in the technical editing courses I teach seem, at the end of the course, much more aware that there are many choices they will need to make as editors and many reasons to be thoughtful about those choices.

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Electronic Storybooks: A Constructivist Approach to Reading Motivation

in Primary-Grade Students

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Abstract

This study stemmed from a concern of the perceived decline in students' reading motivation after the early years of schooling. This decline has been attributed to the disconnect between the media students are accustomed to using outside the classroom and the media they predominantly use within the classroom. This research investigated the effectiveness of online eBooks and multimedia-based, post-reading activities on eight grade 1 students' reading motivation, word recognition, and reading comprehension abilities. Eight students were given ten 25-minute sessions with the software programs over 15 weeks. Preprogram, interim-program, and postprogram qualitative and quantitative data were collected from students, teachers, and parents through questionnaires, interviews, standardized reading assessment tools, classroom observations, field notes, and student behaviour observation checklists. The results suggest the promise of multimedia and Internetbased reading software programs in supporting students with reading and/or behavioural difficulties.

Learning to read proficiently in the primary grades is one of the cornerstones of academic achievement and the foundation for children's later success in school. Much of the research on young children's reading has focused on cognitive aspects such as word recognition and comprehension skills (Guthrie & Wigfield, 2000). Yet, because reading is such an effortful activity, motivation is a factor in whether children choose to devote their energy to such a task (Deci & Ryan, 1985). Motivation to read is both the essential element for actively engaging young children in the reading process and a strong predictor of later reading skills (Scarborough & Dobrich, 1994), and goes beyond time spent reading. Rather, it is reflected in how children think about themselves as readers and how they think about the act of reading and associated language-based activities (Deci & Ryan, 1985). As Stanovich (1986) noted, it may be that motivation is what mediates the Matthew Effect. The Matthew Effect refers to the effect by which, over time, good readers get better and poor readers remain weak (Stanovich, 1986). This cycle of poor readers enduring as poor readers throughout their lifetimes may begin as early as first grade (Stanovich, 1986). Increasing reading competence is motivating for students, and increasing motivation leads to more engaged reading time (Guthrie & Wigfield, 2000). For students who don't master reading skills early in their school years, reading may become a painful experience (Wigfield & Guthrie, 1997). As a result, they may decline opportunities for practice, putting themselves even further behind successful, motivated readers who may be independently reading as much as three times the amount of text as poor, unmotivated readers (Wigfield & Guthrie, 1997).

A major step in preventing early reading difficulties and reducing this gap, then, is to ensure that early reading interventions that emphasize one of the three main goals for reading instruction, namely, motivation for reading (Ministry of Education of Ontario, 2003). Given the powerful and pervasive influence of the Internet on today's youth, it is not surprising that such online technologies have been touted as effective in increasing academic performance (Shade, 2002). Specifically, a growing body of work on early reading programs demonstrates that the use of reading technologies, such as online children's storybooks (eBooks), can promote children's language and literacy skills in terms of phonological awareness, word recognition, and fluency (Blok, Oostdam, Otter, & Overmaat, 2002; Castek, Bevans-Mangelson, & Goldstone, 2006; Korat & Shamir, 2006; Lefever-Davis & Pearman, 2005; Plowman & Stephen, 2003; Valmont, 2000; Van Kleeck, 2003; Wepner & Ray, 2000). Although there is evidence to suggest that the features embedded within electronic storybooks contribute to children's early reading development, further research documenting students' experiences with, attitudes toward, and their motivation for reading these digital texts in the early primary grades are warranted. The purpose of this qualitative study, then, is to explore eight primary-grade students' experiences with online reading. Specifically, the present study investigates: What are eight grade 1 students' experiences with reading, in general, and more specifically, with online eBook reading?

Theoretical Framework

The following discussion presents two theoretical models that were relevant to the framework of this qualitative study; namely, the theoretical perspectives of constructivism

(Dewey; 1916; Piaget, 1973) and motivation (Ames, 1992; Deci & Ryan, 1985; Dweck & Elliot, 1983; Ryan & Deci, 2000).

Constructivism learning theory is defined as the learner's active construction of new knowledge based on his or her prior knowledge and experiences (Dewey, 1916; Kroll, 2004; Piaget, 1973). The conceptualization of the child as passively responding to his or her environment and learning directly through internalization knowledge given by others is rejected by constructivists such as Piaget (1973). Rather, children are seen as inherently active, self-regulating learners who construct knowledge in response to interactions with environmental stimuli; understanding, therefore, is built up step by step through active participation and involvement (Bruner, 1960; Kroll, 2004; Piaget, 1973). Within Bruner's (1960), Piaget's (1973), and Dewey's (1916) constructivist theories, the basis of learning is child-determined exploration and guided discovery rather than direct teaching: "To understand is to discover, or reconstruct by re-discovery, and such conditions must be complied with- if in the future- individuals are to be formed who are capable of production and creativity, and not simply repetition" (Piaget, 1973, p. 66).

Constructivism provides a theoretical approach to the use of online resources such as eBooks for teaching reading in primary-grade classrooms, and as such, deserves careful consideration. As abovementioned, constructivism challenges the approach of traditional instructional design. Fundamental shifts in the role of teacher (from a "sage" to a "guide") are needed in order to benefit from the interactive nature of the technology and its capacity to enable learner-centered exploration and discovery (Koc, 2005). Constructivist theory also

emphasizes that learning should be authentic, and that learning needs to meet real-life experiences. Thus, the belief for educators in teaching is that reading instruction should be grounded in contexts that are familiar to students. Students are now immersed in communication technologies such as the Internet (Clark & Foster, 2005). Constructivism focuses on learner's control of learning processes and it narrows the gap between the school world and real-life society. The future of education, then, depends on our ability to integrate technologies that complement students' out-of-school lives (Scheiter & Gerjets, 2007). One of the axioms of the (cognitive) constructivist theory is that learning occurs by building upon previously learned experiences (Piaget, 1973). Teaching in familiar contexts appears to help learners to relate new information to those experiences. Contextualization also appears to have a strong motivational component. Learning in a familiar context may make learning more personally relevant than decontextualized learning (Hooper & Rieber, 1995). The constructivist goals of learner control, autonomy support, choice, active problem-solving, and use of relevant and authentic texts in beginning reading instruction are preferred to explicit, teacher-directed instruction. These goals are also an important-if not critical-factors of reading motivation (Gambrell, Palmer, Codling, & Mazzoni, 1996; Renninger, 2000; Schiefele, 1998).

The present paper also drew on the central constructs of motivation in relation to grade 1 students' reading experiences, including (a) intrinsic and extrinsic motivation (Deci & Ryan, 1985); (b) self-efficacy and competence beliefs for reading (Eccles, 1983); and (c) achievement goal orientations for reading (Ames, 1992). From an educational point of view, motivation refers to "the likelihood of choosing one activity over another, as well as the persistence and effort exerted when participating in the chosen activity" (Malloy, Marinak, & Gambrell, 2010, p.2). Motivation has also been recognized as an important aspect and requirement of constructivism and the building of new knowledge (Piaget, 1973; Vygotsky, 1978). Since the constructivist theory claims that knowledge is actively constructed by the learner, learning depends to a significant extent on the learner's internal drive to understand and promote the learning process. Thus, intrinsic motivation is required to initially arouse students to want to participate in learning, and it would also be needed throughout the whole process until knowledge construction has been completed. When making a case for reading online eBooks in particular, researchers and educators often use words like choice, interest, control, involvement, stimulation, challenge, and curiosity to capture their motivational and constructivist qualities (Piet, Kommers, & Dunlap, 1996). Applying the two theoretical stances of constructivism and motivation to this study provided a way of exploring the connections between online constructivist learning tools such as eBooks and grade 1 students' reading motivation.

Review of the Literature

Foundations of Reading Motivation

Intrinsic and Extrinsic Motivation. Deci and Ryan (1985) refer intrinsic motivation to initiating an activity for its own sake because it is interesting and satisfying in itself, as opposed to doing an activity to obtain an external goal or tangible rewards such as stickers (extrinsic motivation). Although there is a fundamental distinction in the motivation literature

between intrinsic motivation and extrinsic motivation, and students may be sufficiently motivated for either intrinsic or extrinsic reasons to participate in reading tasks, there is a growing consensus that these two constructs should not be treated as polar opposites (Brophy, 2004). Rather, they often both operate in different situations, and may even form a continuum (Brophy, 2004).

Self-Efficacy for Reading. Students may choose to participate in one learning activity over another on the basis of how well they expect to do, or their expectancy. According to Eccles (1983), perceptions of expectancy are influenced by the students' sense of competence in completing a specific task successfully. Based on Bandura's (1977, 1982) construct of selfefficacy, students tend to engage more readily in activities where they feel they are competent than in tasks where they perceive they are lacking in skill. With regard to reading, a review of studies related to self-concept (Chapman & Tunmer, 2003) found that students' self-concepts develop in response to their early experiences with reading- whether these are perceived as being pleasant and successful, or uncomfortable and difficult. Students who experience early and repeated difficulties with reading may develop a self-concept as a "bad reader," which then influences their expectancy for engaging in other reading tasks. Thus, they may participate, but without a positive expectancy for success, they may not persist in the task or give much effort (Linnenbrink & Pintrich, 2003; Wigfield, Guthrie, Tonks, & Perencevich, 2004). For this reason, it is important that educators scaffold reading instruction, and incorporate tasks that: offer autonomy and choice opportunities; are related to their lives and interests in and out of school; promote curiosity, exploration, interaction,

and self-discovery; compare students' achievements to their past achievements rather than those of other students; and provide frequent, immediate, task-specific feedback, including corrective comments and justified praise (Margolis & McCabe, 2004). Thus, students will likely invest in reading activities if their environment is supportive, and if difficulties do not lead to embarrassment or comparisons with more successful peers (Margolis & McCabe, 2004).

Achievement Goal Orientations for Reading. Research designed to understand why students choose to learn has been organized into two broad orientations (Malloy et al., 2010). The first orientation contains mastery or learning goals, which occurs when children focus on improvement and mastery of a skill such as reading (Malloy et al., 2010). The second orientation involves ego or performance goals, which occurs when children focus on how well they feel they perform in relation to others (Malloy et al., 2010). When confronted by difficulty (or failure), mastery-oriented children persist, stay focused on the task, and sometimes even use more sophisticated strategies (Malloy et al., 2010). On the other hand, when students with performance-avoidance orientations experience failure, they attribute their failures to lack of ability rather than effort attributions, may develop maladaptive forms of behaviour, such as learned helplessness, a low level of persistence, and engaging in offtask and disruptive behaviour instead of task-focused behaviour (Covington, 2000; Dweck & Elliott, 1983; Heider, 1958; Nicholls, 1984; Onatsu-Arvilommi, Nurmi, & Aunola, 2002; Weiner, 1986). Consequently, these students with performance-avoidance learning strategies have lower levels of reading achievement than intrinsically motivated students (Aunola,

Nurmi, Niemi, Lerkkanen, & Rasku-Puttonen, 2002). Such performance-oriented, extrinsically motivated students become passive in reading activities and typically engage in less than 10 minutes of recreational reading per day (Guthrie, 1999).

In line with the constructivist and motivation theories, granting students control of and engagement in the learning experience permits them to construct their own meaning of the reading materials rather than be passive recipients of the information (Flowerday & Schraw, 2000). That is, involving learners in the decisions regarding their reading activities should increase their intrinsic motivation to learn and read (Randi & Corno, 2000). According to Randi and Corno (2000), the use of choice of reading material in the classroom increases students' motivation, effort, and performance. In line with this, most studies of choice of reading material and its effect on reading motivation and engagement (e.g., Deci & Ryan, 1985; Deci, Vallerand, Pelletier, & Ryan, 1991) claim that teacher-controlled environments reduce a student's sense of autonomy, decrease intrinsic motivation, and result in poor reading attitudes and performance in the classroom. When examining the influence of perceived control (e.g., self-described feelings of competence and autonomy) on reading motivation, Flowerday and Schraw (2000) found that learners who reported greater perceived control were more motivated to read and actively involved in their classroom.

The New Literacy of the Digital Age: the Use of eBooks as a Motivational Tool for Reading

In the 21st century, the definition of literacy has expanded from traditional notions of reading and writing to include the students' ability to learn, comprehend, and interact with

technology (Gilster, 1997). As one looks at the interface of technology and literacy, perhaps most potentially rewarding for literacy educators is the role of technology in reading acquisition and instruction, especially for primary grade populations (de Jong & Bus, 2002). For students in the beginning reading stages, it is even recommended that they use "developmentally appropriate information and communication technologies such as the Internet to support and communicate their learning in language" (Ministry of Education of Ontario, 2003; p. 30). Online children's storybooks are one example of how teachers of beginning readers can use such communication technologies to advance the goals of their reading program (Alexander & Jetton, 2003;Blok et al., 2002; Castek et al., 2006; de Jong & Bus, 2002; Korat & Shamir, 2006; Labbo & Kuhn, 2000; Lefever-Davis & Pearman, 2005; Wepner & Ray, 2000). One of the more compelling findings from the research literature on is that children are highly motivated and interested in the new literacies of the Internet (Reinking & Watkins, 2000). Scheiter and Gerjets (2007) further suggest that readers are more engaged with these new literacies because they promote a more active orientation to reading, are easier to read for most readers, meet a wide range of social and psychological needs, are more attention getting and attention holding, and make reading a more creative and playful activity.

Online children's storybooks have taken traditional oral or print stories, and added multimedia and multisensory features such as animated illustrations, sound effects, and fully digitized audio narration accompanied by highlighting of the text, all of which offer young children and struggling readers interactive storybook choices that they can enjoy reading

independently (Alexander & Jetton, 2003; Castek et al., 2006). To stimulate the children's reading orientation and involvement in reading, electronic storybooks let children activate reading of words, phrases, or pages in any order they want and are typically equipped with sound and animations that are activated by the child (Reinking & Watkins, 2000). Specifically, the eBook can include a forward button (a coloured arrow that points to the right) and a backward button (an arrow that points to the left) on each screen, thereby allowing the children to return to previous screens or to continue on to the next one (Korat & Shamir, 2006). The children can also use a function that allows them to reread/relisten to the highlighted text by clicking on an arrow that repeats the text (Korat & Shamir, 2006). In this fashion, the children's attention is focused on the relationship between the text and oral reading by the highlighting of written text (de Jong & Bus, 2002). The computer's pronunciation of text also reduces the burden of decoding for the reader, so more energy and attention can be applied toward processing meaning for comprehension (Grimshaw, Dungworth, McKnight, & Morris, 2007).

As illustrated in this review, there is accumulated research-based evidence for the integration of online eBooks in primary classrooms, as they can impact the potential success of struggling and unmotivated students by providing individual attention, immediate and specific feedback, as well as guided practice and scaffolding during reading instruction (Lefever-Davis & Pearman, 2005; Sandholtz, Ringstaff, & Dwyer, 1997). These technological tools present opportunities to be responsive to different learning styles and can fulfill a given set of educational objectives in less time than needed in more traditional approaches (Reeves,

1998). It has been suggested in the literature presented above that the Internet permits greater control by students as they navigate media-rich information resources such as online eBooks and construct meanings appropriate to their learning needs (Pearman, 2008). The interactive features embedded within these digital storytelling tools result in an increased sense of users' control of the direction they take within these information contexts, as well as higher levels of intrinsic motivation (Becker & Dwyer, 1994; Leu, 2000). Although there is evidence to suggest that the features embedded within electronic storybooks contribute to children's early reading development, further research documenting students' experiences with, attitudes toward, and their motivation for reading these digital texts in the early primary grades are warranted.

Methods

Site Selection Criteria

The Chairperson of the Research Advisory Committee and Director of Education of the school board selected and contacted the principals in the two schools where this study was conducted. Each principal selected two first-grade teachers on the staff who were willing to participate in this study. All four grade 1 teacher participants from the two schools were then asked to distribute letters of invitation to all of their students. The sample consisted of the first two student participants in each grade 1 classroom who returned the consent and assent forms with parent signatures of approval allowing their child to participate in the study. The final total sample consisted of eight students (four boys and four girls) aged 5-6 years, drawn from two grade 1 classrooms in one elementary school (School 1), and two grade 1 classrooms in the other elementary school (School 2). All participants were Englishspeaking and of Caucasian descent. Both elementary schools were situated in the same school district in southern Ontario, Canada. In order to protect the participants' identities, pseudonyms were used.

Participants

The first teacher participant, Debra, was a certified female teacher with 15 years of teaching experience, all of which had been at the primary level. Her first grade classroom consisted of 18 students (8 boys, 10 girls). Throughout her teaching career, Debra has sought out opportunities to expand her knowledge of early literacy by participating in many inschool training and professional development workshops as well as used several professional resources to further explore and integrate in her classroom reading instruction program (e.g., Running Records, Guided Reading, Better Answers, etc.). James and Sally were both enrolled in Debra's grade 1 classroom in School 1. James and Sally were "most comfortable reading very simple predictable books" (Debra, Term 1 report card comment). James was "a very capable student but struggled with focus and being attentive to [reading] tasks" (Debra, Term 2 report card comment). Contrary to James, Sally was labelled by her teacher as a "very quiet student [who] only participated in discussion when asked a direct question" (Debra, Term 1 report card comment). According to her parents, Sally also "enjoyed being read to and sharing books with others," (Parent Questionnaire 1, p. 2) and "liked to play teacher with her peers while reading" (Debra, Interview 1, p. 3).

Veronica, a grade 1 teacher employed in School 1, had been teaching for 34 years (18 of which have been within the primary division). Veronica's grade 1 classroom had a total of 19 students (10 boys, 9 girls). Throughout her teaching career, Veronica had also sought out opportunities to expand her knowledge of early literacy by participating in many in-service training and professional development workshops, engaging in professional reading, and attending School Resource Team (SRT) meetings, which provided early intervention strategies particularly to at risk learners from JK to grade 4. John and Christopher were two student participants in Veronica's grade 1 classroom. John was characterized as a "laid back, well-behaved, quiet student" who actively participated in classroom reading activities but was "just not as enthusiastic and keen as Christopher" (Veronica, Interview 1, p. 3). Contrary to John, Christopher seemed "very involved and interested" during reading activities and was "always excited to put his hand up and participate in class discussions" (Veronica, Interview 1, p. 4).

Jessica taught a grade 1 classroom in School 2. Her class consisted of 19 students (10 girls, 9 boys). Jessica has accumulated 11 years of teaching experience, all of which were spent teaching in the primary grades and included the successful completion of the Special Education (Part 1) Additional Qualifications course. Sarah and Christina were two student participants enrolled in School 2 and in Jessica's grade 1 classroom. Sarah was a "highly motivated, confident student" (Jessica, Interview 1, p. 5) who "demonstrated strong independent reading skills," and "was an excellent participant during discussions and reading activities" (Jessica, Term 2 report card comment). Christina was not classified as a

hyperactive student, but her attention to directions and questions was limited, and "she often required teacher assistance with most reading and writing activities" (Jessica, Term 1 report card comment). Christina was encouraged by her teacher to "develop more confidence in her independent reading and word recognition skills, as well as in answering comprehension questions" (Jessica, Term 1 report card comment).

Tracy was the final grade 1 teacher participant from School 2 with a class size of 19 students (10 boys, 9 girls) and 18 years of teaching experience, all of which were also spent teaching within the primary division. Throughout her years teaching at the designated highincome elementary school, Tracy had participated in a writing workshop as well as completed a writing course with the Summer Institute for Teachers in order to increase her knowledge base and support early literacy. In addition to this, Tracy successfully completed the Primary Education Part 1 (Additional Qualifications) course, which focused on literacy and numeracy and provided her with a strong foundation and understanding of developmentally appropriate theory and practice in primary education. Jaclyn and Mark attended School 2 and were both grade 1 students in Tracy's classroom. Jaclyn was "most comfortable reading simple pattern books" (Tracy, Term 1 report card comment). Jaclyn also "enjoyed being read to and reading books she has memorized" (Parent Questionnaire 1, p. 3). Like Christina, Jaclyn was also encouraged to read daily to develop more confidence and improve her word attack skills as well as to keep using active listening strategies each day and focus on the [reading] task at hand" (Tracy, Term 1 report card comment). Mark was an "extremely responsible, motivated, hard-working, and well-mannered student" who

displayed a "positive attitude and keen interest in [reading]" (Tracy, Term 1 report card comment). Mark was also encouraged by his teacher to "further challenge himself in reading and continue to motivate and guide others" (Tracy, Term 1 report card comment).

It should be emphasized that although three of the eight student participants were identified by their teachers as "struggling low-achievers with attention-deficit/hyperactivity problems" based on standardized assessment scores and classroom observations (Debra, teacher, Field notes, January 13, 2009; Jessica, teacher, Field notes, January 28, 2009; Tracy, teacher, Field notes, March 10, 2009), they were not formally identified as having learning difficulties or behaviour disorders within their school system. However, all three participants received additional support from the Reading Recovery school team.

Research Design

In order to develop the story as it is experienced by participants, and to more fully understand the nature of children's reading experiences, qualitative data were gathered from four perspectives: the researcher as an observer, the grade 1 student participants, their teachers, and their parents. Triangulation (convergence of measures) enhanced the meaningfulness of this study's data. The primary means of data collection consisted of: (a) participant observations during regular classroom reading instruction and online eBook reading sessions (recorded as field notes); (b) questionnaires; (c) transcriptions from individual, semi-structured teacher interviews; and (d) reading assessments such as running records and provincial report card data. It is important to note that the monthly classroom observation sessions and online reading sessions represent the total number of observations that occurred with each student participant.

The Online eBook

The online eBooks (see Figure 1 for a sample screenshot) used in this study were found on the Listening and Reading Comprehension link on the ChildtopiaTM (Childtopia SL, 2008) website, which was specifically designed for children between infancy and 10 years old. The storybooks used in the online reading sessions were similar in length (comprising between 10-15 pages of text and ranged from 200-300 words per page), characterization, complexity and illustrations. ChildtopiaTM (Childtopia SL, 2008) was chosen for this study because it was freely accessible to the researcher and contained the digital features mentioned above that would promote participants' word recognition and listening comprehension, which are two critical elements of a successful beginning reading program (Ministry of Education of Ontario, 2003). The children's attention was also focused on the relationship between text and oral reading by the highlighting of words as the text was uttered by the female voice. Also included were automatic dynamic visuals that dramatized story details and the complete story scene, as well as music and film effects to transform the eBook into an animated book. To stimulate the children's reading orientation and involvement in reading, the e-book included a *next* button (a bird that flaps its right wing) and a *previous* button (a bird that flaps its left wing) on each screen, thereby allowing the children to return to previous screens or to continue onto the next one.

Each story was also accompanied by a set of 10 follow-up comprehension questions that were mainly factual and read aloud using the same female narrator's voice (see Figure 2 for a sample screenshot). Independent readers, however, had the option of turning off the audio narration and read the stories and questions to themselves.

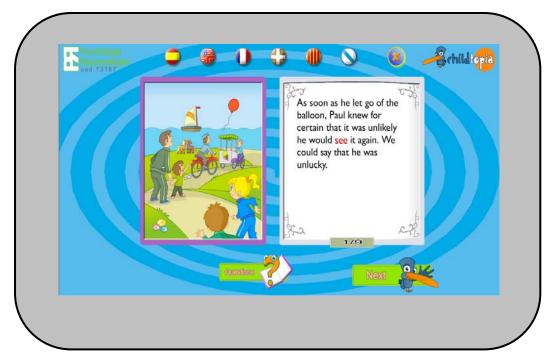


Figure 1: Example of online eBook from ChildTopia[™]



Figure 2: Example of post-reading comprehension question from ChildTopia[™] Data Collection Materials

Classroom observations. Each grade 1 classroom was observed, and detailed observations of the eight target participants were taken by the researcher during regularly scheduled literacy blocks. The researcher sat in an unobtrusive spot in the classroom, minimally interacting with either the teacher or participants; the exception was when the researcher walked around to look at participants' seatwork. In each classroom, the researcher focused on 1 target child at a time for approximately 15 minutes, then turned to the other target child in the classroom. The researcher had a clipboard with lined sheets and attempted to capture verbatim the interactions between the target child participant, his or her peers, and teacher. The teacher's behaviour was coded insofar as she interacted with each focal child, either individually or in a group, with special attention paid to instructional practices for teaching reading, the motivational implications and effects of these attempts on participants.

Sociocultural studies of reading engagement in classroom contexts often focus on time-ontask behaviours which are observable manifestations of motivation. In fact, some researchers have successfully captured some behavioural and active features of reading engagement (ontask and off-task) in classroom through direct observation (Marks, 2000). Thus, the researcher decided to use direct observations of participants during classroom-based reading instruction and activities to confirm students', parents', and teachers' reported levels of engagement in reading tasks. On-task behaviours were operationalized in classroom settings as visual orientation to a required stimulus (e.g., book or worksheet). Conversely, inattention or off-task behaviour is inferred by frequent shifts in activity and behaviour that is not taskrelated (Marks, 2000). This observational method was rarely threatening to the teachers as they were aware that the observer's focus was on the child's learning.

Online eBook reading observations. The computer sessions were held individually in the school library's computer lab during the participant's recess and/or lunch hour so that he or she did not lose any classroom instructional time. During the online reading sessions, the participants worked individually next to the researcher and wore headphones to reduce any auditory distractions. Field notes were used to record specific behaviours and level of engagement of every child participant during the digital reading sessions, including any comments made by participants on elements of illustrations, features, and functions of print on the page, as well as any extraneous comments, questions, and issues related to the child participants' attention, posture, and eye gaze. A child's high level of engagement during both the read-aloud and post-reading activity on the computer was defined as those times when the

student was always attending to the computer screen, by reading aloud or along with the story, clicking the mouse to the "next" page in the story or question, making comments to the observer about the story read or questions asked, using other positive, task-/goal-oriented nonverbal behaviours (e.g., smiling when the computer told the child "Well Done!" after answering a question correctly, or eagerly going back to the question and reattempting the question after the computer told the child, "Oops, try again"). Conversely, a child's low level of engagement during both the read-aloud and post-reading activity on the computer was defined as those times when the student was never attending to the computer screen, not reading along with the story or answering the questions; if students had their eves closed or oriented toward another object in the room rather than the computer screen, then they were also considered off-task. During the postreading activity, a low level of student engagement was defined as those times when the student never changed his/her facial expressions when receiving a correct or incorrect response to a question (e.g., when the computer told the child, "Well Done!" or "Oops, try again" after he/she clicked on his/her answer).

My motivation to read questionnaire-child version (pre-program and post-program). An adapted version of the Motivation to Read Profile (Gambrell et al., 1996) was utilized at

the beginning (September) and end of this study (April) in order to develop a more in-depth understanding of and authentic insights on grade 1 students' experiences and attitudes toward digital reading (see Figure 2). The following questions that pertained to students' experiences with and attitudes toward online computing technologies, and more specifically, online eBooks were added: "(1) Do you use the Internet at home? At school? (2) How much time do you spend on the Internet at home? At school? (3) What do you do on the Internet at home? At school? (4) Have you ever used the Internet for reading? If yes, what do you read on the Internet? (5) If you had to choose between reading a hardcover book, reading an electronic book, or not reading at all, which would you choose? Why?" In addition, the following questions were added on the Post-Program Motivation to Read Questionnaire: "(1) Have you visited the website we used to read and answer questions since you started this project with me? (2) If yes, how many times did you visit the website? Why did you visit the website? If no, why didn't you visit the website? (3) What did you enjoy most/least about the reading the stories on the computer? (4) What did you enjoy most/least about the reading activities you did after reading the stories on the computer?"

A pilot study was conducted on the same day but at different times with a purposive sample of two grade 1 children (6 years of age) approximately three months before the formal study was undertaken to evaluate the accuracy and credibility of the adapted instrument. Content validity was enhanced by having this instrument independently assessed by two grade 1 teachers as well as the researcher's Faculty Advisor who teaches courses in educational psychology, literacy assessment and evaluation.

My child's motivation to read questionnaire- parent version (pre-program and postprogram). Parents of the eight student participants were asked to complete and return two versions of the *My Child's Motivation to Read Questionnaire* before (September) and after (April) the study. This instrument was constructed to parallel the content and format of the student version so that measures between parents and children would be comparable for data

analysis. The questionnaires asked parents to provide their perception about their child's level of enjoyment derived from participating in various reading activities. The questionnaire consisted of items that elicited information about their child's text-type reading preferences and previous experiences with reading on the Internet. Attached to the final letter sent to parents/guardians was an identical version of the original questionnaire; however, similar to the participants' second questionnaire, items which pertained to their child's experiences with the online storybooks were also added to the parents' second questionnaire. The added items were designed to assess whether participants visited the ChildtopiaTM (Childtopia SL, 2008) website at home (as well as the frequency of visits), what their child enjoyed (and/or did not enjoy) about reading the eBooks and completing the post-reading activities, and most important, whether the participant has used the Internet more (for reading) since this study began. The same question format and ranking procedure from the first questionnaire was used with this instrument; parent respondents were also invited to write comments about their child's involvement in this study, including any changes they may have seen in their child's motivation toward reading online eBooks.

Teacher interviews (post-program) and report cards. Each teacher was interviewed individually by the researcher in the school library during recess (approximately 15 minutes in length) at the end of this study (April). These semi-structured interviews were audio taped, transcribed, and member checked. Teachers were asked to describe any changes they informally observed in terms of the participants' reading behaviours and intrinsic motivations, especially towards computer-based online reading; for example, teachers were

asked whether participants had been asking to use the classroom computers to access the Internet (for reading) more frequently. In addition to this, teachers were asked to share their views on the integration and significance of the Internet, and more specifically, online eBooks, as a tool to enrich first grade students' classroom reading instruction (compared to print-based reading instruction). Throughout the first two terms of the school year, copies of the participants' provincial report cards were obtained from the grade 1 teachers. For the purpose of this study, only the letter grades and written reporting comments in the "Reading" strands of the grade 1 Language curriculum were used for data analysis.

Procedure

The following section will describe preprogram, interim-program and postprogram activities and data collection procedures that occurred across the school year.

Pre-program Activities

My child's motivation to read questionnaire #1. In addition to providing written consent for their children to participate in this study, all of the parents completed and returned the *My Child's Motivation to Read Questionnaire #1* to the researcher by late September.

Throughout the first two terms of the school year, a copy of the participants' provincial report card grades were obtained from the participants' grade 1 teachers.

Interim-program Activities

Classroom observations. The first observation session in each classroom was held in late September, after the researcher received written permission to conduct this study. During this time, the researcher also collected all of the consent and assent forms from the eight student participants and 4 teacher participants in all four classrooms in late September. Eighteen regularly scheduled classroom observation sessions were conducted on a weekly basis during the 120-minute morning literacy blocks beginning in September and continuing through April. During the first observation sessions in each grade 1 classroom, the teachers briefly introduced the researcher to the class and stated the purpose of her observations.

My motivation to read questionnaire #1 (child version). After conducting two observation sessions in each grade 1 classroom, the researcher conducted the researcher-developed *My Motivation to Read Questionnaire #1* with all eight student participants in late September. This questionnaire was individually administered (on a one-on-one basis) in the school library during the student participant's recess period. The time for each questionnaire varied due to the age and ability levels of the sample, but the average time it took for participants to complete the questionnaire was 25 minutes.

Digital reading sessions. Ten 25-minute online reading sessions over a 15-week period from November through April (interrupted by several weeks of school vacation, including Christmas and March Break) were held individually in the school library's computer lab during the participant's recess and/or lunch hour so that he or she did not lose any classroom instructional time. During the ten online reading sessions, the participants worked individually next to the researcher and wore headphones to reduce any auditory distractions. Similar to the pilot study procedures, a familiarization session with the computer was held prior to the participants' first online reading session in mid-November. The online reading sessions and classroom observation sessions occurred on the same day for each individual participant in order to limit any confounding maturational factors and to compare participants' behaviour and interactions during reading instruction in these two settings (e.g., digital environment versus print-based classroom environment). The typical interval between each online reading session was one week. The participants generally completed one storybook per session; however, technical difficulties were encountered during some of the sessions, resulting in the student being unable to either read the entire storybook or complete the postreading activities; the observations and data collection was suspended and reconvened either later on that day or the following day. Student participants generally completed two storybooks per session. The average total time it took participants to read one of these storybooks and complete the post-reading activity was ten minutes.

The post-reading comprehension questions were completed after the students finished reading their self-selected storybook on the Childtopia[™] (Childtopia SL, 2008) website. The average total time spent answering these questions was 15 minutes, but this varied widely depending on the ability level of the participant.

Online eBook reading observations. Observational data from every online eBook reading session was recorded in field notes, with each session lasting approximately 25 minutes (from November through April).

Postprogram Activities

My motivation to read questionnaire #2 (child version). Similar to the administration of the previous questionnaire, the final student questionnaire was individually administered in the school library during the participants recess or lunch hour period in April.

My child's motivation to read questionnaire #2 (parent version). Approximately one week after the classroom-based observations and online reading sessions were complete in mid-April, the researcher sent home to parents of participants a Letter of Appreciation for allowing their son/daughter to participate in this study as well as the *My Child's Motivation to Read Questionnaire #2*. The parent questionnaires were completed and returned to the classroom teacher in late April.

Teacher interviews and report cards. Individual teacher interviews were conducted at the end of this study in April. Each interview was conducted in the school library during recess and lasted approximately 15 minutes in length. A copy of the participants' provincial report card grades and comments in the "Reading" strand were obtained from the participants' grade 1 teachers.

Data Analysis

The primary aim in this study was to render the social and cultural dynamics and patterns of the reading practices, attitudes, behaviours, and verbal and nonverbal interactions of the eight grade 1 student participants, their teachers, and peers occurring in their multidimensional context of school culture. By employing a qualitative methodology, this study uses an exploratory, emergent, inductive approach to create and give meaning to the online eBook reading experiences of grade 1 children (Creswell, 2010). Findings are coconstructed in a dialogue between the researcher, the participant and the audience interpreting the study (Creswell, 2010).

Observational data was taken during the student participants' computer program sessions in order to capture relatively concrete descriptions of their experiences and interactions with this technological tool. Qualitative data was collected in the *My* (*Child's*) *Motivation to Read Questionnaires* and the *Teacher Interviews*. For the closed-ended responses, the researcher calculated the frequency with which participants answered each question. Interviews, fieldnotes, and questionnaires were transcribed and coded using a word-processing program (*Microsoft Word*). Each dataset was organized and coded according to the participants' homeroom teacher (using single-letter identifiers A-D) and school type (School 1 and School 2).

In an attempt to gain a sense of the whole, the researcher listened to the recorded interviews and questionnaires, as well as read and reread the field notes and transcripts a few times, which increased the researcher's understanding and enabled her to present what has been discovered to others. After several readings of the data files, the researcher worked on linking the data to this study's research question. Here, the researcher highlighted interesting sections, certain words, phrases, patterns of behaviour, and occurrences that repeated themselves, thus segmenting pieces that stood by themselves. This process of categorizing and subcategorizing information is referred to as open coding (Creswell, 2010). The researcher completed her initial open coding of data by creating tables. Once the raw data were coded according to the category systems described, data belonging to each category were retrieved, assembled, and viewed. Commonalities and differences among student, teacher, and parent responses, experiences, and behaviours were then identified and accomplished using axial coding (Creswell, 2010).

Verification and authenticity (Creswell, 2010) were established by utilizing multiple sources of data and collection strategies over an extensive period of time (Creswell, 2010). The interview data with the four grade 1 teacher participants were verified through the process of member checking. All of the teachers received a hard copy of their interview transcriptions as well as a framework of the themes that emerged across the teacher narratives, in order to validate the researcher's findings and interpretations of the data (Creswell, 2010). Informal classroom observations, field notes, and reading assessments including report card grades and running record scores were also collected simultaneously throughout the study in order to check whether the same patterns were consistent over time; these multiple sources of data were in agreement, and hence the findings in this study are believed to be credible and accurate, and the corroborating evidence supports the major themes and descriptions that are pertinent to this study (Creswell, 2010). In order to establish the credibility of the conclusions and findings, peer debriefing was also used. The peer debriefer, the researcher's Faculty Advisor, reviewed data samples, and generally provided a sounding board for the researcher's ideas, questions, and conclusions in order to confirm or disconfirm emergent themes as logical and proper.

Summary of Findings

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What follows are the results of the parent, child, and teacher questionnaires, teacher interviews, provincial report cards, as well as the observations, all of which are presented together because of their interpretive dependence on one another.

Theme 1: Students' Pre-Program Classroom and Home Reading Experiences

As evidenced by classroom observations and reading levels, the responses of Jaclyn, James, and Christina reflected their low reading achievement and off-task, unmotivated behaviours during classroom reading times. Unlike the other five participants, these three participants frequently engaged in off-task, learned helplessness behaviour during readingrelated tasks. James, Jaclyn and Christina had difficulty focusing independently on printed material for a sustained period of time, and often resorted to fidgety, off-task or disruptive behaviours (i.e., disrupting their neighbours) during their guided, small-group reading sessions with their peers to avoid looking incompetent or to hide their uncertainty about a word. Unlike the independent reading behaviours of the other four participants, James, Jaclyn, Sally, and Christina often stopped reading, did not attempt to independently sound out or guess the word, exhibited behaviours of learned helplessness, and instead waited for their teachers' assistance. Consistent with previous findings (e.g., Burns, 2006), guided reading was extremely helpful to these students only when the teachers provided undivided attention and one-on-one instruction. The "levels of attention, reading productivity, and accuracy improved dramatically" for James', Jaclyn, and Christina when their teachers provided undivided attention and on-one-on instruction (Debra, teacher, notes, September 22, 2008; Tracy, teacher, Field notes, September 30, 2008; Jessica, teacher, Field notes, October 17, 2008).

Again, classroom observations revealed that during independent reading times, Jaclyn, James, and Christina all self-selected books that were either too challenging for them, as they quickly flipped through the pages and focused mainly on the pictures rather than the words on the page, or selected the same easy, low-level books (Level A) that were below their actual reading level. These participants gave up easily, especially when they were challenged with an unfamiliar word. During one observation session, Jaclyn attempted to read a new fiction picture book that was at her reading level, but stopped reading after the first page and flatly stated, "I don't want to read anymore, it's too hard" (Tracy, teacher, Field notes, October 21, 2008). Similarly, when Christina was stuck on a word, she did not try to pronounce the word, but quickly closed the book and mumbled "Whatever" (Jessica, teacher, Field notes, October 1, 2008). Jaclyn, James, and Christina displayed similar off-task behaviours during buddy reading times, as they often became easily distracted, acted silly, and fooled around with their buddies, especially when they had difficulty pronouncing a word. When it was their turn to read, Jaclyn, James, and Christina often read in a soft, less fluent, mumbled, monotone voice; reading for them was often a word-by-word struggle. On the contrary, the remaining five participants always tended to appear more confident in their reading abilities, as they often read aloud more fluently and naturally, with expression and excitement. During independent and buddy reading, when Mark, Sarah, Sally, Christopher, and John were stuck on a word, they relied less on their buddy and utilized more effective

word attack strategies. While Christina, James, and Jaclyn struggled to finish reading one book in its entirety, Mark and Sarah would completely read as many as five books during this 20-minute rotation. According to the teacher comments on the Term 2 report cards for Sarah, Mark, Christopher, and John, they have all "demonstrated strong independent reading skills" (Tracy, teacher, Term 2 report card comment; Jessica, Term 2 report card comment; Veronica, teacher, Term 2 report card comment). Sally, Mark, Sarah, Christopher, and John always worked diligently, were on task, used their time efficiently, and rarely asked for teacher assistance, as confirmed by their Term 1 report card comments, "they work well without supervision, obtain information independently and persist with challenging tasks" (Jessica, teacher, Term 2 report card comment; Tracy, teacher, Term 2 report card comment).

It appeared as though the student participants' patterns of reading engagement (or lack thereof) is consistent with the "Matthew Effect" (Stanovich, 1986), in which the good readers and high achievers like Sarah, Mark, John, and Christopher improved more rapidly than low achievers like James, Jaclyn, and Christina. The latter group of participants exhibited learned helplessness, task-avoidant behaviours during reading activities that appear to be predictive of their reading motivation (e.g., Onatsu-Arvilommi et al., 2002; Unrau & Schlackman, 2006).

The classroom observation data showed evidence of James's, Jaclyn's, and Christina's passive engagement and negative attitudes toward reading, which were also reflected in their first questionnaire responses. For example, the first question posed to both students and parents on their questionnaires related to the importance they attached to (their child) reading well. The findings revealed that, with the exception of James, Christina, and Jaclyn, the remaining fivestudent participants and all of the parents felt it was *very important* (for their child) to read well. The responses of Jaclyn, Christina, and James on the Importance of Reading subscales pointed to the fact that reading was not viewed as an activity of high priority for them. Similarly, when they were asked, "How often do you read for fun on your own time?" these same three participants indicated that they never or hardly ever engaged in reading for non-academic purposes and would rather partake in other leisure activities.

Interestingly though, when asked to rate the participants' feelings about reading books online, James, Christina, John, Christopher, and Jaclyn were positive about reading online storybooks. The researcher posed the following questions to students and parents before (and after) the use of the online eBooks: "If you (your child) had to choose between reading a hardcover book or an eBook on the computer, which would you (he/she) choose?" While three participants were less positive about completing reading activities on the computer, the remaining five participants all indicated that they preferred to read electronically because of its high level of interactivity. These same participants preferred reading eBooks on the computer because they were "easier to read" than print-based materials.

The student participants reported their frequency of Internet use at home and at school. Interestingly, while all of the child participants reported in their first questionnaire that they never or hardly ever used the computer and Internet at school, they tended to spend more time on Internet-related activities at home. The majority of participants used their home computers for playing (CD-ROM) games such as *Jumpstart, Princess, Buzz Light Year, My Little Pony, Dora the Explorer, Freddie the Fish,* and various computer-sports games (e.g., golf, bowling and racing; Child Questionnaire 1). At school, the participants mostly used the computer for drill-and-practice phonics instruction.

Theme 2: Students' Interim-Program Online eBook Reading Experiences

Observational field notes were written by the author during the online eBook reading sessions with each student participant to capture their experiences with this technological tool. The author's observations of the eight student participants during the eBook reading sessions indicated that they were always on task and highly engaged. Interestingly, during their eBook reading sessions, Christopher, Sally, Mark, John, and Sarah all displayed similar behaviours as observed during traditional classroom read-aloud and reading instruction. Specifically, these students were never distracted by surrounding noises and their eyes were always oriented toward the computer screen. Further, the author noted that Sarah and Mark were very confident when answering questions, and often made text-to-self connections while reading. It seemed as though Sarah was also competing against someone and trying to quickly sail through the questions in record-breaking time. Interestingly, the use of competition between students to outdo each other and the theory of extrinsic motivation were further supported when Sarah asked the author at the end of a session, "Does it take Christina a long time to answer the questions?" and "Did Christina answer the questions as quickly as me?" It can be suggested that the more Sarah perceived her reading in comparison to her

peers to be positive, the higher her performance goal orientation was, and the more successful she appeared to be in her reading abilities (Covington, 2000; Dweck & Elliott, 1983; Nicholls, 1984).

Contrary to the author's classroom observational data, Christina, Jaclyn, and James appeared to be paying attention most of the time as the story was read to them by the computer. In particular, Christina's enthusiasm for online storybook reading was evident when she found a story that sparked her interest: "I want to read this one!" When her eyes were oriented toward the computer screen, Christina appeared very focused and engaged at the beginning of the story. For example, when the first word-attack question appeared on the screen, Christina immediately sat up straighter, closer to the edge of her seat, and moved her head closer to the computer screen so as not to miss anything. After she correctly answered the first question that assessed her word recognition skills, Christina excitedly yelled, "I like this part!" with a huge smile on her face. The author noted that Christina's enthusiasm often turned to frustration when her listening comprehension ability was assessed during the first part of the postreading activities. Of particular interest was that Christina seemed more excited, motivated, and confident in answering questions that focused on her basic wordattack skills rather than her listening comprehension abilities; generally, the comprehension questions proved too difficult for Christina as she answered the majority of them incorrectly, and she seemed to lose interest in the program. During most sessions, Christina was found to click the forward button and skip to the "Well Done" slide when she incorrectly answered a comprehension question and the author was not looking. Although Christina's listening

comprehension was rather low, she succeeded in answering the second portion of questions, which demonstrated her strong sight vocabulary and word attack skills. Christina's behaviours indicated that, although there were parts of the program that were too difficult for her, the differentiated activities provided her with opportunities to engage in the learning process, which was not typically seen by the author in the regular classroom.

Dissimilar to observations of Jaclyn's off-task behaviours during regular classroom reading instruction and paper and pencil activities, Jaclyn displayed on-task behaviours and blossomed when she worked with this technological tool. During Jaclyn's participation in the online storybook reading and postreading activities, it was evident that the digital children's literature program and computer-based reading activities sparked Jaclyn's interest and tapped a hidden skill. During the read-aloud, Jaclyn was intently focused on the computer screen, particularly the animations, and always eagerly anticipated the forward button to "pop-up" and chime when she had to turn the page. Jaclyn was never fidgety, getting out of her seat, or playing with small objects while she was reading or answering questions, which occurred relatively frequently in class. Unlike her classroom behaviours during reading activities, Jaclyn successfully demonstrated her listening comprehension and word-attack skills during the computer-based postreading activities. When she received immediate praise from the computer, Jaclyn always smiled proudly and exclaimed in a singing voice "I got it right! "Yay!" (Field Notes, Jaclyn, pp. 12-13). In accordance with the attribution theory (Heider, 1958), Jaclyn occasionally attributed her success to external, unstable causes of luck (Weiner, 1986). Over time, Jaclyn slowly began to attribute her success to internal factors

(Weiner), which was evident when she stated, "I'm really good at this!" (Field Notes, Jaclyn, February 2, 2009). When she provided an incorrect response, Jaclyn was determined to go back and reattempt the question and would insist on clicking the sound icons to have the words and questions read aloud to her again.

While James exhibited very similar off-task behaviours as Jaclyn during his regular classroom reading instruction and seatwork activities, he was also found to be highly involved *during* the online storybook reading and computer-based reading activities without any assistance. When the collection of storybooks available on the ChildtopiaTM website appeared on the computer screen, James would always rapidly move his mouse over each storybook icon to hear the tapping sounds that played simultaneously. The introduction of the digital children's literature program was followed by an immediate decrease in the rate of James's off-task behaviour and led to an increased level of engagement in the online storybook read-aloud. Similar to Jaclyn, James also made several comments, text-to-self connections, and interpretive observations relevant to the characters or objects in the story (e.g., "Look at his arm!" "Did you notice that fly was sleeping?" and "Hey, that's my name too -James!"; Field Notes, James, pp. 5-8). In contrast to his behaviours during regular reading instruction or seatwork activities in his classroom, James was highly engaged during his participation in the post reading activities and rarely needed reminders to stay on task.

Theme 3: Students' Post-Program Classroom and Home Reading Experiences

In particular, three students (Christina, Jaclyn, and James) did not appear intrinsically motivated to read or interested in improving their reading skills prior to their involvement in

this study. It was a different scenario for them after their involvement in this program, as they always looked forward to working on the computer during the reading sessions. On a positive note, according to the students' and their parents' final questionnaire responses, Jaclyn, James, and Christina, in addition to three other student participants, reportedly visited the ChildtopiaTM (Childtopia SL, 2008) website at home, with two of them engaging in online storybook reading on more than five occasions (Child Questionnaire 2, p. 4). In fact, although Mark previously reported that he did not really enjoy the eBook reading experience, he later indicated that he visited and "read the storybooks and answered the questions on the website four times" (Child Questionnaire 2, p. 4). Christopher's enthusiasm and interest in online reading was also evident when he stated at the end of one session, "I am going to go home tonight and read this story again!" (Field notes, Christopher, March 4, 2009). Jaclyn and James also claimed to have visited the ChildtopiaTM (Childtopia SL, 2008) website and engaged in storybook reading and answered the site's postreading comprehension questions between 5 and 10 times (Child Questionnaire 3, p. 4). The "lack of time" was cited as the reason for Sarah's and Sally's parents not visiting the website at home (Parent Questionnaire 2, p. 3). Unfortunately, for unknown reasons, John's parents did not allow their son to visit the Childtopia[™] (Childtopia SL, 2008) website. According to all four teachers, when provided with free-choice center time, six of the student participants also gravitated to the computer center and asked to use the computer more since their involvement in this study.

According to their final questionnaire responses, the participants' cited reasons for enjoying the digital children's literature program (e.g., "the moving pictures," "the big red words that helped me learn new words and read along," "I could choose which book I want to read," and "I can have a book read to me without any help") highlight that the program's features engaged student participants in learning to read (Clarfield & Stoner, 2005; Ota & DuPaul, 2002). Five student participants believed that web-based eBook reading environments were easier to read and listen to in comparison with print-based texts. Students also talked about text interactivity. For example, Mark, one of the student participants, cited the following reason for selecting the former type of reading material, "The words were highlighted in red, so it was easy to read along by myself and learn new words" (Child Questionnaire 2, p. 6). These same respondents claimed that reading online storybooks helped them learn more word wall words as compared to traditional hardcover books. In line with this, Sarah preferred to read electronically because she "could have a book read to her without any help" (Child Questionnaire 2, p. 7).

With respect to their preference for completing reading online storybooks, the same group of participants still really enjoyed this type of reading material. In addition to these students, and contrary to their first questionnaire responses, John, James, and Jaclyn no longer chose to read conventional texts, and were now *very happy* and preferred to read electronic online texts instead. Jaclyn's positive attitude toward online reading experiences was noted by her teacher, Tracy, who mentioned during her interview with the researcher that,

Jaclyn is more motivated and confident in her reading abilities. I know that Jaclyn has used it at home and has enjoyed it immensely...she was already fascinated by the computer to begin with, so her involvement with the digital children's literature program only added to her reading improvement and increased self-confidence. (Tracy, teacher, Interview 1, p. 7)

Similarly, James's teacher, Debra, added that she believed James would definitely enjoy the computer more for reading than traditional print-based reading:

It's faster paced, it's action packed, it'll keep his attention more so than just reading to him; if he [James] had a choice to read a [hardcover] book here or read a book there [on the computer], he'll be there reading on the computer, so reading online storybooks would be really good for him. (Debra, teacher, Interview 1, p. 6)

Interestingly, during classroom observations, and on more than one occasion, James would ask Debra when he would be able to work with the researcher, to which Debra replied, "When you are finished all of your seatwork" (Debra, teacher, Field Notes, January 8, 2009). Debra used this incentive effectively to keep James's behaviour under control while simultaneously increasing his motivation level through his computer usage. James successfully completed all of his seatwork tasks in a very short time period (which was seldom observed).

Consistent with the reinforcement theory (Skinner, 1969; Thorndike, 1932), students need to receive immediate feedback in order to make corrective modifications and guide subsequent responses. On the contrary, the computer-based reading activities in this study incorporated an immediate feedback strategy (Epstein & Brosvic, 2002; Epstein et al., 2002). Christopher's comment highlights this: "If I get a wrong answer [on the Childtopia website], then I fix my answers right away and do better" (Child Questionnaire 3, p.9). Similarly, students were asked, "Do you like knowing if you got a right or wrong answer quickly?" and all of the participants answered *yes* in response to this question.

Christopher noted that he had a lack of autonomy and choice during reading instruction and stated: "My teacher [Veronica] doesn't let me choose which book she reads to me, but I get to pick the book I read on the ChildtopiaTM (Childtopia SL, 2008) website" (Child Questionnaire 2, p. 5). On the contrary, students were also given the choice of which online storybook they would have read to them, and they made their own decisions as to which page of text they would read or have read to them again. Debra and Jessica also stated, "They do have more choice and freedom on a computer" (Debra, teacher, Interview 1, p. 5); "read-alouds in the classroom are more teacher directed, because the teachers are picking the book" (Jessica, teacher, Interview 1, p. 7). In support of this, seven student respondents felt that online storybook reading provided them with more control and choice relative to traditional reading materials.

Based on their final questionnaire responses to the question, "How important is it for you to read well?" all of the student participants, including previously unmotivated students such as Christina, Jaclyn, and James, placed a higher value and importance on learning to read well by the end of their computer program involvement. In their first questionnaires, Christopher, Sally, John, James, Jaclyn, and Sarah rated their feelings toward completing computer-based reading activities less than positively; however, they all reported increased positive feelings about engaging in such activities at the end of this study. Since "[individualization is not always possible] given the constraints on time in most classrooms" (Debra, teacher, Interview 1, p. 3), the teachers in this study believed that online talking storybooks such as the ones available on the ChildtopiaTM (Childtopia SL, 2008) website could be effectively used as an adjunct to traditional read-aloud, especially in the grade 1 classroom for struggling, beginning readers who require one-on-one attention (e.g., Veronica, teacher, Interview 1, p. 5).

Teachers were also asked to comment on any observable changes in the student participants' reading motivation since their participation in this study:

Christina's sight word recognition and reading level has improved as well...I find her more engaged on the carpet too during read-alouds, whereas before she used to be a little more fidgety and lost and just not really paying attention. (Jessica, Interview 1, p. 6)

Jaclyn is most definitely not only more motivated but she's more confident, which I think increases her motivation...she was already very fascinated by the computer to begin with, so this only added and greatly helped her to improve in her reading.

(Tracy, teacher, Interview 1, p.4)

I do think this [program] has motivated Mark...he has improved, he's at a very high reading level right now...I would of course assume that it's also from his training on the computer that he has been able to word-attack in the different ways so that he can make meaningful substitutions. (Tracy, teacher, Interview 1, p. 7).

In terms of their report card grades, Sarah, Mark, Christopher, and John demonstrated the highest and most consistent *Reading* performance across the two school terms. John and Christopher also showed remarkable growth in their reading skills from Term 1 to Term 2 of the school year. Jaclyn showed remarkable progress in her reading since her involvement in this study (D to C-). In Term 1, Jaclyn was classified as a nonreader (level 0), and by the end of Term 2 she was able to read at a level 9. According to her teacher's written report card comments, Jaclyn had come to read and understand more high-frequency words: "When she has recently read to me, she paid more attention to the text than she has before, she made more self-corrections, and on average, she made some meaningful substitutions, too" (Interview 1, Tracy, p. 5). Jaclyn's parents also indicated this observation in their final questionnaire; they saw "big improvement in her phonics and reading level, [and an] increase [in] her sight vocabulary and ability to sound out words" (Parent Questionnaire 2, p. 6). According to Jaclyn's teacher, by the end of Term 2, "Jaclyn was starting to more readily use visual and language structure cues to read [on the computer]" (Tracy, Term 2 report card comment).

Like Jaclyn, Christina, Sally, and James had also shown improvement in their sight word recognition and reading rates by the end of Term 2. James and Sally scored a reading level of 4 at the beginning of Term 1 and were identified as reading at levels 6 and 7 at the end of the second term. James showed the slightest improvement in Reading (C- to C) from Term 1 to Term 2. Sally improved her reading abilities and jumped up a whole letter grade (C- to B-). In Term 1 of the school year, Christina was reading at an instructional level 2, but at the beginning of Term 2, she showed a modest improvement and was reading a level 6 text. Also comparable to Jaclyn's report card grade, Christina showed little growth in her Reading performance (D+ to C). In Term 1, Christina, Sally, James and Jaclyn "had difficulty predicting what may happen next in a story and could not revise or confirm their predictions," but in Term 2, and "with some prompting, were then able to demonstrate an understanding of what they have read" (Jessica, Tracy, & Debra, Term 1 & 2 report card comments).

It seemed as though all of the student participants improved in their reading fluency rate and word recognition skills by the end of their involvement in this study. The text comprehension skills of James, Jaclyn, and Christina were developing at a slower, lower rate in comparison to the other four student participants. It might be that the word-by-word matching features on the digital children's literature program and the multimedia-based reading activities contributed to these participants' improved word recognition skills.

Discussion and Implications

With the goal to understand grade 1 students' experiences with and attitudes toward reading digital texts in a sociocultural context, this investigation was undertaken as a general qualitative study (Creswell, 2003). Classroom observations revealed that five student participants exhibited diligent, motivated, on-task behaviours during reading, while the exact opposite behaviour patterns were observed in the other three student participants. Classroom observations revealed that Jaclyn's, James's, and Christina's reading competence beliefs were deflated, and they frequently used maladaptive coping strategies such as task avoidance and learned helplessness (Covington, 2000; Dweck & Elliott, 1983; Miller & Meece, 1999; Nicholls, 1984; Onatsu-Arvilommi et al., 2002; Salonen et al., 1998; Westen, 1996; Wigfield & Guthrie, 1997; Woolfolk-Hoy, 2005). These student participants' behaviours matched their attitudes toward completing such print-based worksheets after reading a story but not toward completing computer-based reading activities.

The findings of this study contribute to the growing evidence base on the positive motivational effects of computer-assisted reading instruction on students, especially those who had reading and behavioural difficulties during their classroom reading instruction, such as Jaclyn, James, and Christina. Their perceived enjoyment and fascination with online storybook reading might continue to be used as incentive to foster these students' reading motivation. suggest that computer-based reading instruction resulted in increased sustained attention and decreased off-task behaviour for the three "struggling" student participants who were hyperactive and inattentive during the components of their classroom's beginning reading instruction. The off-task, learned helplessness behaviours typically displayed by Jaclyn, James, and Christina during sustained classroom reading instruction were not observed during their computer sessions. The present results were similar to those of Ota and DuPaul (2002), and Clarfield and Stoner (2005), as these student participants' involvement in this program appeared to provide them with individualized, highly engaging instruction with high rates of success and reinforcement. These three students were highly engaged, attentive, and involved during the online storybook reading and the multimedia-based reading activities. For some grade 1 student participants, such extrinsic motivators as individual

immediate feedback (in the form of positive reinforcement) and decreased rates of social comparison with peers may have a positive influence on their perceived self-efficacy and motivation. Consistent with the attribution theory (Heider, 1958), these three participants, who had a maladaptive attribution style and usually attributed their computer program successes to unstable, external factors such as luck ("I guessed that answer"), later began to use more adaptive attribution styles with positive self-talk ("I am really good at this!" and "I remembered this part of the story") towards the end of this study.

It is likely that the value of feedback and praise for intrinsically motivated behaviour most likely influenced the student participants' frequency and amount of reading and consequently their reading attitudes (Das et al., 1985). Not surprisingly, all of the student respondents reported very positive feelings toward receiving praise for reading well. Christina even added, "She [Jessica, her teacher] told my dad, and I was really happy because he hugged me after" (Child Questionnaire 3, p.9). This comment captures her construct of recognition, as Christina enjoyed receiving a tangible form of recognition for her success in reading (Hidi & Harackiewicz, 2000; Miller & Meece, 1997). Similarly, Jaclyn was also extrinsically motivated to read well in order to receive tangible rewards from her parents: "If I work hard at school, my mom said she would buy me a violin" (Child Questionnaire 3, p. 9). Clearly, Jaclyn, Christina, and Sally endorsed a performance goal orientation, as they worked primarily to read well in the eyes of their parents.

The dimension of competition (Unrau & Schlackman, 2006), which reflects the constructs of extrinsic motivation and performance goal orientation, was evident in seven

student participants' responses and during classroom observations. Interestingly, Sarah also showed the extrinsic motivation aspect of competition in reading during her online reading sessions.

It is also worth noting that these three participants, in addition to two other participants, reportedly increased the frequency of computer and Internet usage at home. Aside from online game playing, these student participants claimed to read more eBooks at home and visited the same Internet website used in this study's program sessions for online storybook reading as well as for completing the site's post reading activities. This supports Deci and Ryan's (1985) motivation theory as these participants were intrinsically motivated to actively engage in these technological tools during their free time at home (McCarrick & Xiaoming, 2007). In fact, since their involvement in this study, seven of the eight participants rated more positive feelings toward digital reading instruction (than before the program), and three student participants (John, Jaclyn, and James) who originally preferred print-based worksheets, now preferred online storybook reading and completing reading activities on the computer. Six student participants (Jaclyn, James, John, Christina, Sarah, and Christopher) also asked their teachers to use this technological tool more since their involvement in this study.

All of the students were actively involved in their selecting online storybook readalouds during their program sessions. According to the parent and student questionnaire responses, all of the participants were happier when they were able to choose the kind of reading material they read rather than have it chosen for them. Reflecting on their digital reading, the motivational qualities of self-determination, choice, and stimulation were some of the student participants' cited reasons for enjoying this program. That is, student participants' greater perceived control in their online book reading choices may have contributed to their increased interest in the content domain and motivation to read.

In accordance with *The Report of the Expert Panel on Early Reading in Ontario* (Ministry of Education of Ontario, 2003), the shared experience of a read-aloud also enables teachers to informally assess their students' listening comprehension and provide immediate feedback. However, contrary to the immediate oral feedback of their responses during the read-aloud, student participants experienced delayed feedback when they completed postreading comprehension print-based activity worksheets and often waited a few days or even weeks to find out whether their responses were correct. By contrast, the multimedia-based postreading activities enabled student participants to receive instantaneous feedback. The rapidity of feedback was one of the program's strongest advantages (Clarfield & Stoner, 2005) and perhaps part of the reason for the student participants' perceived enjoyment of this activity.

The motivational qualities of choice, control, interest, and involvement were apparent with the student participants' visual eye gaze patterns during their interactions with hardcover books as well as with the computer programs. Observational data showed that the majority of student participants focused on the animated moving pictures first but then drew their attention to the highlighted text. It appeared that the word-by-word matching and 3-D animated features helped to capture all of the participants' attention (including the struggling readers), assist in the learning of new words, and sustain attentive listening during the entire read-aloud without being distracted or influenced by their peers or external stimuli. The participants' cited reasons for enjoying the digital children's literature program (e.g., "the moving pictures," "the big red words that helped me learn new words and read along," "I could choose which book I want to read," and "I can have a book read to me without any help") highlight that the program's features engaged student participants in learning to read (Clarfield & Stoner, 2005; Ota & DuPaul, 2002). In this program, the text on the screen was read aloud. A few students voiced some concerns about the pace of the moving text ("moving, highlighted words") in the talking storybooks. One common complaint made by the participants during the online reading sessions was that the "girl (female narrator) read too quickly, and the highlighted words moved too fast," and consequently, students had difficulty following along and would become lost.

In sum, these findings indicate the overall contribution of the digital children's literature program and post reading multimedia program on student participants' motivation to read and general reading achievement.

They may have found it easier because they were listening to the eBooks and not reading them.

Implications for Practice

This study has revealed that alongside conventional reading, multimedia and online storybook reading may have positive motivational effects, particularly with those student participants who have not experienced success in reading. The digital children's literature program and post reading multimedia program exposed the eight grade 1 student participants to diverse and interactive versions of a read-aloud with follow-up reading activities. These findings have some implications for curricular practice.

Teachers can assess these different aspects of reading motivation by questioning students with an instrument like the researcher-developed My Motivation for Reading Questionnaire at the beginning of the school year and several times throughout the school year, so that changes in the child's reading motivations, attitudes, and interests can be documented over time. This questionnaire may increase teachers' awareness of their students' reading attitudes, challenges, and interests. The information derived may help teachers become more knowledgeable about effective and motivational reading instruction practices that meet the diverse needs of their students and take into account the prior knowledge and experiences each child brings to the classroom. Administering the questionnaire at each grade level would also be conducive to tracking students' progress from grade to grade. All in all, careful scrutiny of the responses, coupled with teacher observations of student behaviours in various classroom reading contexts, can help teachers plan for meaningful, individualized reading instruction that will support students in becoming highly motivated readers.

Another consideration for practice is to capitalize on immediate feedback student participants received from their computer program sessions. Activities that offer the greatest potential for student enjoyment are those that allow students not only to respond actively but also to get immediate feedback that they can use to guide subsequent responses (Brophy,

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2004; Skinner, 1969; Thorndike, 1932). Automatic feedback features are also built into many educational games and computerized learning systems (Malone & Lepper, 1987). Similar to the findings in Ota and DuPaul (2002) as well as Acevedo-Polakovich et al.'s (2007) study, this feedback feature was an important reason for the student participants' perceived enjoyment of the researcher-developed multimedia-based reading activities. Unlike classroom practices after a reading lesson, within seconds the student participants quickly discovered and corrected their misunderstandings after they listened to the computer repeat the question and possible answers again.

Of particular importance, the computerized reading activities in a game format increased active engagement and performance but decreased James's, Jaclyn's, and Christina's off-task behaviours. These students had difficulties beginning and following through on print-based reading tasks and typically displayed attentional difficulties during their regular classroom reading instruction. It was observed that these students were eager to receive and respond to immediate feedback when learning something for the first time; whereas in their classrooms, they were much less enthused about the prospect of going back to try to relearn something that "they did already" (Brophy, 2004). In sum, for reading competence to occur, "students need to be provided with immediate feedback about their gains in knowledge and general reading progress" (Gaskins, 2005, p.118). Aside from using computer-assisted reading instruction such as the digital children's literature program and postreading multimedia program, teachers could also use strategies to maximize positive interaction with their students like Jaclyn, James, and Christina and minimize opportunities for disruptive behaviour.

If "lack of time" is an issue for teachers and parents using these online storybooks, they can create links to these online storybooks and follow-up reading activities on their school intranet homepage or copy the website shortcut to the desktop of their (school or home) computer. Families can also increase digital read-aloud opportunities by asking older siblings, babysitters, or other family members to sit next to their young readers during online reading experiences. Similarly, if teachers are fortunate enough to have extra assistance in their classrooms (e.g., co-op students, parent volunteers, or teaching assistants), they should also ask them to assist students during their interactions with online learning environments.

Online storybook reading also provides students with the option of either listening to stories read to them with the text's electronic voice or reading it by themselves without the "talking voice" feature. The latter option fosters strategies for decoding, fluency, and comprehension, as students can practice proper phrasing and fluency. Additionally, some online storybooks cater to individual developmental needs, as they allow students to adjust the reading speed (e.g., the spoken, highlighted words per minute). In the online storybooks available on the ChildtopiaTM (Childtopia SL, 2008) website, for example, the size and font of the text was enlarged to accommodate individual learners; with other online storybooks, students can also have the option of adjusting the reading rate speed. In addition to assisting struggling readers with their reading (e.g., with the word-by-word matching feature and read-aloud option), these unique features will also help students like Mark, Sarah, and

Christopher, who need to be challenged in their reading and reading-related tasks. In accordance to Lepper and Cordova (1992), the provision of choice, challenge, and personalization in online storybook reading will produce dramatic increases, not only in students' intrinsic motivation but also their depth of engagement in learning, the amount they learn in a fixed time period, and their perceived competence and levels of inspiration.

The results from this study are consistent with those of de Jong and Bus (2002) as well as Blum et al. (2008), who found that animations and 3D features further enhanced the student participants' engagement and motivation to listen to and understand online stories as well as successfully complete reading activities. Based on observations and participant questionnaire responses, the animated, 3D features embedded into the online reading program also captured the grade 1 students' attention, which may have motivated them to increase their effort and participation during the program sessions. It is also important to note that most of these game-like features involve presenting intellectual challenges and are more effective in promoting student motivation to learn than are competitive games that emphasize speed in supplying memorized facts rather than integration or application of learning (Brophy, 2004).

Overall, the findings from this study have shown that the digital children's literature program, although perhaps not an entirely satisfactory replacement for adults reading printed books to children, may nonetheless be a beneficial supplement to oral and print literacies for grade 1 students. Of course, parents and teachers should not rely on using only these reading software programs for developing children's reading skills and motivation. Instead, they should use these technological reading tools with other material resources that cover a diverse range of student interests and allow them to self-select and explore different types of literature both inside and outside the classroom.

The aforementioned complaints made by the participants about the eBooks should be taken into consideration. When deciding which eBooks to use, then, one should look for programs with adjustable features in order to best suit diverse reading preferences and abilities.

Limitations and Future Research

The present qualitative study was designed to gain a deeper understanding of the nature of and attitudes toward conventional and digital reading experiences among grade 1 students, their parents, and teachers. Although the current results are promising, several limitations and implications for further research in this area are recommended.

First, it is important to note that observational data depict the observer's viewing of the eight students; consequently, a potential for observer bias exists because the same observer conducted all of the observations and documented those observations through field notes.

The author conceded that there may have just been a "novelty effect" (Song & Keller, 2001) with the self-selected students using the online reading program. The implication of this criticism is that the positive outcomes- learning from the new medium, having more positive attitudes about eBook reading- will tend to decline as the technology becomes more familiar and its novelty wears off. This has important implications for individuals in that they

must continue to update and make their online eBook websites relevant and tailored to the needs and interests of Internet users. Another suggestion emerging from these critiques of research on computer and Internet usage is to use longitudinal data from a large, representative sample to study the effects over a long period of time.

Technical difficulties experienced during the online reading sessions should be taken into serious consideration when conducting future Internet-mediated research, as they presented the greatest challenge in this study. On numerous occasions, observations and data collection were either suspended and reconvened at a later time or the programs were restarted during that session when there were technical problems. Some of these problems included glitches in the ChildtopiaTM (Childtopia SL, 2008) website, reduced Internet connection speed, computer freezing, hyperlinks, sound, and animations, all of which were a hindrance to and stalled participants' learning. Consequently, this may have affected the participants' level of engagement and curtailed their enthusiasm for this type of learning environment. With any computer- and Internet-mediated research, it is virtually impossible to eliminate all technical difficulties.

A potential problem with taking field notes in research is the so-called "Hawthorne Effect" (Creswell, 2003). In this qualitative study, the Hawthorne effect may have been a factor during the classroom observations and online reading sessions, since the participants (and their teachers) were aware of the fact that their actions were being recorded by the investigator (Creswell, 2003). Hence, it may be difficult to be sure that the teachers' and participants' actions were the same as they would have been without the observations

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(Creswell, 2003). Almost all qualitative research is confounded by this problem, as researchers can never eliminate all of their own effects on participants or obtain a perfect correspondence between what they wish to study (the natural setting) and what they actually study (a setting with a researcher present; Creswell, 2003).

The study's small sample size, lack of control measures to manage extraneous or intervening variables among program participants, and the method of recruitment such as voluntary self-selection also need to be taken into consideration. Clearly a self-selected sample of eight cannot be generalized and so additional cautions must be exercised both in what the study is proposed to do and also what it has accomplished.

Second, many contextual factors other than the reading curriculum were not examined in this study are also related to and can influence grade 1 students' reading development, attitudes, and motivation within home and school reading experiences. One promising way to explore the causal nature of these relationships would be to isolate the potentially independent effects of students' socioeconomic status, gender, age, teacher characteristics, and reading levels on reading motivation and self-efficacy.

The results of this investigation suggest that the computerized reading program was effective in improving task engagement for three student participants with behavioural and reading difficulties. Thus, an investigation of the effectiveness of this digital children's literature program on reading skills and reading motivation with other early elementary school-age students who are formally identified as having learning difficulties or behaviour disorders, as well as English language learners experiencing academic and/or motivational problems in reading is warranted.

The outcomes that are reported here depend on a few informants rather than a representative sample of grade 1 students, teachers, and parents. A large-scale, nationally representative sample of grade 1 student participants, parents, and teachers would provide data at a system level and temper the confounding variables affecting children's reading attitudes toward and the effects of conventional and digital reading on their reading development and motivation. A longitudinal study that followed the same group of participants into the later grades would also offer greater insight into the relationship between and the long-term effects of the two types of book reading instruction (digital reading versus print-based reading) on grade 1 students' reading motivation and reading achievement. It would also be interesting to build on the current research and conduct a cross-section study with older children in the later stages of their reading development, especially where read-alouds are less common in the classroom to capture more fully the relationship between the different types of reading instruction, reading motivation, and reading achievement.

Conclusion

The decrease in motivation to read across the elementary school years has stimulated concern about how students might be motivated to read and engage in literacy activities. This study has shown that reading software with multimedia enhancements, motivational aspects, and constructivist methods of instruction can promote reading motivation among beginning readers. Of particular importance was the effectiveness of these programs in decreasing offtask behaviours and increasing sustained levels of attention, competence and engagement for three students who had reading and attentional difficulties during the components of their classroom's reading program. In light of the "Matthew Effect," the multimedia and digital reading programs can help to address the gap in achievement and motivation between good and poor readers. Educators and parents are instrumental in helping their students to develop the new skills and strategies that are important in today's technological age. Digital reading programs alone will not teach children to read, but rather may provide an opportunity for practice of skills that beginning readers learn from direct, systematic instruction in their classrooms, in a highly appealing and constructivist manner. As students take advantage of these online opportunities, positive dispositions will develop toward the use of these new digital literacies for reading, fostering motivation, engagement, and a lifelong love of reading.

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