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Learning Space: Perspectives on Technology and Literacy in a Changing

Educational Landscape

Daniel Powell, Ph.D.

Florida State College at Jacksonville

daniel.powell@fscj.edu

Abstract

Rapid developments in both educational technologies and curriculum philosophies have changed the ways in which students and educators interact with texts. Calling upon the work of such leading literacy scholars as Manzoor Ahmed, Vicki Jacobs, and Terry Salinger, this essay examines America's stagnant functional literacy rates through the interrogation of a simple question first raised by N. Katherine Hayles in her recent text *How We Think*: Why should hypertext, and web reading in general, lead to poorer comprehension? Using historical trends and contemporary research findings on how children use a variety of texts, this essay represents a call to re-affirm the importance of dialogical reading practices in the home and the classroom. Concurrent to effectively teaching those traditional reading practices, our educational system must also prepare children for a future in which machine and hyper reading habits will only take on additional prominence. A positive repositioning of literacy as a foundational academic, professional, and societal skill must therefore be equal to the passion that many administrators are currently expressing (through curriculum design and resource allocation) for courses in science, technology, engineering, and math (STEM).

Keywords: literacy, STEM education, hyper reading, close reading, machine reading, dialogical literacy practices

In *The Structure of Scientific Revolutions*, historian and physicist Thomas Kuhn introduces the theory of paradigmatic shifts—those changes in social and scientific traditions that have such immense consequences that their very nature is no longer commensurable to the long-held systems of belief they displace. Kuhn theorizes that, in the process of normal scientific inquiry, moments of crises emerge that demand innovative approaches to new testing methods. When these methods gain traction within a community and consensus emerges on the validity of the data they produce, a paradigm shift redefines the culturally shared values and assumptions of the group.

While Kuhn's influential 1962 text examines scientific developments in support of its claims, the tradition of human communication, as cavernous in its scope and breadth as any other discipline in scientific inquiry, seems mired at present in a period of crisis that capably illustrates his theories at work. As editor Terence Hawkes states simply in the preface to Walter Ong's *Orality and Literacy: The Technologizing of the Word*:

> It is easy to see that we are living in a time of rapid and radical social change. It is
> much less easy to grasp the fact that such change will inevitably affect the nature
> of those academic disciplines that both reflect our society and help to shape it. (ix)

One such area of rapid change is the emerging primacy of the digital writing space, a technological paradigm shift whose origins may have begun decades ago, but whose consequences have come most glaringly to bear in the last two decades. As the ubiquity of digital publication has exploded throughout the developed world, our approaches to writing and communication have undergone drastic changes. The consequences of these developments can be immense for, as Ong asserts, more "than any other single invention, writing has transformed human consciousness" (78). As a cornerstone of literacy, a nebulous set of abilities that Terry

Salinger views as encapsulating "reading, writing, and many other skills," (1) writing stands at

the heart of creative expression and educational opportunity. Writing connects thinkers across

the thresholds of time and space, and the process of decoding the written system—of reading and

deciphering information—represents the other side of the communication equation. Taken

together, the processes of sending and decoding information comprise the dominant divisions of

the topic we have come to understand generally as "literacy."

Cultures organize themselves around a core of designing principles, and inclusive

communication practices stand at the heart of any cohesive society. As changes in technology

reshape the ways in which we learn new concepts, conduct business, manage our interactions,

and cultivate the interests of the greater good, a series of questions begins to emerge: How has

technology impacted our approaches to education? How do we define "literacy," and how can

we improve the general levels of cultural navigation for those who have been left behind by what

is now commonly referred to as the "digital divide"? And finally, how have shifting attitudes

about the future of our economy begun to manifest themselves in the day-to-day administration

of our educational systems?

Rapidly developing technologies can become something of a double-edged sword. Just as

"first-movers" enjoy an advantage when implementing a "disruptive technology or business

model that…challenge[s] an incumbent with innovative technology," so to do early adopters

enjoy an advantage when experimenting with these products and services from the user's

perspective (Lucas 8). In many instances, gaps in the level of access to a particular technology

exist which can predict who the winners and losers might be when a paradigm shift takes place.

Inequalities in socioeconomic status, geographical location, and access to training and skills

practice are some of the issues that have surfaced in recent years as America's educational

community attempts to track and make sense of the changes the digital revolution has had on

student achievement.

Establishing both contemporary and historical perspectives is useful in creating a

framework for thinking about literacy and education in America, and an analysis of aggregate

reading comprehension levels is the most logical place for such a discussion to begin.

It was reported in the 2009 National Assessment of Educational Progress (NAEP[1]) that

33% of fourth graders read below the testing instrument's lowest level of "basic." In other

words, a third of the testing subjects failed the assessment. The instrument tested children on a

series of comprehension questions spanning both literary and informational reading passages.

There was a slight measure of improvement for eighth graders testing in 2009, although 25% of

students still failed to meet the "basic" standard, and only 4% of students could read at the

"advanced" level ("Reading 2009").

When comparing these findings with historical trends, we actually learn that reading

achievement levels have improved slightly since 1971, though that improvement has been

negligible. The "Average Scale Score" (scored 0-500) figure for thirteen-year-old students in

1971 stood at 255; in 2009, the figure had risen to 260 ("Long-Term Trend"). It is important to

note, however, that some critics have ascribed the slight improvement to a revision of the testing

instrument, which was implemented in 2004 ("Reading 2009").

What do these statistics actually *mean* for our students, our educational system, and the

future of our economy? Well, they illustrate that in 2009, fully one third of testing subjects aged

nine and ten read below grade level, while a quarter of subjects aged thirteen and fourteen

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[1] The results of the 2013 NAEP reading report will be released in the fall of 2013.

couldn't meet those same basic reading standards. That's a large segment of our population that

is still fundamentally learning to read, rather than using reading to learn (Jacobs 12). These

results paint a picture in which roughly "40 percent [of adolescents] cannot draw inferences from

written material…and only one-third can solve a mathematics problem requiring several steps"

(Jacobs 7).

When students struggle to decode written, oral, and visual information in the classroom,

realizing even basic levels of comprehension becomes exceedingly difficult. Students experience

progress at different rates, and some become discouraged to the point of abandoning the

educational system altogether.

In fact, "among public high school students in the class of 2008-09, the [national] AFGR

(adjusted freshmen graduation rate) was 75.5 percent" ("The Condition of Education"). This

means that almost 25% of American students failed to graduate from high school on time with a

regular diploma. The drop-out rate is almost a perfect reflection of the number of eighth graders

who failed to read at grade level in the 2009 NAEP report, and is perhaps a contributing factor in

the dismal adult literacy scores that were reported in a 2009 study by the National Center for

Education Statistics. As Greg Toppo notes:

> A long-awaited federal study finds that an estimated 32 million adults in the
>
> USA—about one in seven—are saddled with such low literacy skills that it would
>
> be tough for them to read anything more challenging than a children's picture
>
> book or to understand a medication's side effects listed on a pill bottle.

Toppo's use of examples above presents an important question: *How* do we define the idea of

"literacy" itself? What are the practical literacy outcomes that, if negotiated successfully, allow a

person to make his or her way in American society?

While the previously cited test findings are based solely on reading comprehension, many

educational theorists have expanded the definition of literacy to include a much broader set of

skills and attributes. The United Nations Educational, Scientific and Cultural Organization

(UNESCO) has drafted three separate definitions of the term over the last five decades:

(a) A person is literate who can, with understanding, both read and write a short

simple statement on his or her everyday life (UNESCO 1958);

(b) A person is functionally literate who can engage in all those activities in

which literacy is required for effective functioning of his or her group and

community and also for enabling him or her to continue to use reading,

writing and calculation for his or her own and the community's development

(UNESCO 1978);

(c) Literacy is the ability to identify, understand, interpret, create, communicate

and compute using printed and written materials associated with varying

contexts. Literacy involves a continuum of learning in enabling individuals to

achieve his or her goals, develop his or her knowledge and potential, and

participate fully in community and wider society (UNESCO 2005). (Ahmed

181)

These characterizations illustrate an evolution in thought and complexity in *how* we

characterize literacy, but the basic comprehension questions actually posed in the 2009 NAEP

testing instrument seem not to push much at all beyond the boundaries presented in UNESCO's

first, exceedingly simplistic definition. Taken together, our alarming national drop-out and

reading-comprehension rates (especially when juxtaposed with our present period of rapid

technological innovation) present a pair of seemingly simple questions with very complex

answers: How did we get here, and what should we do to reverse these negative statistical

trends?

A response to the first question might rest at least partially in an understanding of our

cultural attachments to media itself. In his 1994 text *The Gutenberg Elegies*, Sven Birkerts

expresses his reticence about the digital march to progress. He compares the "morbid symptoms"

that the Greeks endured in their transition from oral to written language dominance with our

present circumstance, stating:

> If the print medium exalts the word, fixing it into permanence, the electronic
>
> counterpart reduces it to a signal, a means to an end…The tendencies outlined
>
> above are already at work. We don't need to look far to find their effects. We can
>
> begin with the newspaper headlines and the millennial lamentations sounded in
>
> the op-ed pages: that our educational systems are in decline; that our students are
>
> less and less able to read and comprehend their required texts, and that their
>
> aptitude scores have leveled off well before those of previous generations. (123)

Birkerts adopts a refreshingly cautionary stance on the idea of an "all-electronic future," stating

that he harbors a "great feeling of loss and a fear about what habitations will exist for self and

soul" in the digital age (128). His contrarian views concerning some of the digital epoch's most

widely lauded attributes (which, among Lucas's substantial inventory, include two billion

digitally networked users and instantaneous data retrieval) is predicated on three adverse

developments: language erosion, a flattening of historical perspectives, and the waning of the

private self (128-31).

It is the actual physical diminution of the collected tools of our intellectual heritage that Birkerts views as an affront to learning in the digital era:

> The depth of field that is our sense of the past is not only a linguistic construct, but is in some essential way represented by the book and the physical accumulation of books in library spaces…Once the materials of the past are unhoused from their pages, they will surely *mean* differently. The printed page is itself a link… (129)

Almost twenty years after the publication of *The Gutenberg Elegies*, a recent study presented in *Research in Social Stratification and Mobility* seems to have confirmed some of Birkerts's theories on the connection between proximity to tangible books and learning. As Tom Bartlett reports in his article "Want Smart Kids? Here's What to Do," having a sizable accumulation of books in the home is a greater predictor of educational success than is a parent's socioeconomic status or level of educational attainment. Bartlett writes:

> Researchers found that children who grew up in a home with more than 500 books spent 3 years longer in school than children whose parents had only a few books. Also, a child whose parents have lots of books is nearly 20-percent more likely to finish college. For comparison purposes, the children of educated parents (defined as people with at least 15 years of schooling) were 16-percent more likely than the children of less-educated parents to get their college degrees. Formal education matters, but not as much as books.

While correlation does not illustrate causation, it *is* a sizable study (conducted over twenty years, and covering more than 70,000 respondents from twenty-seven countries) that supports the notion that intellectual curiosity can be a natural byproduct of informational access.

And so, given Lucas's postulate on instantaneous data retrieval, should it not stand to reason that students using the internet have greater access to information, and therefore possess the potential to become stronger scholars than their print-reliant forebears?

Theorist N. Katherine Hayles effectively refutes that argument in her recent text *How We Think*. Citing neurophysiologist Stanislas Dehaene and psychiatrist Norman Doidge, Hayles constructs a convincing argument that web reading can actually contribute to poorer overall comprehension. In her chapter "How We Read," she outlines three practices that seem now in competition with one another in the digital era: close reading, machine reading, and hyper reading. Close reading is the traditional tool of literary scholars, which includes "detailed and precise attention to rhetoric, style, language choice, and so forth through a word-by-word analysis of a text's linguistic techniques" (Hayles 58). The other types, in Hayles's view, represent modes of "fast reading and sporadic sampling" (58). Hyper reading truncates context as terms and phrases are limited and refined through search queries, while machine reading may eliminate context altogether as complex algorithms comb large amounts of data, sifting for patterns that often emerge independent of meaning. Citing Dehaene's "neural recycling" hypothesis, which suggests that some reading practices effectively repurpose existing brain circuits, Hayles argues that close reading allows the commitment of data to long-term memory to happen more efficiently (64-5). This is particularly true when one considers the cognitive strain of "clicking on links, navigating a page, scrolling down or up, and so on" while trying to situate content within long-term memory (Hayles 64). The linear reading habits that Birkerts and Hayles

view as the foundation of curating, learning, and possessing information are exercised less

frequently among contemporary students, and there is also the added concern of using

information out of context that contributes to what Harvard's Dr. Vicki Jacobs views as a lack of

"'higher-order' intellectual skills" (7).

Such digital reading practices, when coupled with the flood of erroneous information

regularly disseminated in the unfettered digital domain (Notte), have spawned the subsidiary

academic discipline of digital literacy studies. It's not enough simply to understand the linear

aspects of a story, essay, or article; consumers of information must also understand which

evidence is credible and trustworthy. As Trever Millum notes, "Yes, you can get an enormous

amount of data very quickly but, no, the technology does not sift it for you, quality assure it,

analyse it or synthesise it. Those old-fashioned skills still need to be taught" (28). Millum's

salient points speak to the importance of teaching digital literacy skills, but evidence suggests

that vulnerable student populations are ill-prepared to succeed in the digital educational

environment. For some, not acquiring these skills could represent a serious barrier to attending

college altogether:

> For disadvantaged students lacking awareness or the digital-connection
>
> capabilities, entry into college may become harder to obtain than ever before.
>
> "Our first-generation college students, even if they have computers with high-
>
> speed Internet, still struggle through the college-application process because they
>
> do not have the same frame of reference and knowledge base when it comes to
>
> things like college-search websites," said Darrell Sampson, a guidance counselor
>
> with the 182,000-student Fairfax County school district in Virginia. "If you do not
>
> know what it is you are supposed to be looking for, or how the process is

supposed to work," he said, "you are probably not going to be accessing the

wealth of information available through technology meant to assist you."

(Fleming)

Disparities in digital literacy instruction and skills practice represent only one barrier to student

access. Another is present in the geographical discrepancies of broadband availability, even in a

country as wired as the United States. In a recent article published in *Congressional Digest*, it

was reported that, "of the 19 million Americans who live where fixed broadband is unavailable,

14.5 million live in rural areas" ("Access to Telecommunications…"). The Federal

Communication Committee's *Eighth Broadband Progress Report* noted that rural broadband

speeds were significantly slower than were services in urban areas, indicating that it's not only

what you know, but where you live that dictates your level of inclusion within a fully integrated

(education, commerce, entertainment, and civic engagement) digital environment.

The K-12 and post-secondary educational communities appear situated in a precarious

position—stretched between a print legacy built on the cultivation of close reading skills and an

extensively mediated digital environment that embraces hypertextual documents and machine

reading practices. While post-secondary institutions have embraced the validity and profitability

of online and hybrid educational learning opportunities, a stigma concerning medium still exists

on the topic of publication for, even in "the late age of print, scholars in the humanities continue

to regard print forms as authoritative" (Bolter 112). Even though there is some inherent

incongruity in embracing the digital classroom while eschewing the digital journal, post-

secondary institutions are improving the levels of rigor in online education while expanding

educational opportunity in the form of free classes. Harvard and the Massachusetts Institute of

Technology, for instance, are foundational participants in the edX movement, a push to offer free

online courses (Lewin).

Both the present and the future of American K-12 education are less clear, even though

the stakes are much greater. The American public education system is, after all, the foundation

upon which our country's intellectual and entrepreneurial capital is constructed. A systemic (and

seemingly chronic) lack of funding has become exacerbated by competing educational

philosophies which stand to further fragment and stratify our student populations in the short

term, and our labor pool in the long term.

Since becoming a founding sponsor in the National Science and Math Initiative (NMSI)

in 2007, energy company ExxonMobil has aggressively advertised the importance of bolstering

the number of Americans earning post-secondary degrees in the fields of science, technology,

engineering, and math (STEM). The NMSI is seeking to implement broad reforms in our

country's K-12 educational system. One such advertisement laments the findings of the 2009

Program for International Students Assessment, which placed the United States 17th overall in

scholastic achievement in science and 25th overall in math (*Letssolvethis.com*). Touting a mixture

of educator professional development, rigorous and common core state standards, and an

increased emphasis on advanced placement education, the NMSI's efforts to reverse our

country's place in the PISA standings are both laudable and lofty, as a variety of competing

factors have had material negative impacts on the organization's ability to meet its benchmarks.

One of these important factors is our country's stagnant progress rates in reading competencies

across all levels of K-12 education.

Where the STEM fields are concerned, educational reform has become something of a

political flashpoint across the country. In Florida, Governor Rick Scott has tied all levels of

educational emphasis, from elementary to post-secondary schooling, to STEM. In announcing

his 2011 legislative priorities, Scott wrote:

> The K-12 system must also meet STEM demands in both the K-12 setting as well
>
> as in its workforce education programs. Our students must meet high academic
>
> standards with strong preparation in science and math in order to be prepared to
>
> compete with an increasingly competitive global workforce. (Solocheck)

Florida is not alone in its push to situate STEM at the top of the educational hierarchy.

Rick Perry, Governor of Texas, has made it a foundation of his state's educational philosophy,

and President Barack Obama has launched the "Educate to Innovate" initiative, which lists the

following as its goals:

1) Increase STEM literacy so that all students can learn deeply and think
   critically in science, math, engineering, and technology.

2) Move American students from the middle of the pack to top in the next
   decade.

3) Expand STEM education and career opportunities for underrepresented
   groups, including women and girls. ("Educate to Innovate")

The aims of such programs are certainly not without merit; after all, it's commendably prescient

for a society to cultivate a workforce that can meet the demands of a diverse global marketplace.

But such a drastic restructuring of our educational hierarchy could not come at a worse time for

our students, who are, based on national testing measurements, ill prepared to handle such a

rigorous curriculum. Such fundamental shifts in our collective educational philosophy, while

giving the appearance of sagacity, actually appear to represent the opposite ideal. Asking kids

who lack basic reading fundamentals to participate in a rigorous STEM curriculum is the very

definition of placing the cart before the horse.

And which students will struggle the most with these program adaptations? According to

the figures found on page 10 of the 2009 NAEP report, minority (who typically realize fewer

educational and technological resources in the home) populations continue to experience a

sizable skills gap in relation to their White counterparts. According to the report, White students

enjoy a "26-point score gap" over Black students, and a "25-point score gap" over Hispanic

students ("Reading 2009"). This translates into stronger levels of academic preparation for White

students, which is advantageous in a push to secure work in the high-paying STEM professional

fields.

Technology marches forward, caring nothing about race, gender, socioeconomic status,

or geography. It simply exists, as a conceptual entity, to build on existing paradigms in its

inevitable progression along historical and cultural continuums. But that sterile characterization

of technology as a concept does nothing to alleviate the truths of our lived experience, which

indicate that "hierarchies based on gender, race, and economic advantage remain strong in our

culture" (Bolter 210). So these seemingly parallel concepts must ultimately converge in their

formation of an answer to one final important question: What is our best path forward?

Harvard Educational Review published a special issue on the topic of adolescent literacy

in the spring of 2008, and Jacobs set the tone for that issue with a piece titled "Adolescent

Literacy: Putting the Crisis in Context." In her oft-cited analysis, Jacobs traces a decade of

empirical findings on the subject of literacy, as well as the variety of responses designed by the educational community to correct these deficiencies.

Three key concepts rise to prominence in reviewing Jacobs's report. The first is that elementary education is crucial to intellectual development. The second is that a shift away from integrating reading specialists in the classrooms and delegating literacy education to content-area instructors has resulted in negative consequences for our students. And the third is that educators must balance technological access with instruction in traditional reading and writing competencies.

In addressing these concepts in order, it is apparent that children must learn to reason and decode early in life. As Jacobs reports:

> Children who have acquired decoding and fluency skills by the end of the third grade will most likely be prepared to learn how "to acquire knowledge, broaden understandings," and cultivate their "appreciations of the written word" (Harris and Hodges 213). Those who have not achieved automaticity and fluency in their reading will be severely limited in their access to more technical, syntactically complex, and dense reading that is characteristic of content-based reading. Without access to print, they cannot acquire the knowledge that later learning presupposes. (13-4)

It is not by coincidence that Jacobs overtly refers to print in the passage above. Children require "dialogic reading," a form of conversational interaction between parent and child that a recent Vanderbilt University study found was impeded when parents and children read on tablets or e-readers (Guernsey). The use of tactile, physical books that Birkerts champions in *The Gutenberg*

Elegies forms the basis for the close reading that Hayles views as crucial to intellectual

development in *How We Think*.

Secondly, K-12 administrators must revisit the importance of reading specialists as an

integral component of their institutions' pedagogical infrastructure. Jacobs writes:

> If the trend persists and we continue to transfer the responsibility for adolescent
>
> reading instruction (including for struggling readers) to content-area teachers, we
>
> need to understand that these teachers face a daunting task—especially if the
>
> ultimate goal is to create excellent classroom reading teachers. (22)

What good is the NMSI's commendable goal to expand the professional development

opportunities for science and math teachers if 25% of their eighth graders can't read at a basic

level? Early emphasis on literacy skills is important, but so is ancillary emphasis on reading

skills. Specially trained educational professional can offer these services in the classroom, if an

educational philosophy that stresses reading to learn can find funding for them.

The final concept is the necessity for America's educational collective to strive for

educational balance. Research indicates that early education is so crucial to a child's intellectual

development that an emphasis on dialogic reading, vocabulary accumulation, and syntactical

reasoning is paramount in predicting future academic success. Primary educators should focus

the great majority of their pedagogical energy on teaching students traditional reading

competencies with physically printed texts. Occasional exposure to digital learning opportunities,

including educational games and word processing programs, is important, but the day-to-day

instruction of reading and writing should still take the form of repetitive, interactive, hands-on

teaching and learning.

As students matriculate into the secondary ranks, both teaching digital literacy skills and providing *all* students with the tools necessary to implement those skills are crucial. This can be a daunting task for cash-strapped districts, but it's not impossible, nor is it unprecedented.

My wife is a school counselor at a large urban high school in Jacksonville, Florida. Sandalwood High School's student population reflects the general make-up of the city; it is racially and ethnically diverse, with wide gaps in the socioeconomic status of its students and their families. Access to digital technologies is marginal on school grounds, and many students have few economic or technological resources in the home. Sandalwood, like many schools in Duval County, struggles to meet state-imposed standards for reading based on the Florida Comprehensive Assessment Test (FCAT). In 2012, only 45% of tenth graders in Duval County could read at grade level ("Duval Reading…").

In an effort to reverse these trends, the district's new school superintendent, Nikolai Vitti, has made digital learning a focal point for all levels of K-12 education. In December of 2012, Vitti and the school board announced that Duval County had secured special bond funding that is backed by the Florida Department of Education. With access to zero-interest funding, Superintendent Vitti hopes to provide, within a period of two years, each of the district's 125,000 students with access to either an iPad or a laptop computer. In clarifying his rationale for greater technological integration, Vitti said that students "have become digital learners, and this technology will enhance their opportunities for success in a technology-driven world" ("Duval County Public…").

It's an important step in granting educational equality to all Duval County students, but the true measure of the move's success won't be known for years, as the earliest adopters of these digital technologies, the children now entering third and fourth grade in our local

elementary schools, make their way through the system. Our best hope is that the kids in that population embody the spirit of the pedagogical approach that Tufts professor Maryanne Wolfe presents in *How We Think*:

> We must teach our children to be "bitextual" or "multitextual," able to read and analyze texts flexibly in different ways, with more deliberate instruction at every stage of development on the inferential, demanding aspects of any text. Teaching children to uncover the invisible world that resides in written words needs to be both explicit and part of a dialogue between learner and teacher, if we are to promote the processes that lead to fully formed expert reading in our citizenry. (75)

Paradigm shifts have deep and lasting consequences. In many cases, they render old technologies useless while new opportunities and technologies fill those voids. The rapid changes in our reading and writing spaces fully illustrate these concepts, from the necessity for adapting to new reading strategies to the creation of digital literacy curricula and specialists. And yet, for all of the cultural bluster about maintaining our status as a global innovator in the age of information, it is crucial that American educators acknowledge the value of the basic, foundational literacy skills that are best cultivated in the traditional, repetitive skills practice of interacting with print texts.

The future is coming, but when in human history has that ever not been the case? We shouldn't mythologize either the importance of a STEM education or the dominance of the digital environment. In order to meet the demands of the paradigm shifts that stand just beyond the horizon, it's important not to lose perspective on the importance of the technologies, such as

the book and our systems of communication, that have for centuries made those paradigms

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Effects of Reading Formats on the Comprehension of New Independent

Readers

M. Christina Roberts, M.Ed., MLIS
Kejabri-Roberts, LLC.
robertmc@stthom.edu

Dr. Catherine R. Barber, Ph.D.
University of St. Thomas
barbercr@stthom.edu

Abstract

This research study was conducted to determine whether book format (print or electronic) influenced newly independent students' reading comprehension. Thirty second grade students were randomly assigned to read a print or electronic version of a pre-selected book using a crossover study design to allow measurement using a sequenced treatment method. A multiple choice quiz was used to measure comprehension. The time spent to complete reading was recorded to allow investigation of this variable. The data analysis examined the relationship between the dependent variables of reading comprehension and time spent to complete reading combined with the independent variables of book format, treatment sequence, and reading proficiency level. The results showed a statistically significant relationship existed between book format and comprehension scores as well as book format and time spent to complete reading ($p < .05$). A qualitative survey determined preferences for reading format and content based upon ease of use of format as well as the content appeal.

The importance of learning to read cannot be overlooked, as reading is a skill that allows

individuals to acquire knowledge in all subject areas. In 2000, the National Reading Panel (NRP)

Report identified several areas of research related to computers and reading. The Panel

recommended further study of the use of computers for selected instructional tasks, teaching the

reading/writing component, utilizing multimedia software, providing motivational reading, and

introducing hypertext applications (National Institute of Child Health and Human Development

[NICHD], 2000). In the decade following the NRP report, additional research (Grimshaw,

Dungworth, McKnight, & Morris, 2007; Korat & Shamir, 2008; Lefever-Davis & Pearman,

2005; Pearman, 2008; Shamir, 2009) concerning the impact of reading materials in the form of

print books, e-books, or interactive electronic books continued to provide information on the

effectiveness of these formats for increasing student engagement and reading comprehension.

However, there is still much to learn about issues surrounding the evolution of reading formats,

the use of these formats to motivate readers, and the design of best practices to promote their use.

Reading advocates such as the American Association of School Librarians (AASL), a

division of the American Library Association (ALA), understand that readers in the 21st century

must be able to comprehend, analyze, and evaluate text in both print and digital formats (AASL,

2009). The National Education Technology Plan released in 2010 has provided a vision for all

educators and students to have wireless internet access devices for research, communication, and

multimedia resources (U.S. Department of Education, 2010). However, the incorporation of

technology-driven reading platforms increases the need for additional research on students' use

of electronic and print resources and its potential impact on reading comprehension. With this

information, educators can make educated choices regarding the correct resources as well as

technologies to support student reading comprehension for all readers particularly those students in need of reading intervention.

Even before the addition of an electronic format, students' reading comprehension has been found to be influenced by factors such as a language mismatch between the reader/author, an inability to fully integrate the information presented, a misunderstood text organization, and/or an unengaged reader (Barr, 2007). Educators want students to become life-long learners and readers as students who have reading success will comprehend what they read, enjoy the experience of reading, and apply the information gained from reading (Graves, Juel, & Graves, 2007). If the additional features in interactive electronic books are determined to increase enthusiasm and engagement in reading, then student comprehension may increase as well (Grimshaw et al., 2007). Similarly, the choice of reading the same book title in either a print or electronic format could negatively influence student engagement.

Previous investigations have been conducted to establish whether reading comprehension gains could be measured for students who used electronic systems for reading; however, the results have been contradictory and therefore inconclusive (e.g., Doty, Popplewell, & Byers, 2001; Underwood, 2000). Research concerning the impact of book format on reading comprehension has often generated results that indicated no significant differences across formats (e.g., Grimshaw, Dungworth, McKnight, & Morris, 2007; Korat, & Shamir, 2008). Earlier studies of the CD-ROM electronic book format highlighted problems with interpreting the results due to the varied multimedia components contained in different products, such as sound, music, and animation (Shamir & Korat, 2006). For example, Pearman (2008) investigated whether the choice of CD-ROM or print formats would provide better comprehension scores for

54 second grade students. Pearman found that CD-ROM storybooks minimized the time students

spend on decoding so they can focus more on reading comprehension.

Some researchers have suggested that the addition of animated components to the text

has actually distracted young children rather than support their literacy (Shamir & Korat, 2006;

Shamir, 2009). In a similar vein, Trushell, Burrell, and Maitland (2001) found that the interactive

components of electronic storybooks on Year 5 students' reading comprehension negatively

influenced these students' reading comprehension. Likewise, Lefever-Davis and Pearman (2005)

noted that the overuse of electronic features for decoding and word meaning may cause young

first grade readers to not fully develop skills necessary for reading comprehension. In contrast,

Ricci and Beal (2002) found that the interactive elements of electronic multimedia storybooks

did not hinder first grade students' recall of the story. Larson (2010) presented a case study that

showed how e-readers can be used to encourage fifth grade reader's engagement and interaction

with the text. Similarly, in the realm of orally read material, de Jong and Bus (2004) determined

that kindergarten students' story comprehension was the same regardless of whether the story

was narrated electronically or read by an adult. Pearman and Chang (2010) noted that when the

additional features of electronic books support the story, reader comprehension may be

enhanced, but supplemental features such as hotspots, highlighted text, and sound effects could

also be "distracters" that could impair reading comprehension. Larson found that interactive

elements such as note-taking and highlighting have the potential to increase 6-7 year-old

students' engagement as well as text comprehension (Larson, 2009). In 2010, Sharmir and Korat

designed e-books labeled "considerate" that were created with hotspots directly linked to the

storyline to help reduce problems associated with electronic hotspots and story understanding.

The researchers determined positive reading gains for students who utilized these "considerate" e-books.

Given the mixed evidence regarding the benefits and drawbacks of electronic book formats for reading comprehension, educators may wonder whether technology-driven reading formats are perhaps more useful for their ability to motivate students (Block & Parris, 2008). Unfortunately, the literature regarding the impact of electronic books and reading motivation is similarly sparse and mixed. Grimshaw et al. (2007) found that the type of book format did not notably affect 9-10 year-old children's reading satisfaction with either a print or electronic storybook. In comparison, Korat (2010) found that e-books designed with electronic features such as narration, animated illustrations, and dictionary features directly related to the storyline all positively stimulated emergent readers' literacy development. Similarly, research by Larson (2009) indicates those interactive elements such as note-taking and highlighting have the potential to increase fifth grade students' engagement as well as text comprehension. Segal-Drori, Klein, Korat, and Shamir (2009) discovered that the design and use of e-books can be enjoyable as well as beneficial but adult interaction with students is still a necessary component for emergent readers' success. Likewise, a study by Jones and Brown (2011) determined that third grade students are highly motivated to read e-books and remain engaged in the reading process when allowed to freely choose the type of book to read.

The development of new literacy forms including digital texts and internet resources increases the need for new research to determine the "best practices" for effective comprehension instruction with digital reading. In a previous study, Dalton and Rose (2008) recognize that "the primary goal of scaffolded digital reading environments is to develop

engaged, active, and strategic readers who are able to understand both print and digital

multimedia text" (p. 352). Likewise in a review conducted by Moody (2010), key considerations

for selection and use of both print and e-books include selection of developmentally appropriate

materials, inclusion of adult support, and the removal of extraneous features that create

distractions. With the knowledge gained from current research, educators are provided with

information to help develop strategies to achieve reading comprehension goals when using

digital formats. The design of best practices for the use of digital reading formats will allow

students to become successful readers well into the future.

The current study seeks to provide additional data pertaining to the differences in

students' reading comprehension depending on the book format (electronic vs. print) and

whether such differences were associated with proficiency levels of newly independent readers

grouped as advanced or proficient. By utilizing electronic book designs that exclude elements

such as animation, sound, music, and narration that could increase reader distractibility, the

results of this study provided information to allow educators to determine whether the various

book formats without electronic features such as narration and animated illustrations can

positively influence new independent readers' comprehension. In this study, 30 second grade

students were identified as advanced or proficient readers and randomly assigned to read a print

or electronic reading format of a researcher-selected book. Each reading group read a new book

title using both types of book formats during a two week data collection period. The dependent

variables were reading comprehension and time spent to fully complete reading each book. The

independent variables included format type (print and electronic), reading proficiency level

(advanced vs. proficient), and treatment sequence (electronic-print vs. print-electronic). The

hypothesis was that there would be significant differences in the reading comprehension for

newly independent second grade students when the students read different book formats.

Method

Participants and Setting

The sample included 30 second grade students, ages eight to nine years old, selected from

two second grade classrooms at a private school in Houston, Texas. The combined study group

was composed of 20 females and 10 males, with English being their first language. Each

classroom had one teacher who taught core subjects to students in a self-contained classroom.

Students were instructed weekly in the use of technology resources beginning in kindergarten.

Both classrooms contained SMART boards and desktop computers that were regularly accessed

by both the teacher and students during classroom instruction.

Participants had a lexile score in one of two ranges, 265 to 599 (proficient) and 600 to

953 (advanced). The placement of students into two leveled reading groups allowed reading

materials to be matched to the average range of reading levels to facilitate improved data

reliability. Matching books to student reading ability adjusted for performance factors that

allowed comparison of comprehension scores recorded using print or electronic books regardless

of an individual student's reading proficiency (MetaMetrics, 2008).

Measures

The instrument used to determine each student's reading comprehension was a five

question multiple-choice quiz designed for use in a lexile-based independent reading program

(SRC, 2006). Numerous studies (e.g., Doty et. al, 2001; Grimshaw et. al, 2007; Trushell et.al,

2001) have found the use of comprehension quizzes to be a valid measure for the assessment of a

student's reading comprehension. All students received a paper copy of the quiz produced for

their book immediately upon completion of reading their assigned book. Students were seated at

tables adjacent to one another for reading as well as test administration. Cardboard study corrals

separated students to minimize distraction during reading and assessment. Each comprehension

quiz contained identical questions that were randomly ordered by the researcher. Each study

participant also completed a qualitative survey during the third week of the study to facilitate

assessment of student preferences for either reading formats based on ease of use as well as

reading enjoyment.

Design

The experimental crossover design of this study provided a method to quantitatively

measure the effect of the independent variables of print and electronic reading formats on the

sample participants' reading comprehension. During the initial week of data collection, students

were randomly assigned to read a print or electronic version of the initial book title matched to

their reading level. The same student read the second book title in the alternate format the

following week. The ability to match participants based on their assessed reading ability allowed

treatment conditions to be controlled so that the study results could be reasonably applied to the

general population of students.

One of the study design concerns was controlling for the variations in the participants'

reading ability. For this study, the variations in student reading levels were controlled by

matching participants to reading materials based on students' previous reading assessment

scores. After analyzing data generated from a current Scholastic Reading Inventory (SRI)

assessment, the student sample was divided into two homogeneous groups based on their lexile

levels. The SRI assessment identified a range of 265-599 as proficient and 600-953 as advanced.

The proficient group had an average lexile level of 423. To enable matching of book resources,

the lexile level translates to a reading level (RL) of approximately 2.37 based on a correlational

chart available from Follett Corporation (Follett, 2011). The advanced group had an average

lexile level of 738. For this group, the lexile level of 738 corresponds to a reading level (RL) of

3.72. The students were grouped according to average lexile levels to allow matching of reading

materials corresponding to each of the leveled groups. Those students from both of the second

grade classrooms falling below the lexile level of 265 participated in the reading activity and

assessment but were excluded from the sample group results.

Procedure

Prior to the data collection, each student was assigned an identification number. The

identification numbers were used to label the paperback books as well as the laptop computers

used to access the electronic books. Approximately 50% of each leveled reading group was

randomly selected to read a print version of the book while the other remaining 50% of each

leveled reading group was assigned to read the electronic version of the book. The electronic

books were accessed from the online reading website *Big Universe Learning*

(http://www.biguniverse.com). Big Universe Learning provides published electronic books

through a fee based subscription service. The publisher books contained on this site closely

replicate traditional print books with features such as two-page spreads, the ability to turn pages

with a mouse click and static print/images. The e-books did not contain narration, highlighted

text, hotspots, or dictionaries, which allowed accurate comparison of student reading using both book formats. Wireless laptops were used to access the electronic books read by students assigned this format. Although tablet readers such as *Nook, Kindle* or *iPad* provide a newer technology for delivery of e-books, many schools transitioning to digital formats have limited funds to purchase these devices for wide-scale use. For this reason, the use of laptops was considered a reasonable way to replicate the hardware delivery method utilized by a large sector of the population.

During data collection, each classroom visited the library at their regularly scheduled weekly time. The researcher provided an overview of the research to students including: 1) each student would read a print or electronic book chosen by the researcher, 2) each student would complete a five question comprehension quiz after reading the first book, 3) each student would read a second book in the alternate format the next week, and 4) each student would complete a comprehension quiz on the second book. Students read their print or electronic book while sitting at the tables in the library. During the first week of data collection, the proficient group read the book *First Day Jitters* by Julie Danneburg (2.6 RL), and the advanced group read the book *The Hockey Card* by Jack Siemiatycki (3.8 RL). In the second week, proficient group students read book *My Even Day* by Doris Fisher (2.4 RL), and advanced group read the book *Sack Full of Feathers* by Debby Waldman (3.7 RL). All students received a paper copy of the quiz produced for their book upon completion of reading their selected book. The researcher collected all quizzes for scoring and data analysis. The collected data were filed and locked in the library office.

The qualitative survey was provided to students the week following data collection. The researcher gave each student a paper copy of the survey. The five survey questions were written to include the book titles read by the individual to increase the accuracy of each student's response. The multiple choice style questions were designed so that each student could circle the answer that best represented their views about both the book content and format. After completing the survey, each student returned the survey to the researcher for analysis.

Results

Quantitative Data Analysis

The data analysis examined the relationship between the dependent variables of reading comprehension and time spent to complete reading combined with the independent variables of book format, treatment sequence, and reading level of each student. The crossover study design allowed measurement of the dependent variables using a sequenced treatment method for all students. Students were randomly assigned to read a print or electronic version of a researcher selected book the first week and an alternate format of a different book the following week. During both weeks of data collection, the time spent to completely finish reading each book was recorded for all students.

Comprehension score analysis. The initial analysis of the data generated the means and standard deviations for reading comprehension scores associated with each book format and reading level (see Table 1). A three-way analysis of variance (ANOVA) was conducted to determine whether there was an interaction among book format, student reading level, and the treatment sequence. The interaction of these three combined variables was determined to be

statistically significant, $F(1, 26) = 7.94$, $p = .01$. The main effect of book format and the interaction of format and reading level or treatment sequence did not yield statistically significant results ($ps > .05$).

Table 1 *Means (M) and Standard Deviations (SD) for Comprehension Scores*

	Reading Level	Reading Sequence	*M*	*SD*	*N*
E-book score	Advanced	E-book-Print	94.29	9.76	7
		Print-E-book	84.00	20.66	10
		Total	88.24	17.41	17
	Proficient	E-book-Print	86.67	16.33	6
		Print-E-book	94.29	9.76	7
		Total	90.77	13.21	13
	Total	E-book-Print	90.77	13.21	13
		Print-E-book	88.24	17.41	17
		Total	89.93	15.52	30
Print book score	Advanced	E-book-Print	80.00	20.00	7
		Print-E-book	96.00	8.43	10
		Total	89.41	16.00	17

Proficient	E-book-Print	100.00	0.00	6
	Print-E-book	97.14	7.56	7
	Total	98.46	5.55	13
Total	E-book-Print	89.23	17.54	13
	Print-E-book	96.47	7.86	17
	Total	93.33	13.22	30

A split of the data based on student reading level (advanced/proficient) revealed a statistically significant two-way interaction between book format and treatment sequence for the advanced reading group, $F(1, 15) = 7.72$, $p = .01$. Additional data analysis was conducted to consider the relationship of book format and reading level for the advanced group using a paired t test analysis. The e-book and print book scores were determined to be significantly different for the advanced reading group who read the e-book first, $t(6) = 2.5$, $p = .05$. For the advanced group, students who read the e-book first scored higher on the e-book comprehension quiz compared to the comprehension scores reported after reading the print book during week two. Although the difference in reading comprehension across formats was not significant for those participants who read the print book first $t(9) = -1.77$, $p = .11$, comprehension scores were marginally higher for the print book format than for the e-book format. In short, advanced readers generally scored marginally to significantly better the first week than the second week, though the difference between formats was more pronounced among students who read the e-

book first. In contrast, for the proficient group, the ANOVA identified a marginally significant

main effect of reading format, F (1, 13), $p = .08$, such that proficient students scored marginally

better when reading the print book format than when reading the e-book format (see Table 1),

regardless of treatment sequence.

Time spent to complete reading analysis. The time spent to finish reading each book format

was analyzed to determine the relationship between book format, reading level, and treatment

sequence. Data analysis was conducted to determine the means and standard deviations for time

spent to complete reading related to each book format and reading level (see Table 2). A three-

way analysis of variance (ANOVA) determined that there was an interaction among book

format, student reading level, and the treatment sequence, F (1,26) $= 95.13$, $p < .001$. The two-

way analyses of variances (ANOVAs) of book format and treatment sequence found a

statistically significant interaction for both reading levels: advanced group, F (1, 15) $= 106.83$, p

$< .001$; and proficient group, F (1, 11) $= 11.56$, $p = .01$.

Table 2 *Means (M) and Standard Deviations (SD) for Time Spent to Complete Reading*

Sequence Read	Reading Format	Reading Level	M (minutes)	SD	N
E-book-	E-book	Advanced	7.14	.69	7
Print book		Proficient	8.33	2.58	6
		Total	7.69	1.84	13
	Print book	Advanced	11.71	2.81	6
		Proficient	6.67	3.39	7
		Total	9.38	3.95	13
Print book-	E-book	Advanced	17.60	3.98	10
E-book		Proficient	5.86	2.61	7
		Total	12.76	6.85	17
	Print book	Advanced	8.00	1.89	10
		Proficient	7.86	1.35	7
		Total	7.94	1.64	17

Two paired *t* tests were performed to determine differences between book formats and treatment sequence for each leveled reading group. A statistically significant difference between formats was found for the advanced reading group using both treatment sequences. Advanced

group students who read the e-book first spent 61% less time (4.57 minutes) to complete reading

the e-book as compared to the time spent to finish reading the print book format in week two, e-

book-print book, t (6) = -3.83, p = .01. In addition, advanced group students who initially read

the print book spent 46% less time (9.60 minutes) to complete reading than when reading the e-

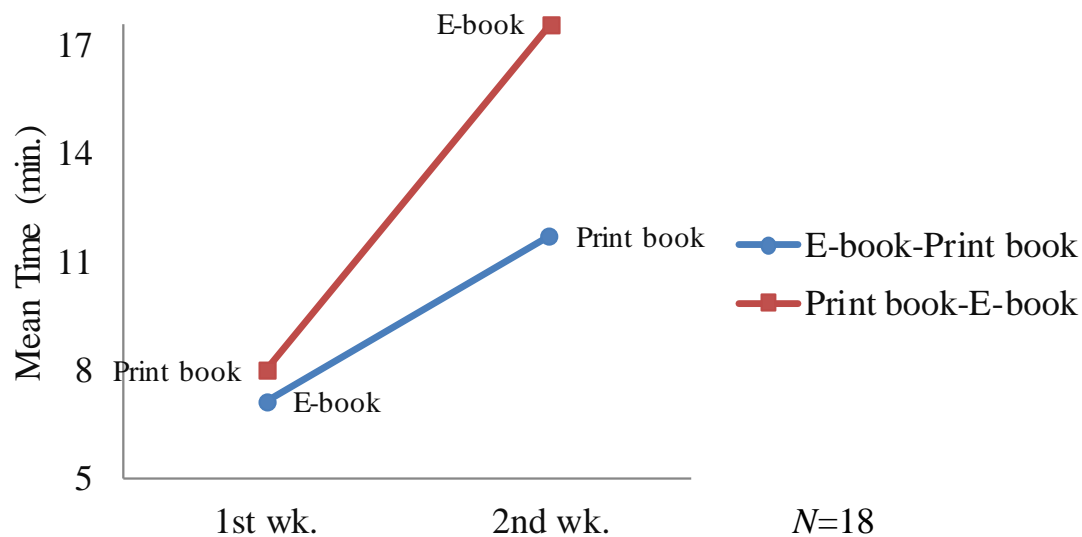book in week two, t (9) = 12.13, $p < .001$ (see Figure 1).

Figure 1. Mean time spent to complete reading for advanced students in each treatment sequence.

Among proficient readers, the *t* test analysis yielded statistically significant results for the

print book-e-book sequence, t (6) = -2.65, p = .04. Proficient students who read the print book

first read more slowly than students who read the e-book. These students spent 34% more time

(2.00 minutes) to finish reading the print book as compared to their average time to complete the

e-book during week one. In addition, the treatment sequence of e-book-print book for proficient

students demonstrated marginally significant differences between time spent to complete reading

the e-book and time spent to finish reading the print book, t (5) = 2.19, p = .08. Students in the

proficient group who read the e-book first read slower than students who read the print book.

These students spent 25% more time (1.70 minutes) to complete reading the e-book in the first

week one than to finish reading the print book during week two (see Figure 2). In summary,

regardless of book format, advanced reading group students spent more time to complete reading

in week two, while proficient reading group students generally spent less time to finish reading
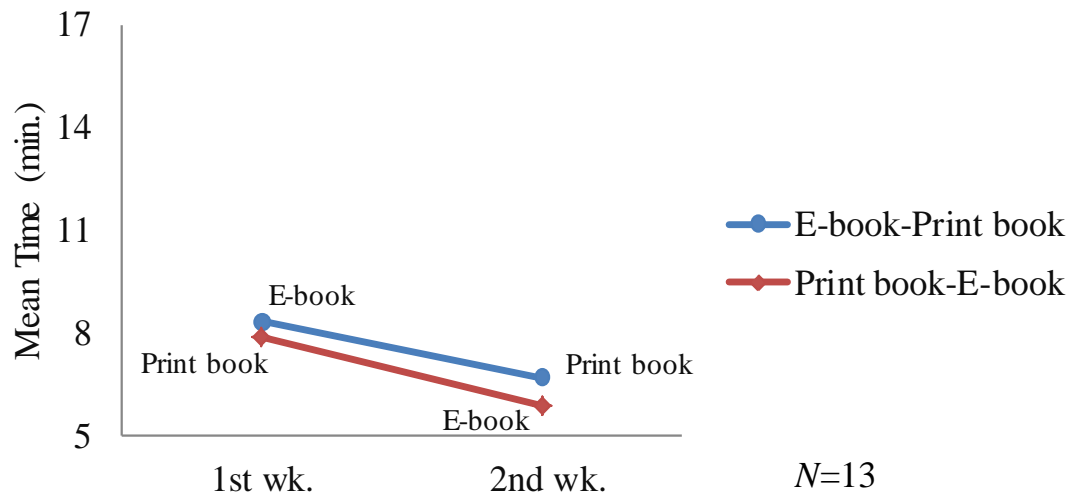
in week two.

Figure 2. Mean time spent to complete reading for proficient students in each treatment sequence.

Qualitative Data Analysis

During the third week of the data collection, each study participant completed a

qualitative survey to allow collection of students' preferences for reading format and content

based on each book format's ease of use as well as the book content appeal. Students were asked

to provide a response of e-book or print book for two questions related to book format.

Responses were analyzed for each reading group. The majority of students in both reading

groups reported a preference for reading the e-book as compared to the print book. Responses to

the question regarding usability of book formats indicated that students in both reading groups

were equally divided in their preference for e-book or print book (see Table 3).

Table 3: *Analysis of Student Perceptions of Book Format Reported by Reading Level*

	Book Format				
Reading Level	Appeal		Usability		*N*
Advanced	E-book	71%	E-book	50%	17
	Print book	29%	Print book	50%	
Proficient	E-book	85%	E-book	46%	13
	Print book	15%	Print book	54%	

Table 4 *Analysis of Student Perceptions of Book Content Reported by Reading Level*

	Book Content				
	Appeal				
Reading Level	Week 1		Week 2		*N*
Advanced	I liked it a lot.	47%	I liked it a lot.	47%	17
	Okay or didn't like it.	53%	Okay or didn't like it.	53%	
Proficient	I liked it a lot.	92%	I liked it a lot.	85%	13
	Okay or didn't like it.		Okay or didn't like it.		

8%   15%

Fishers Exact test $p = .011$ Fishers Exact test $p = .040$

Two additional survey questions answered by students were designed to consider student interest in each book's content regardless of book format for both week one and two of the data collection period. Survey analysis determined the advanced students to be evenly split regarding their enjoyment of the book content. In comparison, the proficient group reported a high enjoyment level of the book content for both weeks (see Table 4). These observed differences between advanced and proficient readers in terms of enjoyment of the books were significantly different, as evidenced by chi-square analyses using Fisher's Exact test. The groups differed in terms of the percentage of students who enjoyed the books during both week one ($p = .01$) and week two ($p = .04$), indicating that overall the proficient group had greater enjoyment of each book's content compared to the advanced group, regardless of the book format. Analysis of students' perceptions about book format as well as content provided additional data to determine motivational factors that could be related to reading performance.

Discussion

The primary hypothesis stated that there would be significant differences in the reading comprehension of newly independent second grade students when the students read different book formats. The results of our investigation were unable to clearly support our hypothesis. After analyzing the data, it appears that the reading comprehension scores of students in the advanced group appeared to be heavily influenced the sequencing of reading formats. In the first week, advanced students who read the e-book scored higher on the comprehension quiz compared to the scores reported after reading the print book during week two. Similarly, the advanced students who read the print book in week one also scored higher than after reading the e-book in week two. The advanced group's reading mastery combined with the novelty of participation in the study may explain the higher scores in the first week regardless of book format. In week two, the significantly lower comprehension scores recorded for advanced students regardless of format could have been attributed to the students' lack of interest in the book content. The self-selection of reading materials has been linked to student interest in the reading material and could possibly lead to gains in students' comprehension scores. A recent study conducted by Jones and Brown (2011) determined that third grade students are highly motivated to read and remain engaged in the reading process when allowed to freely choose the type of book to read.

In contrast, the scores of proficient students were marginally influenced by format. The proficient group of students had higher comprehension scores after reading the print book than after reading the e-book regardless of their treatment sequence. For the proficient group, a

reduced mastery of reading combined with the familiarity of print books may have contributed to a trend towards higher scores using a print format.

The study design included e-books with a linear text design and no additional animation such as highlighted words, sound effects, or hypertext features such as dictionaries. Exclusion of these elements minimized possible distractions and enabled the researcher to decrease the effect of book format on reading comprehension. Student engagement with the e-books involved using the touchpad on the laptop to flip the electronic page whereas individuals utilizing the print book flipped the pages with their fingers. The majority of the students were unaffected by the different methods used to advance the pages of the book formats. However, the researcher noted that two proficient students experienced difficulty reading their e-book due to the use of finger tracking. Finger tracking is generally discouraged as students move from emergent to independent reading (Pinnell & Scharer, 2003). Previous literature (Grimshaw et al., 2007; Lefever-Davis & Pearman, 2005; Pearman & Chang, 2010, Trushell et. al., 2001) reported that e-books that included non-linear text components could adversely affect elementary school age students' reading and/or the amount of time spent to complete reading the text. In this study, the use of an electronic book format with a linear text design eliminated these extraneous multimedia components and allowed comparison of reading comprehension related to factors such as book content and ease of use.

To promote individual engagement with each book, all students were allowed to spend an unlimited amount of time to complete reading their randomly assigned book. The research indicated that advanced students spent more time to finish reading their assigned book in week two than in week one regardless of reading format. The advanced readers' interest in the books'

content as well as the novelty of participation in a research study may explain the decreased time needed to complete reading both book formats during the first week of data collection.

Similarly, format was not consistently associated with length of time spent to finish reading for the proficient group. Proficient students spent more time to complete reading during the first week than they spent during the second week, regardless of format. This is inconsistent with Grimshaw et al. (2007), who found that although book format did not notably affect the 9-10 year-old children's reading satisfaction of either storybook, students took more time to finish reading the electronic version of the book. Perhaps proficient students needed more time to adjust to the experimental situation and to the new material, resulting in more time spent to complete reading in week one. The variations in the time spent to finish reading different formats for the reading groups was an interesting discovery that would require additional research to fully determine the effect of book format on time spent to complete reading each type of book.

In this study, a qualitative survey indicated that the majority of students in both reading groups reported a preference for reading the e-book as compared to the print book. Responses to the question regarding usability of book formats indicated that students in both reading groups were equally divided in their preference for e-book or print book (see Table 3). Survey analysis determined the advanced students to be evenly split regarding their enjoyment of the book content. In comparison, the proficient group reported a high enjoyment level of the book content for both weeks (see Table 4).

The qualitative survey completed by students following data collection provided information to help evaluate possible relationships between motivational factors and reading performance. Past studies have noted key elements such as motivation and engagement that are

directly linked to reading comprehension. A RAND study listed three main factors linked to

reading comprehension: 1) the text, 2) the act of reading, and 3) the reader (Snow, 2002). Each

of these three items is intertwined so that all elements are necessary for successful reading

comprehension. Dalton and Rose (2008) noted that the ability of technology-driven reading

formats to motivate students and positively impact reading comprehension is an emerging area of

research.

Strengths and Limitations

The crossover design of the study allowed each student to read both book formats and

provided data related to treatment sequence, reading level, and book format. The ability to

analyze multiple independent variables allowed the variables of reading level, reading sequence,

or book format to be tested individually or combined to more effectively determine any

interaction on student's reading comprehension or time spent to complete reading. In an effort to

reduce the effect of differences in participant reading abilities, the students were grouped

utilizing the Scholastic Reading Inventory (SRI) assessment results. A limiting factor when

utilizing matching was the reliability of the data used for placement of students into their

respective groups. Matching the reading levels of the books to the two reading levels increased

the accuracy of the comprehension scores determined for each student participant. However, the

accuracy of the identified lexile level and/or reading level of the book selected for student

reading was not guaranteed. Although multiple resources were referenced to verify the accuracy

of the lexile and reading level of the books, some variations were found.

In addition to limiting power to detect significant differences, the small sample size ($n =$

30) limited the ability to generalize the effects of reading formats on reading comprehension for

the general population of second grade readers. The ability to generalize the measurement of

statistically significant variances in both the advanced and proficient students' time to complete

reading the book was also limited by the small sample size. In addition, the study group

contained a disproportionately high number of female participants (20) compared to male

participants (10). However, the leveled reading groups, proficient and advanced, had similar

gender distribution.

Although the study provided an opportunity for each student to participate twice using

both types of reading formats, the ability to locate reading materials at the correct reading level

in both a print and electronic format hindered the ability to conduct the research for a longer

period of time. Allowing students to self-select books within their independent reading level

would eliminate any negative motivational factors created due to lack of interest in the researcher

selected books.

Electronic books were not formally utilized at the school where the students attend.

Although some students may have utilized electronic book formats outside of school, the

researcher was unaware of any participant's use of electronic books available through the *Big*

Universe website, which provided the electronic book format used in this study. For this

experiment, books were selected that were not available in the school library. Second grade

students were individually surveyed by their teachers to determine if anyone had previously read

the researcher selected books. Although students indicated no awareness of the titles, the ability

to limit previous exposure to the reading material by one or more students prior to the study was

not guaranteed. A final limitation was that the open environment of the library that created a

setting where outside factors could have created interference during data collection. Every effort

was made to reduce the distractions that could have affected student participation, but perfect

control was not possible.

Recommendations and Action Planning

The results of the study are inconclusive but indicate that students who are advanced

readers master reading comprehension regardless of the book format. Although the investigation

yielded small variations in comprehension and time spent to complete reading, it is important to

remember that even minor gains or decreases can be important in certain educational situations,

such as student evaluation and testing.

Furthermore, the use of an e-book format by advanced readers during week one allowed

higher comprehension scores than week two lending modest support to the use of the e-book

format. However, these results could be linked to the treatment sequence, increased motivation

stemming from e-book use, or the appeal of the book content. In contrast, the proficient students

seemed to score better using the more familiar print book format, whereas the unfamiliarity of

the e-book seemed to modestly decrease student comprehension scores. For proficient readers,

the combination of new reading material and a new reading format may have contributed to the

lower comprehension scores for e-book readers in both weeks. Introduction of linear style e-

books using e-readers would allow students to develop proficiency with using the products prior

to evaluation of student comprehension.

Of particular interest in this study is the time spent to complete reading the two book

formats. The advanced group had statistically significant differences between book formats for

each week. As a whole, the advanced group spent less time to finish reading the book in week

one regardless of format than reading the book in week two. In addition, the advanced group's

comprehension scores during week two were lower for both reading formats. The results

indicate that the book content as well as the book format ultimately impacts the amount of time

spent to complete reading a book. The ability to self-select books for each student's independent

reading level may increase student engagement leading to improved comprehension and a

reduction in the time spent to finish reading. Another concern was the controlled setting used to

facilitate data collection, as it did not replicate the typical reading environment of student

readers. Allowing students to read a linear designed e-book on an e-reader device rather than a

lap-top would likely eliminate differences in reading environment that could impact

comprehension scores. Although the small sample size limits the ability to make generalizations,

the survey data collected in the current study suggest that the inclusion of e-books could be a

motivational device used to increase student reading overall.

In this study, the time spent to complete reading appeared to be influenced more by book

content rather than book format. Educators should be cognizant of the role that students' reading

interests play in reading comprehension regardless of the book format utilized for delivery of the

information. Further research needs to be conducted to determine if students who exclusively

self-select linear designed e-books compared to students who self-select traditional print books

will show reading comprehension gains over a longer period of time based on their assessment

scores. The use of a handheld e-reader for e-books could further enhance future studies, as use of

an e-reader would more closely mimic the portability of a traditional print book.

The qualitative component of this research study indicates that students appear to be

motivated to read e-books regardless of the ease or difficulty of use. The limited duration of the

study hinders the ability to directly link e-books to reading motivation but suggests the novelty

of their use is very appealing. Both proficient and advanced readers were equally divided

regarding the usability of print books as opposed to e-books. With repeated use of an e-book

format, problems associated with usability would most likely diminish over time. Based on the

study findings, the introduction of linear designed e-books in addition to traditional print books

could be beneficial, as their use could provide additional reading motivation particularly for

lower level readers. Adequate training in the use of the e-books would help to alleviate issues

that increase time spent reading as well as decrease reading comprehension scores, allowing

students to fully benefit from use of this book format.

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iPad Intervention with At-Risk Preschoolers: Mobile Technology in the Classroom

Mary Brown, B.A.
Clinical Speech-Language Pathology, Master's Degree Candidate
Department of Communication Sciences and Disorders
Northern Arizona University
meb345@nau.edu

Mary Towle Harmon, Ph.D.
Assistant Professor
Department of Communication Sciences and Disorders
Northern Arizona University
mary.harmon@nau.edu

Abstract

This study investigated the efficacy of iPad applications to enhance key academic skills areas in Head Start children. Twenty four-year-old Head Start children, selected from a larger study, were pre-and post-tested on upper and lower case alphabet knowledge, matching, and number concepts using criterion referenced measures. Children were randomly assigned to an intervention condition or comparison condition. Children in the intervention condition received one hour of weekly instruction using iPad applications chosen specifically for their focus on alphabet knowledge, matching or number concepts. Children in the comparison condition also interacted with iPad applications one hour per week using applications that did not target the identified academic areas. Children were post-tested following the ten-week study. Gain scores reveal strong effects on multiple variables.

The research question was:

1. Do iPad applications, specifically chosen for their alphabet knowledge, matching and number concepts, enhance these specific skill areas in Head Start children?

Key words: at-risk preschoolers, iPad, mobile technology, literacy, matching, number concepts

Introduction

With the increasing use of interactive mobile technology, the iPad has become a powerful tool of living and learning; socially, academically, cognitively, and linguistically (NAEYC, 2012). As defined by the Global System for Mobile Communications in their report, *Mobile Education in the United States*, mobile technology encompasses personal portable devices (e.g. e-Readers, tablets, Personal Digital Assistants (PDAs), and smartphones), that utilize a mobile network (2011). Handheld mobile technologies such as the iPad are emerging in classrooms across the country to support dual language learners, increase motivation to learn, improve fluency skills, encourage collaboration, and improve reading comprehension (Shuler, 2009). As the use of educational mobile technology increases, much of the instruction is being implemented via programs or applications. Common Sense Media (2011) reported approximately 72% of iPad applications in the Educational Category are marketed for preschoolers. The question then becomes one of how technologies such as iPad applications are being used, and whether they are effective facilitators of learning.

Research to support mobile technology as a supplemental teaching tool for children shows promising findings. To determine the most fundamental question of whether school age children will even engage in mobile technology, Michael Cohen Group (2012) conducted a qualitative study of young children and iPad use. Sixty children, ages 2-8, were observed interacting with iPads over a period of two months. The researchers found that children moved rapidly from novice iPad users to mastery of the device and application content. The authors

suggest that the interactive and exploratory nature of iPad applications may provide an optimal

learning experience.

Within educational settings, the majority of mobile technology usage as an educational

tool has focused on supporting the literacy performance of school age children. In Escondido

Union School District, a group of teachers piloted a study to investigate the effectiveness of iPod

application use with first through eighth grade students to improve reading fluency and

comprehension, as well as motivation, through digital audio playback of the reader's narration.

Students using the iPods were shown to make up to six times the gains in word count per minute

over a six-week period, and nearly two years of reading comprehension growth in six months.

(Escondido Union School District, n.d.).

The JUMP into Reading for Meaning program assessed an educational game for the

Nintendo DS Lite to supplement vocabulary instruction for low performing fourth grade students

(Sanchez, Gee, Bus, Moorthy, & Sinicrope, 2009). Over a period of six months, students who

interacted with the selected educational game during after-school programs showed greater

improvement on post-test measures of vocabulary knowledge than those students who were not

provided the opportunity.

Hutchinson, Beschorner, and Schmidt-Crawford (2012) conducted research using the

iPad as a tool of literacy instruction in a classroom of 23 fourth grade students. iPad applications,

used daily in classroom literacy instruction for three weeks, were selected based on their focus

on reading comprehension via visualization, sequencing, and cause and effect. While

quantifiable data was not provided, the use of iPads was noted to positively supplement the

literacy learning goals within this classroom. Both students and instructor reported positive

outcomes related to the technology use such as better visualization and enhanced story

comprehension. Encouraging results indicating possible efficacy of mobile technology use to

supplement school age literacy learning have been mirrored by research emerging in the field of

early childhood education.

In early childhood settings, mobile technology research has emphasized foundational

literacy skill development. For example, Horowitz et al. (2006) examined the efficacy of video

streaming lessons via cell phones as a means of increasing letter knowledge of preschool

students. Participant families streamed two types of video clips to their cell phones: literacy tips

for parents on integrating letter knowledge into daily activities, and Elmo "Letter of the Day"

clips. Participant families were required to stream three sets of these videos, each set comprised

of one literacy tip and one "Letter of the Day", weekly for a period of eight weeks. Participant

report and observation indicated that the combination of literacy teaching tips and instructional

alphabet clips showed great potential as a means of supplementing literacy instruction. In

addition to resulting in increased alphabet knowledge of participants, the video streaming was

reported to ease access to educational information for parents, provide a venue for easy everyday

integration of literacy learning, and encourage enthusiasm and motivation to learn about letters

by the children.

The use of mobile technology to supplement literacy learning aligns with current

discussion highlighting the importance of choosing technology to supplement what is already

occurring in the classroom versus changing classroom instruction based on the technology

(Harris & Hofer, 2009; McManis & Gunnewig, 2012). Literacy standards-based skills addressed

in early childhood classrooms include: alphabet knowledge, rapid digit naming, object

sequencing, oral language, arithmetic, and visual processing skills such as matching. All of these

skills have been either moderately or strongly correlated with later literacy success (Duncan et

al., 2007; Francis, Fletcher, Maxwell, & Satz, 1989; Gallagher, Frith, & Snowling, 2000;

Purpura, Hume, Sims, & Lonigan, 2011; Scatschneider, Fletcher, Francis, Carlson, & Foorman,

2004; The National Early Literacy Panel, 2009.)

In the area of alphabet knowledge, Gallagher, Frith, and Snowling (2000) investigated the

literacy skills of 97 children; 63 at genetic risk for dyslexia and 34 with no reported risk for

literacy impairment. Participants were assessed at 45 months of age in various areas of possibly

predictive literacy skills, among them, nonverbal ability and alphabet knowledge. Participants

were again assessed at six years of age. Results indicated the strongest predictor of literacy

abilities at age six was alphabet knowledge at 45 months.

Schatschneider, Fletcher, Francis, Carlson, and Foorman (2004) demonstrated the

importance of letter naming and letter-sound knowledge, as a predictive measure of later literacy

skills. 384 children were followed from kindergarten to investigate early reading predictors as

measured through Grade 1 outcomes. A subset including 189 children was then selected for

continued investigation of the prediction of Grade 2 outcomes. Measures assessed four times

during kindergarten included: phonological awareness, alphabet knowledge, rapid automatized

naming, vocabulary, visual-motor integration, and recognition-discrimination. Measures of

academic achievement in first- and second-grade revealed that phonological awareness, rapid

automatized naming of letters and letter sound knowledge were highly predictive of later reading

abilities. At the beginning of kindergarten, phonological awareness, letter naming speed, and

letter knowledge were fairly comparable in their predictive nature for reading and word

identification.

Francis, Fletcher, Maxwell, and Satz (1989) studied the validity of both verbal and

nonverbal skills as possible predictors of later literacy abilities, measured at kindergarten and

grades 2 and 5. This longitudinal study tracked 220 male students. Nonverbal skills measured in

kindergarten included perceptual matching, demonstrated through the recognition-discrimination

task of geometric figure-matching. Both the measured verbal and nonverbal skills had significant

effects on literacy performances between kindergarten and grade 2. Perceptual matching

measured through geometric figure-matching was determined to be a strong predictor of reading

abilities in second grade.

Finally, Ginsburg, Lee, and Boyd (2008) support the inclusion of mathematics into early

childhood education programs to promote later academic achievement. The authors maintain that

instruction in mathematics is a type of instruction in literacy and language, a concept that applies

to counting, mathematical terminology, and metacognition.

Addressing alphabet knowledge, number concepts, and matching, to support the

academic success of school age children is well documented. As a result, early childhood

educational agencies continually integrate these skills into the academic standards. Federally

funded programs such as Head Start, for example, expect mastery of at least 10 letters during

preschool, counting in sequence to 10 and beyond, matching objects, and use of terms such as

"more, less, and fewer" before kindergarten (Arizona Department of Education, 2005). Deficits

in these areas may put a child at risk for later literacy and academic difficulties. One possible

supplemental tool to support these skills in early childhood is mobile technology in the form of

Apple iPads. Currently, no empirical data exists substantiating the use of Apple iPad technology

to support the learning of these skills in at-risk preschool children. This pilot study investigated

the efficacy of using iPads to supplement classroom instruction in teaching alphabet knowledge,

matching and number concepts. The research question for this study was: Do iPad applications,

specifically chosen for their alphabet knowledge, matching and number concepts teaching,

enhance these specific skill areas in Head Start children?

Method

A pretest-posttest comparison condition design was utilized for this pilot study. Criterion

referenced measures were used to assess children's upper and lower case alphabet knowledge,

matching concepts and number concepts. All measures were administered immediately before

treatment began and again within one week after treatment ended. Children were randomly

assigned to the treatment or comparison condition. Those assigned to the treatment condition

interacted with one of three Apple iPad applications. Those assigned to the comparison

condition interacted with Apple iPads programmed with educational applications unrelated to the

four academic areas addressed in the treatment condition.

Participants

        Twenty students, a sub-set of children from a larger study, participated in this project.

Children were from five different Head Start classrooms from rural communities in Arizona; the

children ranged in age from 48 -59 months. All participants were required to meet the following

inclusionary criteria: (a) pass a hearing screening, bilaterally, at 25dB across the frequencies of

500, 1000, 2000, and 4000 Hz; and (b) no report, by parent or teacher, of current or previously

identified concerns about cognitive development and (c) a score of four or lower on the Alphabet

Knowledge-Upper Case subtest of the Phonological Awareness Literacy Screener – Preschool

(PALS – PreK; Invernizzi, Sullivan & Meier, 2001). All children were native English speakers

of standard American English.

By parent report, six participants in the intervention condition were Hispanic/Latino, three were American Indian, one participant was Black and one participant was more than one race. For the comparison condition, seven participants were Hispanic/Latino, two were American Indian and two participants were White.

Procedures

All children meeting the eligibility criteria were administered four criterion referenced measures. The four skill areas assessed were upper and lower case alphabet knowledge, matching, and number concepts. These skills were identified by Head Start as core curriculum skills.

The Upper and Lower Case Alphabet Knowledge subtests of the PALS-Pre-K were used to measure alphabet knowledge. These subtests are administered by showing children a single 8 1/2 x 11 page with several lines of print containing the letters of the alphabet in random order and asking the child to name each letter on the page. The child was prompted with the statement, "As I point to each letter, tell me the name (sound) of the letter." A total score of 26 was possible. Matching and number concepts were assessed using criterion referenced measures developed for this project. The matching measure investigated the child's ability to recognize pictures that were the same. Children were shown ten different 5 ½ x 11 cards. Each card had a color picture on the top of the card and four pictures on the bottom of the card. As the examiner pointed to the single picture at the top of the card, the child was asked to "show me the picture that is the same" from the field of four. A total score of 10 was possible. Appendix A provides an example of several of the matching cards. The number concepts measure investigated the child's ability to use numbers, mathematical relationships and related vocabulary. Tasks ranged

from asking the child to identify which picture from a small field reflected "more", "most", or "fewer", and to count from 1-10. A total score of 10 was possible. Appendix B provides an example of the number concept cards. Both authors administered the assessments.

Following administration of the criterion referenced measures, children were randomly assigned to a treatment condition or a comparison condition. The treatment condition received one hour of weekly instruction using iPad applications chosen specifically for their focus on alphabet knowledge, matching or number concepts. Specifically, the children were expected to interact with each different application twenty minutes a week. Children in the comparison condition also interacted with iPad applications one hour per week using applications that did not target the identified academic areas.

The iPad applications chosen for this project were selected with several key criteria in mind. The applications focused on the key academic concepts identified for this project, they were appropriate for preschool age children with several levels of difficulty through which children could move independently, and they provided positive or neutral feedback to children's responses. For the intervention condition, the applications provided multiple opportunities for the child to learn about and practice at least one of the skill areas.

Before the study, teachers and assistants received instructions to help insure children received scheduled interventions. A schedule for each child's computer instruction was created in collaboration with the classroom teacher. Teachers were asked to ensure both conditions accessed the iPads and the respective applications at least one hour a week. Classroom teachers tracked student engagement in the logbooks provided by the researchers. The intervention condition was required to use each research application a total of 20 minutes per week. The comparison condition was required to use the non-research applications, saved under a different

folder, for the same amount of time. On average, the intervention children spent 292 minutes

(range = 40-756) on the alphabet knowledge application, 233 minutes (range = 80 – 375) on the

matching application, and 210 minutes (range = 60-349) with the number concepts application.

Children were post-tested one week following the intervention using the same criterion

referenced measures. Administration of the measures was counterbalanced.

Results

Multiple one-way analysis of variance (ANOVA) were performed to determine the effect

of iPad applications to enhance the letter knowledge, matching and number concepts of at-risk

preschoolers. No significant differences were found among the four variables on the dependent

measures, Wilks's Λ = .65, $F(4,15)$ = 2.01, p>.05. However, Cohen's d effect size values showed

strong effect sizes on upper case letters (d = .72), lower case letters (d = .90) and number

concepts (d = .83) results which suggest moderate to high practical significance. Table 1 contains

the means, standard deviations, 95% confidence intervals and Cohen's d for the dependent

variables for the two conditions.

Table 1

Mean, standard deviations, 95% Confidence Intervals and Cohen's d for changes in Upper &

Lower Case Letter Knowledge, Matching and Number Concepts

		Intervention			Comparison		
		Pre	Post		Pre	Post	
							Cohen's
DV	*n*	*M (SD)*	*M (SD)*	*n*	*M(SD)*	*M(SD)*	*d*
UC	10	.80 (.79)	4.30 (6.62)	10	.60 (.97)	.90 (1.10)	.72
		[.23, 1.36]	[-.43, 9.0]		[-.09, 1.29]	[.11-1.69]	
LC	10	.40 (.97)	1.40 (2.06)	10	.40 (.52)	.40 (.70)	.90
		[-.29, 1.09]	[-.08, 2.8]		[.03, .76]	[-.10, .90]	
MC	10	6.60 (2.41)	8.10 (1.52)	10	5.80 (1.54)	8.00 (1.50)	-.43
		[4.90, 8.32]	[7.00, 9.20]		[4.70, 6.90]	[6.93, 9.10]	

NC	10	4.60 (2.36)	5.80 (2.40)	10	3.80 (1.93)	4.50 (2.37)	.83
		[2.91, 6.30]	[4.08, 7.51]		[2.41, 5.18]	[2.80, 6.19]	

Note. DV = Dependent variable, UC = Upper Case Letters, LC = Lower Case Letters, MC = Matching Concepts, NC = Number Concepts.

There appears to be a correlation between the average time spent on the different applications and overall effect sizes. Upper case and lower case letter knowledge skills, which revealed large effect sizes of .72 and .90 respectively, demonstrated the highest average time on task (x = 292.4).

Discussion

iPad applications are being used as a supplemental tool for learning within educational environments. This pilot study investigated the efficacy of iPad applications in improving the literacy and overall academic skills in at-risk preschoolers. Results indicated that while statistical significance was not obtained, practical significance was found for the use of iPad applications to support learning in the preschool skill areas of alphabet knowledge and number concepts. Certain limitations were considered as to why statistical significance was not reached. Limitations and directions for future research will be discussed.

Limitations

Limited sample size and length of intervention should be considered limitations of this

study. Cohen (1988) states that an increase in sample size correlates to an increase in statistical

power. When number of participants must be limited, a minimum of 7 participants per cell is

suggested. Comparison of a smaller number of cells, such as the 6 included in this study, requires

a larger sample size to maintain statistical power (Wilson VanVoorhis & Morgan, 2007).

Another possible contributing factor is the limited time frame of the intervention. While a ten-

week intervention, designed for subjects to interact with each of three application programs for

a total of 20 minutes per week, is often considered an adequate time frame when investigating

educational issues, due to the nature of education programming, no child received the targeted

amount of time with the applications. All subjects' exposure to the iPad and applications was

limited by school closures, classroom demands, and some even further through absences.

Another limitation of this study may relate to the lack of oversight received by the

subjects while interacting with the iPad applications. Conducted within Head Start classrooms,

study subjects were presented the option to interact with the applications during daily free time.

After classroom teachers prepared the iPad station and invited the subjects to engage with the

technology, teachers returned to dividing attention between children involved in the research and

the rest of their classroom. This often resulted in visually monitoring the students interacting

with the applications from a distance, reducing the ability of the teacher to ensure that students

were actively engaged with the pre-selected applications.

A final limitation necessary to discuss in the scope of this study is the selection of the

research applications. The applications used in this study were selected by the authors based on

observation of (a) availability of differing levels (b) feedback provided by the application and (c)

perceived interest of preschool children. No validated or evidence-based rubric was referenced in

the selection of the applications used in the study.

Future Research

Promising findings of this study contribute to a foundation supporting the use of iPad

applications as supplemental teaching and learning tools. However, limitations encountered in

this study should be addressed in future research. Larger sample sizes should be considered and

various lengths of interventions should be trialed, taking into consideration the variability found

in educational programming, in order to determine the impact of length of intervention on gains

in targeted areas. Research should be adapted to allow for supervision of subjects while

interacting with iPad applications to facilitate observation of subjects' engagement, individual

responses to the activities, collaboration among subjects, and other possible factors impacting

results.

Future studies should consider using a validated rubric to evaluate applications before use

in research. Members of the educational community are looking to the web, both for advice on

application quality and to share their own experiences (e.g. *mindleaptech.com*, *iear.org*,

teacherswithapps.com, *appsineducation.blogspot.com*).   Websites such as *iear.org* (I Education

Apps Review) offer a venue in which individuals can access thorough reviews of educational

apps but, as noted by Walker (2011), no common language of comparison has been established.

By utilizing validated rubrics such as an Evaluation Rubric for Mobile Applications (APPS)

(Walker, 2012), the quality of applications can be evaluated by assigning a numerical value to a

set of common terms (i.e. curriculum connection, authenticity, feedback, differentiation, user

friendliness, and student motivation). A consistent measure of the quality of applications could minimize this factor as a variable impacting the results of future research

In the course of this study, instructors frequently reported that English language learners within their classroom showed increased interest in the iPad applications (compared to the native English speaking students). This raised the question of iPad application efficacy in supporting the education of English language learners. Increased interest and motivation in this population could indicate great potential for supporting their learning, a concept meriting further investigation.

Further research should continue to investigate the efficacy of iPad applications to support learning in a variety of subject areas. Alphabet knowledge, number concepts, and matching were skill areas chosen by the authors because of their link to early childhood curriculum standards. It is possible that other skill areas or concepts targeted by iPad applications could lead to more salient changes in the abilities of research subjects.

Finally, future research should consider the use of a mixed method approach to analyze qualitative data gathered from parents and caregivers or through classroom observations during the course of the study. Such analysis would allow for further extrapolation of the data. Of particular interest would be whether prior experiences with iPad technology impacted performance.

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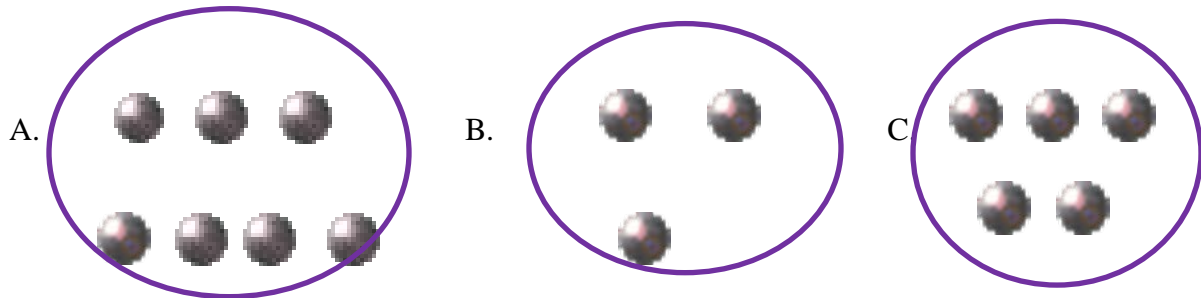
Appendix A

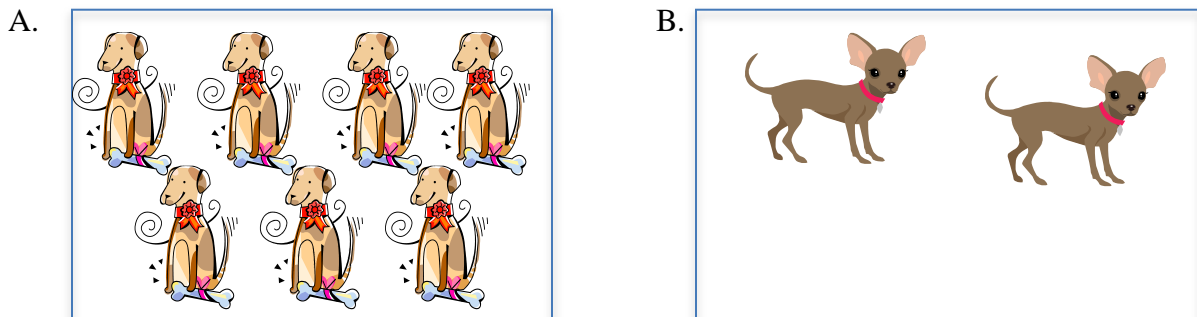**Samples from criterion-referenced measure of number concepts**

1) Researcher: "Count the beans."

2) Researcher: "Which circle has the fewest balls?"

3) Researcher: "Show me seven dogs."

C.

Appendix B

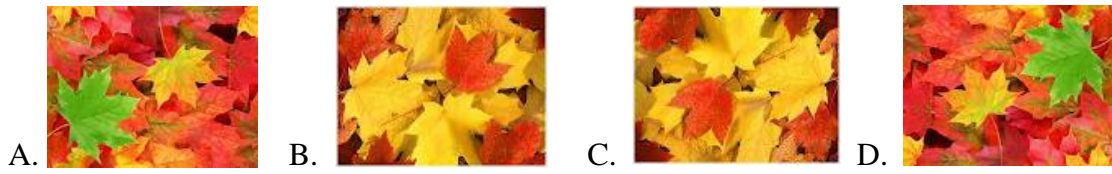**Samples from criterion-referenced measure of matching**

Researcher: "Show me the picture that is the same as this one (while pointing to item presented
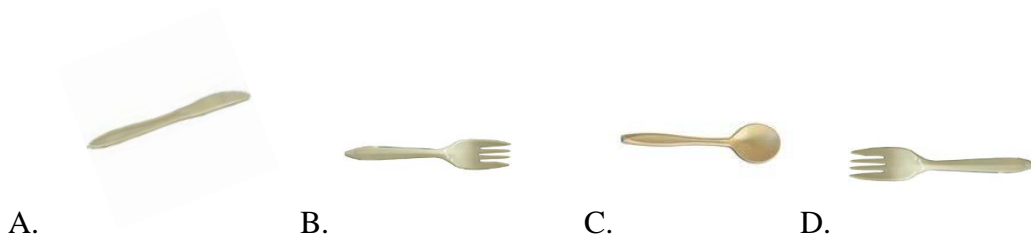
individually in the first row)."

1)

A.   B.   C.   D.

2)

A.   B.   C.   D.

3)

A.   B.   C.   D.

Critical Participation in Literacy Research through New and Emerging

Technologies: A Study of Web Seminars and Global Engagement

Peggy Albers, PhD
Professor of Language and Literacy Education
College of Education
Georgia State University
malbers2@gsu.edu

Christi Pace
Ph.D. Student
College of Education
Georgia State University
cpace4@student.gsu.edu

David W. Brown, Jr.
Ph.D. Student
College of Education
Georgia State University
dbrown97@student.gsu.edu

Abstract

The explosion of social media and online delivery platforms offers a host of possibilities for sharing literacy research and practices worldwide, gateways to digital technologies have increased teaching and learning opportunities across educational spaces, including web seminars. Global Conversations in Literacy Research (GCLR) is a critical literacy project, a series of web seminars that engage global audiences in discussions about literacy research and practice. We are now in our second year of a longitudinal study of this project. Our overarching question is To what extent can or does GCLR as an emerging critical literacy project influence and impact the literacy community? In conjunction, we studied the following: a) What do participants and speakers identify as the affordances and constraints of GCLR as an online platform for literacy scholarship?, b) What literacy issues emerge in and across GCLR web seminars, and how are they taken up (or not)? and c) How do the website analytics and social media offer insight into how web-based literacy projects like GCLR emerge and extend its reach? Qualitative methods of data collection include chat transcripts, interviews, and website analytics, and data were analyzed using constant comparison (Bogdan & Biklen, 2003). Findings show specific types of interaction occur within web seminars, common issues around literacy emerge across global and geographic boundaries, and that growing interest depends on web presence, highly recognized speakers, and free and open access.

Keywords: new literacies, literacy, technology-mediated settings, professional development, interactions, new technologies

The explosion of social media and online delivery platforms offers a host of possibilities for sharing literacy research and practices worldwide. These gateways to digital technologies have increased teaching and learning opportunities across educational spaces, including web seminars. Global Conversations in Literacy Research (GCLR) (www.globalconversationsinliteracy.wordpress.com) is a critical literacy project, a series of web seminars that engage global audiences in discussions about literacy research and practice. We are now in our second year of a longitudinal study of this project. Our overarching question is To what extent can or does GCLR as an emerging critical literacy project influence and impact the literacy community? In conjunction, we studied the following: a) What do participants and speakers identify as the affordances and constraints of GCLR as an online platform for literacy scholarship?; b) What literacy issues emerge in and across GCLR web seminars, and how are they taken up (or not)?; and c) What information and insights about online global participation can be gleaned from GCLR through its website analytics and social media?

Grounded in critical literacy, GCLR acknowledges that access to diverse, multiple, and global perspectives are vital resources for changing consciousness around literacy research and practice through exchange of international ideas on literacy issues, and that new and emergent technologies contribute to these changes. Information about GCLR seminars and speakers is publicized through listservs, social media (Facebook, Twitter, Linked In), and its GCLR website. Delivered through Blackboard Collaborate, GCLR hosts seven web seminars annually, with the capability for up to one thousand people to participate in a single web seminar. As an on-going critical literacy project, GCLR is committed to providing access to literacy scholarship and democratic participation in this scholarship.

Theoretical Framework and Relevant Literature

Unequivocally, 21st century technologies--social media, mobile technologies, new pedagogical formats, and others--have transformed and significantly influenced how we learn and how we access learning. Apparduai (1996) suggests we live in a world of "cultural flows" of products (e.g., technologies, people, ideas, practices, knowledge, beliefs) (p. 33), which cut across various boundaries such as geography, culture, language, time zones, and spaces. As members in this highly connected and diverse world, we are establishing new skills, values, and practices in response to changes in life, especially in light of new and emerging technologies. According to Internet World Stats (http://www.internetworldstats.com/stats.htm) as of June 30, 2012, of the approximately 7 million people living in the world, 2,405,518,376 use the Internet. Since 2000, usage across all continents has increased 566%. Such accelerated growth indicates an epistemic change in the belief that knowledge is not static, but rather fluid and multi-dimensional, and communication immediate (Bouchard, 2011). As such, new and emergent technologies are shaping and being shaped by how people interact and engage with others virtually. They feature new models and structures to support knowledge acquisition, and position educators and educational institutions as no longer holding principality over learning (Kop & Fournier, 2011). People across the globe are seeking out "on demand" knowledge about their jobs/careers (van Dam, 2012); literacy researchers and educators are no different.

A large part of the literature locates online delivery and design almost exclusively within the context of classroom disciplinary learning (see Garcia & Hopper, 2011; Karchmer, Mallette, Kara-Soteriou, & Leu, 2005; Lukinbeal & Allen, 2007; Morrison, 2010), commercial gain (Berg, 2008), and business training models (van Dam, 2012). In literacy, we found no extant studies,

just information on organizations launching webinars (IRA, 2010). Research about how

participation in web seminars works, evolves, and influences thinking is timely and necessary

(Albers, Pace, & Brown, 2012), and can offer new possibilities for literacy research and practices

by the very nature that they transcend boundaries (e.g., time, space, geography, populations,

languages) that otherwise might represent barriers (e.g., cost, travel, time). Negotiating these

cultural flows invites creative and imaginative participation, and positions the world to envision

how we, as global members, might participate with each other through such technologies

(Silverstone, 2007).

This study is theoretically situated in Janks's (2010) four orientations to critical literacy:

domination, access, diversity, and design. These orientations take seriously the relation between

power and language in literacy education. *Dominance* understands language in all of its symbolic

forms as a means of "maintaining and reproducing relations of domination" (p. 21). Analyzing

all types of texts (e.g., visual, written, spoken, and so on) through critical discourse analysis

makes visible issues and interests related to power. Further, dominance assumes that power is

negative and productive of inequitable social relations. *Access* is understood as knowing how

language operates to maintain power. The catch is that while it is critical that readers and viewers

have access to dominant forms of language, by participating in these forms, language sustains

and extends its power. *Diversity* is situated not only in social and cultural interactions, but the

modes through which literacy is experienced and learned are "a central resource for changing

consciousness" (p. 22). We participate in discourses, as Janks argues, which are "linked to wide

range of social identities and embedded in diverse social institutions" (p. 23). As people engage

in new discourses they acquire new dispositions and alternative ways to understand their ways of

being in this world. Diversity as signified through difference is also situated in power; who gets

to name what difference is or how the word "difference" is marginalized against that which is
"normal." Language, culture, expressions (e.g., visual, spoken, written, gestured, etc.) are all part
of diversity, which, according to Janks, help us "re-remediate and re-present" our understandings
of the world (p. 23). *Design* recognizes that representation occurs across semiotic systems,
situates creativity as essential, and positions meaning making as infinite. People draw and select
from the many resources to construct, interpret, and generate meanings. Design assumes
conscious selection and integration of the semiotic resources in play, and makes visible to what
extent power and dominance emerge or are challenged (Author, 2011).

Janks's (2010) perspective is apt for this study. Literacy has been a long-standing and
contested social issue, and those with power determine the scholarship that emerges to inform
curricula and teaching. National legislation such as No Child Left Behind and Race to the Top
positions language learning and experience as decontextualized and skills-based, with educators'
promotion and pay tied to student test scores. Such legislation has given rise to highly scripted
programs that have had negative impact in public schools. The newly adopted Common Core
State Standards (CCSS) embed power in written language, particular genres (e.g., persuasive
texts), and definitions of "text complexity" to fit characteristics that drive learning back into
early 20th century thinking (Shannon, in press). Assessment of CCSS will most likely fall victim
to similar testing as mandated by previous legislation (Pearson, 2012).

Access to literacy research and practice that challenges this power is warranted and
needed, research that is grounded in critical literacy and social justice. Using networked
technologies, web seminars offer innovative global participation in literacy research and
learning, and have the potential to impact large populations. Projects designed with interactivity
and immediacy of access to language and literacy, argue Janks & Vasquez (2011), must be

explored. GCLR is at the crossroads of the "information highway," and bridges literacy

scholarship with networked technologies. Sustained investigation of projects that use such

technologies to disseminate literacy theory, pedagogy, and practice is timely and necessary.

Methodology

This longitudinal qualitative study is grounded within an interpretivist design (Schwandt,

2000). Aligned with critical literacy, interpretivism holds that meaning is constructed through

social interaction and is changeable as people flow in and out of social, cultural, political, and

ideological environments and contexts (Lincoln & Guba, 2003). Further, interpretivism serves as

an appropriate methodology as it allows for multiple layers of critical analysis of the

participation in and across web seminars, which is reflective of reality in emerging and

networked technologies.

Data collection for this study occurred from September 2011- November 2012 across 11

web seminars and is ongoing. Researchers collected data from the following: a) semi-structured

interviews with 12 of the 13 speakers and 26 participants; b) chat transcripts; c) transcribed web

seminar audio/video recordings; d) website analytics; and e) email correspondence. In general,

we followed this data collection procedure. We introduced this study at the beginning and

conclusion of each web seminar, presented the research questions, and invited participants to

volunteer for a recorded 15-20 minute structured, online interview. Those interested in being

interviewed typed their email into the chat area, and interviews were conducted within two

weeks and recorded. Speakers were interviewed immediately following their web seminar and

recorded through Blackboard Elluminate. We collected web statistics/analytics at least twice a

day for the duration of the study and entered these data on a spreadsheet. We received and

responded to email queries and stored these documents in a secured folder.

Semi-structured interviews (deMarrais, 2004) enabled us to understand the affordances and constraints of GCLR as an online platform; how (or if) GCLR web seminars have the potential (or do) contribute to literacy discussions on a global level; how participants and speakers responded to issues that emerged from the content of the web seminars; and to what extent GCLR's social networking contributed to their participation. The timeliness of these interviews allowed researchers to capture fresh responses about the speakers' experiences, participant and speaker interactions, and affordances and constraints of the web seminar. *Chat transcripts* enabled us to capture literacy questions and issues raised across seminars, and how they were taken up (or not) within seminars. *Transcribed audio/video recordings* located within the periphery of transcribed chats afforded us a means to understand the exact moment in the speakers' talks that generated participants' questions and issues that emerged across a seminar. We aligned the chat transcripts (both public and private messages) with the transcribed recorded seminars. *Website analytics/electronic correspondence* (GCLR website, Wordpress, Facebook, Twitter, listservs, emails) allowed us to study global interests in literacy as they pertained to speaker and topic, the relationship between the website and participation in web seminars, publicity blasts (emails, posts), web seminar attendance, and geographic access. We studied the number of GCLR website hits and views; which GCLR website pages were accessed and how often; and the time, location, and date of access. ClustrMap (Figure 1) allowed us to capture concentrations of interest, location, and time of access. Bi-monthly, we captured bar graphs of website data. Listserv/email correspondence helped us track global interest and comments about GCLR.

Figure 1. ClustrMap captures concentrations of interest, location, and time of access.

Data were analyzed using the constant-comparative method (Bogdan & Biklen, 2003) with data

sets coded, themes generated, and understandings identified. Researchers engaged in preliminary

analysis of data immediately following each live seminar. During the seminar, we recorded

analytical notes regarding issues raised, taken up (or not), from where participants accessed the

seminar, and studied the comments about GCLR and/or the seminar that participants wrote in the

chat area after a speaker's presentation. We conducted cross-seminar data analysis, which began

after the second web seminar and up through the 11th seminar.

In general, we used a recursive approach (Lincoln & Guba, 1985) to compare and

contrast themes generated from the most current seminar to the previously analyzed ones.

Researchers independently read and reread data sets, and discussed and negotiated findings at

our bi-monthly meetings. When we confirmed findings, we then recorded these. Specifically, for

written and spoken data (chat, interviews, email correspondence) researchers took a discursive

approach. Gee (1996) defines discourse as "socially accepted ways of using language, other

symbolic expressions and artifacts of thinking, feeling, believing, valuing, and acting that can be used to identify yourself as a member of a socially meaningful group" (p. 144). Discourses are always intertextual and linked across time, place and speakers. Within a discursive approach, we studied each data set (including symbols and emoticons) to understand inter-seminar connections regarding which issues and questions were raised; types, length, and content of interactions; and ideas expressed by speakers and participants through chat and/or interviews. We also studied email correspondence for intertextual links especially noting common ideas expressed across queries or comments. We studied website analytics (e.g., number of hits, access points) for access trends within and across web seminars, especially noting significant shifts in numbers in relation to promotional publicity blasts. Across these data sets, when we could confirm findings, we recorded them (e.g., content: difficulty following chat while listening to the speaker; applying the speaker's information to practice; technology: difficulties or not).

Findings

Four major findings emerged from our analysis. First, web seminars were anchored, situated texts in which speaking, writing, and thinking are often navigated in nonlinear ways, and made visible participants' experiences and knowledge about communication in online spaces like Blackboard Collaborate. Second, web seminars have clearly identifiable affordances and constraints in terms of presentation and participation. Third, literacy issues and questions are taken up as larger discourses that cut across seminar topic and speaker. And fourth, networked technologies are important factors in a web seminar's evolution and growth.

Web Seminars Generated Anchored, Situated Texts

Web seminars anchored a speaker's topic and content, and generated situated texts, represented as chat and emoticons, in which participants, and the speaker when possible, reacted

and responded verbally and visually to each other's comments and thoughts. In terms of design,

web seminars allowed for real time access to participants' written comments--on the spot

assemblages of conversations. At times participants navigated their conversations non-linearly

even though chat is captured linearly. At other times, participants engaged in longer discussions

not visually interrupted by what we call "rogue" comments, or stray comments that because of

their position in the linear display of chat did not fit with the context of previous or subsequent

comments. Such navigation offered insight into both the content of these comments as well as

their communication patterns in Blackboard Collaborate's online space. The nature of live web

seminars captured chronologically and linearly "in the moment thoughts and reactions" through

chat; however, participants often navigated non-linearly to respond to others' comments. In the

short excerpt below, three comments were made and are linear as chat allows, and P3 navigated

through P2's rogue comment to respond, in part, to P1.

    1:56:30 – *P1* Wish all parents were this active in reading!!

    1:56:58 – *P2* It's lonely in the hashtag! #GCLR Twitter, anyone?

    1:57:12 – *P3* This is interesting< and goes along with some research suggesting that

            students become less motivated to read as they progress through school.

As situated texts, the chat allowed participants' to share their thoughts and reactions

which were taken up (or not), new conversations were initiated, and thoughts clarified and/or

confirmed. As situated texts, participants were able to respond immediately to a speaker's point,

visual, audio, or video; there was no wait time between what the speaker said or presented and

her/his response. Chat enabled participants to engage in longer situated discussions.

The excerpt below was generated around the speaker's mention of Frank Smith's holistic

and critical work in opposition to literacy work mandated by politicians (Figure 2).

1	1:46:29 –	*P1*	I LOVE Frank Smith's work.
2	1:47:03 –	*P2*	me too! We use his text in our foundation course.
3	1:47:39 –	*P1*	Yes, [to P2], Frank Smith makes sense
4	1:48:03 –	*P2*	Yes, he's a slow read to understand and a reread to internalize!
5	1:48:07 –	*P3*	Great book: Understanding Reading by Frank Smith
6	1:48:30 –	*P4*	LOVE THAT BOOK! Smith is brilliant
7	1:48:42 –	*P5*	[P6] made me practically memorize that book in the 70's!! Right
8			Mom?
9	1:48:42 –	*P1*	We have indeed backed the wrong horse, [to Speaker].
10	1:48:58 –	*P6*	yes, indeed!
11	1:49:02 –	*P1*	I want [P6] to be my momma, too.
12	1:49:15 –	*P5*	It was his first book before Understanding Reading-
13			Psycholinguistics and Reading?
14	1:49:26 –	*P5*	Reading wWithout Nonsense?
15	1:49:35 –	*P6*	Yes!

Figure 2. Participants engaged "in the moment" and "assembled on the spot" conversations.

The conversation in Figure 2 was representative of the "in the moment" and "assembled on

the spot" (Gee, 2005) conversations which positioned these participants as members of a

meaningful group who, through a networked seminar, shared common experiences reading

Smith's work. P1 initiates a conversation around the speaker's mention of Frank Smith, and five

others take up this conversation. P1 and P4 state generally that they "LOVE" the work of this

scholar. P2 identifies Smith's work as "foundational" to literacy, a statement that to P1 "makes

sense." P3 narrows the discussion to a particular book title, a title that P5 "practically had to

memorize." The "Right Mom" (Lines 7-8) by P5 situates this conversation within the personal;

she refers to P6 as her "Mom"—a familial term she used to describe her close relationship with

P6, her former professor. P1 wishes this same relationship by expressing that she wants P6 "to be

my momma too" (Line 11). P5 asks a question and adds information about Smith's book, "It was

his first book….?", corrects this information and writes the second title; P6 confirms P5's second title. As a member in this 3 minute chat, P1 initiated three separate conversations and was joined by five other participants: Frank Smith, backing the wrong horse, and being P6's academic child. Two of these conversations were taken up (one more than the other) and one is not (academic child).

Chat, as part of the design of web seminars, generated on the spot and situated conversations, anchored by a key text (that of the speaker's). This design feature offered access to the thoughts of global participants 1000s of miles a part, and thus enabled them to share insights, questions, and comments about literacy topics. Although nearly linear, these participants understood how to navigate within these situated texts as nonlinear threads (Lines 9-10). They could converse even when rogue comments interrupted the physical linearity of chat.

Content and Technology were Identified as Clear Affordances and Constraints

Based upon our analysis of our interviews and chat, technology and content emerged as two main categories under which speakers and participants each identified affordances and constraints. Table 1 contains representative comments from speakers and participants.

	Affordances		Constraints	
	Content	*Technology*	*Content*	*Technology*
Participants	• Thanks again, all, this was again terrific. I am hooked! • Excellent content and speakers both last year and this year. • "I love Global Conversations. They are TRULY cutting edge and inspiring." • These seminars keep pushing the boundaries of my literacy and literacy education understandings	• Interaction with international scholars and scholarship • "It was amazing. I will come back for the rest of the lectures." • "You guys saved us a several thousand dollar plane ticket!" • "It was nice to see the presenter this time!" • Anonymity through usernames • Willing to take risks: speak online through chat but not in public forums like conferences	• Thanks for the typed discussion, as I had no sound. • Amazingly informative, give [the speaker] more time to talk. • It would be nice to have speakers from other places [than US, Canada, England, and Australia]; these seminars would be global	• "I finally figured out that I needed to update Java. If you put in the email announcement that it works best with the latest Java, it would probably help people with connection problems." • I would have loved to be able to download this. • Time zone issues • Software issues
Speakers	• "One hell of a large seminar. These are the kind of conversations we need to be having." • "These are great forums for international discussions" • "We have added these seminars to our doctoral courses." • "I'd like to present at 3:00 so that students I know in South America can attend."	• Dual presenting: "afforded the one not talking to interact with the chat area." • "Incredible to bring all these people together from all over the world on a Sunday night, Labor Day Weekend. It just speaks to the value of this work. Just wonderful!" • "I like that I am able to present from the comfort of home. I can just go to bed now!"	• "One hour is just enough time; more than that is too much time listening." • Cannot hyperlink to videos or webs in PowerPoint and cannot "fancy up the presentation." • PowerPoint is static in Elluminate and does not allow for effects	• "I couldn't see the audience. I couldn't gauge what they were thinking or if I needed to repeat something." • Stress of not being able to connect on the night of the seminar • "I wish I could have read the chat comments. I was so focused on my presentation that I couldn't respond."

Table 1. Representative comments from speakers and participants.

In general, participants spoke to a range of affordances that web seminars offer. GCLR's regularly scheduled web seminars allowed participants to return time and time again with one participant attending all 11. For her, "These seminars allow me to connect with others and hear speakers that I would not hear otherwise." When we met her at a conference, she became emotional and related that GCLR's community enables her to feel great affinity and a space where she has voice to share her thoughts and responses to literacy topics. Across the 11

seminars, GCLR has "regulars," or participants who attend frequently. A number of participants

referenced the free and open-access aspect as most salient to their participation. One participant

remarked about his attendance at Allan Luke's seminar: "You guys have saved us a several

thousand dollar plane ticket!" Other participants were "hooked," and saw these seminars as a

"great way to spend Sunday evenings." For the speakers, web seminars allowed them to present

their most current work, and offered space for "kinds of conversations we should be having."

Many of the speakers recognized the affordance of GCLR as an online critical project to effect

change, and offered names of future speakers, promoted it to their own websites, colleges, and

classes, and provided insight into marketing and publicity. At their own web seminar, speakers

enjoyed seeing familiar "faces," ("So great to know there are friendly faces out there...even

though I can't see you :)"), made themselves available through video to greet the audience, and

appreciated participants' comments that recognized their scholarship (e.g., "The interplay of the

four lines of discourse was very thought-provoking."). For seminars that had two speakers,

GCLR as an online platform afforded them ways to alternate between speaking and chatting,

which was a constraint for single speakers. As a free and open-access project, speakers noticed

audience size, and one asked whether his 300+ audience "was a good number?" Participants and

speakers voiced constraints in terms of content. Participants wished that this forum would "give

the speaker more time to talk," while speakers saw their 50 minutes "just enough time." All

speakers noted that presenting through PowerPoint limited their potential of doing a "fancy"

presentation with transitions or seamless sound/video bytes. Most of them agreed that not seeing

their audience was challenging, "[It] feels awkward in some ways." In an email comment about

content, one participant wrote that these conversations were "hardly global," as we had speakers

from only the U.S., Canada, England, and Australia, and wished for "more diversity in

speakers."

In general, technology was both a strong affordance as well as constraint. Participants

were highly enthusiastic about interacting with global others, including the speakers, and overall

saw technology as affording them "wonderful opportunities to spend an evening with an

international speaker." They also enjoyed seeing colleagues from other universities, and catching

up with each other before the seminar began with such comments as "How's your dissertation

coming along?" Others joined in on the "hellos" and "shout outs," often proudly identifying

themselves, their universities, or where they were accessing the seminar.

P1: Hello all. This is [P1] from University at Buffalo, New York.

P2: Hello from Brisbane, Australia but have no sound.

P3: Hello! [P4], University of Pennsylvania, Reading/Writing/Literacy

These "shout outs" occurred most often before a seminar began, but continued throughout the

seminar as either a public or private message, depending on the extent of knowledge participants

had about sending private chats in Blackboard. While some participants enjoyed chatting, some

participants found the chat "disrupting", sometimes even "frustrating." For instance, since chat

moves in a rapid, continuous, and linear pattern, by the time one participant typed a

response/comment, other unrelated comments had likely made their way into the discussion.

Several speakers noted that they had to try not to look at the chat so that they would not lose their

train of thought. We also found that participants were willing to take risks in this virtual

environment that they might not otherwise take in a face-to-face seminar. Many participants took

on pseudonyms and established anonymity in their participation, while others felt more at ease

chatting than they would "in large public spaces like conferences."

Literacy Issues Cut Across Topic and Speaker and Were Taken up as Larger Discourses.

Our third finding involved identifying literacy issues, concerns, and thoughts that

emerged within and across web seminars. Regardless of topic, there was a set of common

Discourses (e.g., assessment, standardized testing and curricula, language and culture, struggling

readers and writers, access [language, technology]) that were raised as responses or as questions

in the chat. These Discourses appeared to be of importance to participants, and when a speaker

introduced a concept/term, participants often "stepped away from the speaker's talk" to engage

in a conversation. We explain these conversations as *situated discursive asides*, or conversations

that emerged in the chat, situated within a point the speaker made, and that addressed the larger

issues that underpinned these points. Situated discursive asides were initiated by a single

participant who explicitly or implicitly wrote a comment in the chat, and by nature of the

comment's visibility, invited others to respond. If the invitation was taken up, interested

participants stepped aside from the current live presentation, and carried on "assembled on the

spot" conversations. The excerpt below represents one of these conversations in which seven

participants discussed Standard English, initiated by the speaker's mention of family speech

patterns (Figure 3):

1	2:06:07	*P1*	Well.... we all modify our speech depending on the audience.... in speaking,
2			and also in writing.
3	2:07:10	*P2*	I'm wondering if we are putting too much emphasis on Standard English- so
4			much that african american students are totally separately home life from
5			school life? Sounds like what did.
6	2:07:33	*P3*	Students need to know how and when to modify their speech and writing.
7			There is a discourse that students need to be able to reach.
8	2:07:43	*P4*	Whose language counts? school or home?
9	2:07:54	*P5*	but code switching is not just modifying our speech depending on the
10			audience. Code switching is switching between two languages and in this
11			case the standard English and African American English
12	2:08:03	*P1*	I don't think so.... I think we need to have high expectations (not that you
13			don't, [P2]!) for their speech and writing - because the truth is, they will
14			need to use traditional speech to succeed in middle-class society.
15	2:08:05	*P3*	School language eventually reaches into the work place.
16	2:09:48	*P6*	[P3] and [P2], I am torn about that as well. We need to allow students to use
17			their own language but point out when it is appropriate.
18	2:10:45	*P2*	I think that too much emphasis discourages social learning. What can we do
19			about this?
20	2:11:32	*P7*	while you are pointing out when language is "appropriate" you may want to
21			have a conversation on why it is appropriate who gets to define
22			"standard"…some historical context to the students

Figure 3. Participants discuss larger Discourses that underpin literacy issues.

In this 5 minute 15 second chat, seven different participants moved from initial reference to the speaker's situated discussion of speech patterns, and into a larger Discourse focused on power and language, especially as it concerned code switching in Standardized English and African American vernacular. P1 initiates the conversation on modifying speech patterns, which P2 takes up as an issue of language and power in schools, especially as situated in Standard English and African American vernacular. In Line 6, P3 enters the discussion, and suggests that students must know certain aspects of language, a "discourse that students must be able to reach." P4, in seeming agreement with P2, challenges P3's beliefs about Standard English and discourse, and invites P3 to consider the issue of whose language becomes standard. In

agreement with P3, P5 enters the conversation and directly links modifying language to code

switching, which P5 then links language to economics—a larger Discourse that often governs

how language gets taught in schools. P5 argues that "traditional speech" represents "high

standards" in school, and it is because of these "high standards" and use of "traditional speech"

that students will "succeed" in a "middle class society." P3, in seeming agreement with P5, links

language to the work force, and an implied "good job." The discussion moves into larger issues

of language and success, language and workplace, and the need for students to understand the

difference, conversations that, at times, clearly raised tensions among audience members.

As Janks (2010) suggests, diversity is located in the social and cultural interactions, and

become central in changing consciousness. What we found interesting about situated discursive

asides is that participants from different places and cultures were able to express and discuss

issues that mattered to them, issues that may challenge another participant's opinion. P4's

question, "Whose language counts?" challenges P3's statement about what P3 believes students

should know. Once written in the chat, participants' comments can be taken up and discussed in

terms of power and access. As asides, these conversations were written and once written, opened

to challenge, confirmation, and/or extension. This except illustrates how issues within a live web

seminar occurred on the spot, initiated by a speaker's point at that moment, but extended into

discussions on larger Discourses at play. Further, this excerpt provides some evidence that there

is impact of web seminars and participants' thinking. Given that these participants do not know

each other, exist 1000s of miles apart, these situated discursive asides allow for an exchange of

ideas, "social and cultural interactions" that position participants to alter their current thinking

because such asides can happen in online spaces.

Not all conversations were long or were taken up in the same fashion as the one above.

Chat transcripts across web seminars indicated that participants chose whether or not to take up

an idea. For example, in this 4-minute chat segment, P1 raises a question in Line 1 to the speaker

and an issue in Line 9; however, none of the participants took these up as invitations to engage in

conversation with him.

2:07:33 –	*P1*	[to Speaker]: Do you see a difference in interpretative theory in differing modes (i.e., print vs. visual art)?
2:08:08 -	*P2*	You used Rosenblatt's theory--she talk literary texts
2:08:56 -	*P3*	It seems like semiotics suggests that meaning making is meaning making—regardless of mode. I agree with your response.
2:11:30 -	*P4*	There's an argument that poets are synesthetic. "

We also studied to what extent chat moved too quickly for participants to respond. However, it

was unclear whether this was a result of the chat moving so quickly or a matter of topic interest.

Networked Technologies are Important Factors in a Web seminar's Evolution and Growth

We found that Internet/networked resources, including a free Wordpress blog site, social

media (Facebook, Twitter, listservs) mattered in how an online critical literacy project like

GCLR emerges and grows, and to what extent it has global interest, and ultimately, impact.

Although seemingly common sense, such findings support that to make global impact, available

Internet resources—including networked technologies and social media--afford this impact.

Before the launch of the GCLR website, we worked with email listservs only. This limited our

outreach as it depended highly on whether members of the listserv thought the project was

important enough to send information to others. Attendance at early web seminars averaged

fewer than 35; however, with increased Internet presence and our increased efforts at social

networking, the average audience numbered 250 in 2012-2013.

From the website's launch in December 2010 to August 2011 and publicity blasts to

listservs, GCLR's Wordpress site recorded approximately 1700 visits to the main page.

However, by the end of the 2011-2012 series and the start of 2012-2013 series, the website

recorded 10,388 visits. During that time, we launched our GCLR Facebook page and began

posting on other literacy-based Facebook pages. From September 2012-November 2012, the

number of visits was 6923, well on track to exceed the 10,000 number from last year. GCLR's

Wordpress site recorded over 21,000 hits across individual pages within the website (as of this

writing). These technology-Internet tools afford projects like GCLR to track its progress and

growth, and use this information to plan for expanded growth. Figure 4 indicates the growth

across the project's existence, and makes visible the extent to which Internet resources grow

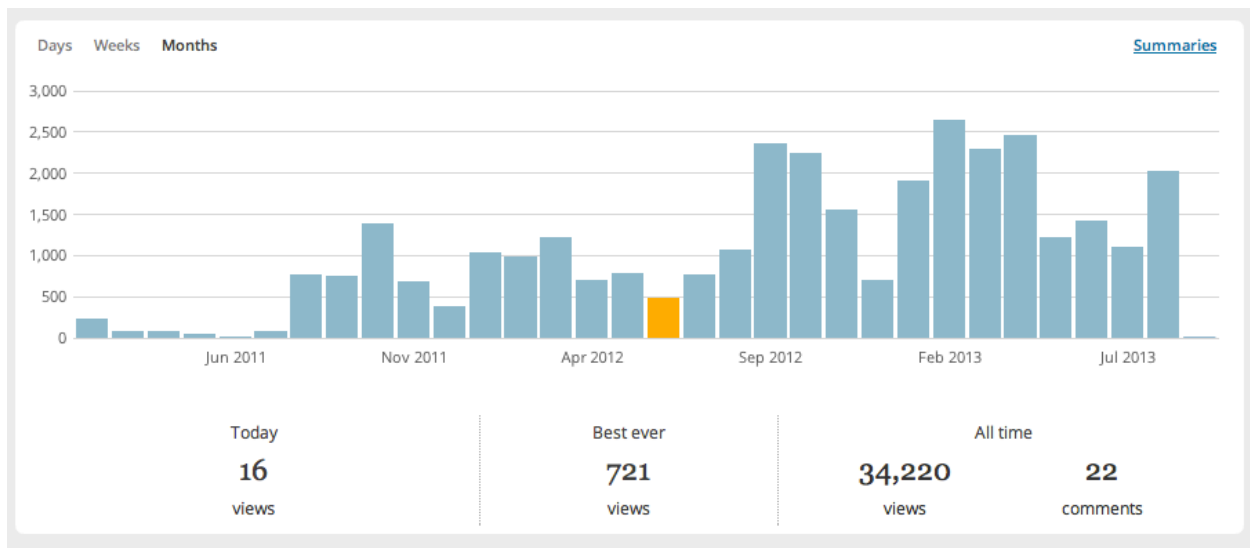interest in a literacy project.

Figure 4. Bar graph indicates the growth across the project's existence, and makes visible the

extent to which Internet resources grow interest in a literacy project.

Figure 4 puts into visual perspective the highs and lows of website access, months that

saw more access, and for us, why these highs and lows occurred. This graphic shows how there

was little interest or awareness of this project prior to January 2011, even with our email blasts.

However, with website presence, by August of 2011, awareness and interest grew exponentially.

When we added Clustrmap in September 2011 to the GCLR website, we could then see from

where people accessed this site. As of November 2012, ClustrMap recorded 7,751 hits from all

50 U.S. states and over 80 countries. As of this writing, we have had over 15,879 hits, and over

125 countries that have accessed the site. GCLR's statistics indicate that across the lifespan of

the website, GCLR's visibility via views has increased three-fold. In 2011, GCLR had 4822

views, while in 2013 (so far), the site has recorded 15,195 views. We suggest that these statistics

indicate that literacy is of global concern, and that people from six of the seven continents

accessed the Internet, including the GCLR site, to search out resources. The high concentration

of hits from the U.S., Canada, England, and Australia was no surprise; this project is English-

based, seminars presented in English, and by scholars from these four places. Further, access to

information on this site required that the viewer speak and/or read English; however, since

November 2012, GCLR now has a translation widget to the site to increase outreach and access.

We found a correlation between the number of hits to our publicity blasts through Facebook and

listservs; the more we publicized, the larger the number of visits/hits. We suggest that to market

a critical literacy project such as GCLR, a website is imperative to its initial infrastructure and

growth. Overall, we interpret the growing interest in GCLR as an indication that website

presence, social media, and electronic correspondence are important to a web seminar project's

evolution and growth.

Discussion

Networked technologies have had a highly visible impact on our social and cultural lives,

and the ways through which we participate and compete for participation in this highly

networked world have become highly diverse. From Facebook, MySpace, LinkedIn, distributions

lists, Facetime, Go to Meeting, texting, and so on we are not just connected, but networked,

socially, technologically, and intellectually. Networking, once done through professional

conferences, has taken on alternative definitions—networking through new media, social media,

and technology tools enable us participate synchronously and asynchronously. As young scholars

enter the field, how scholarship is circulated and shared is shifting; it is not surprising that

literacy educators and scholars are grappling with how new practices might be conceptualized

and actualized within and outside school settings. A longitudinal study of GCLR as an online

open access platform for scholarship not only is timely, but warranted; it offers insights into how

participation happens in online spaces, what emerges from networked participation, and to what

extent networked technologies can propel critical projects into larger and global arenas. We

discuss our findings through the concept of participation: participation as situated discursive

asides, participation as affordance and constraint, participation as networked technologies, and

participation as disruptive technology.

Participation as Situated Discursive Asides

As a free and open-access project, GCLR affords real-time, on-the-spot participation with

people across the world, many unfamiliar to each other, about literacy issues that matter. We

found that conversations in the chat were situated, anchored and contextual. We explain this type

of participation as situated discursive asides: participants stepped aside the live presentation to

discuss an issue often prompted by a speaker's point (e.g., code switching); carried on situated

discussions alongside and within the live action (their chat made visible to large group); and

stepped back into the live presentation. There is significance in these "asides;" virtual spaces

allow for participants to engage with each other immediately and quickly with minimal

disturbance to the live action. Participants have access to diverse perspectives and can challenge

dominant Discourses, such as evidenced in the excerpt focused on Standard English and African

American vernacular. Participants were able to discuss, at the moment that the speaker presented

the idea of situated language in teaching, their perspectives on which language is valued in

schools, to gets to name the power behind these decisions, and the role that language should play

in students' lives (to participate in middle class society, workplace). Perceptions and beliefs

certainly may change when participants read professional and mass market journals, and can be

shared on blogging sites, email, and/or distribution lists; however, web seminars by design allow

for situated discursive asides, moments in the presentation that allow for discussions on a

particular issue to happen in real time.

Further, as asides taken up in a public and open forum, such as offered by an open access

web seminar project, participants who may never meet online or in person in other venues can

effect some change in another participant's thoughts through the chat as situated text and as

discursive asides. As a critical literacy project then, there is some evidence to suggest that

discursive asides produced through the chat may have potential to effect change in the beliefs

and stances of others who live miles and continents apart. In physical spaces (e.g., conference

sessions), protocol often dictates behavior and participants often ask questions at the end of a

presentation directed at a speaker. However, online spaces where situated discursive asides can and do happen provide space to engage others in situated, on the spot, discussions that may challenge and/or concur with particular viewpoints. Additionally, asides allow participants to pose questions to the speaker or others, which can be, and often are, taken up by other participants in the seminar. Knowledge and perspectives are not owned by the speaker, but are shared by the audience in attendance. Further, from these asides, Discourses were made visible by those participating in these asides. Situated discursive asides run alongside, merge into, and can shape or reshape the thinking of all participants—audience as well as speaker. Entry into such access and participation significantly positions not just the content as significant, but also the Discourses that guide the content.

Participation as Affordance and Constraint

With all communication media and sign systems come affordances and constraints. While predictable constraints emerged (e.g., getting "kicked off," facility with Blackboard Collaborate tools, audio issues), we contend that these issues are transitory as technology advances. We found that the affordances outweighed the constraints in access, chat, and presentation format. The open access aspect of this project affords outreach participation, with "regulars" participants attending across seminars. Social and electronic media reached more participants, and attendance increased across the study. Participants appreciated that these seminars were free, and the interconnectedness with global others afforded them opportunities to discuss online between themselves possibilities for future collaborative work, and two participants did just that. Chat capabilities allowed participants to share classroom practices, thoughts, and ideas related to a speaker's topic; however, chat also allows for individuals to dominate, as illustrated by P1 in the Frank Smith chat. This may be why some participants found the chat distracting or why some

people did not engage in the discussions. As such, chat sometimes made ripe the opportunity for

power differentials.

Though chat capabilities allowed participants to interact with each other and the speaker

and receive responses in real-time, they do not foster longer, more in-depth literacy

conversations. Often, by the time a response is initiated, the lines of chat have already moved up

and are no longer visible. As for presentations, of the 13 speakers across 11 seminars, only 4 had

previous experience presenting web seminars. Most had participated in web seminars and were

comfortable with it as a presentation format, yet several others felt unsure of themselves as they

stepped out of their face-to-face "comfort zones" and into the virtual world. This enabled

speakers to participate in ways that they might not have imagined as a result of digital tools.

Even with the best of intents, issues of power and access were not entirely disrupted. GCLR web

seminars are presented in English. Although English is spoken approximately by only 25% of the

world's population according to linguist David Crystal (http://www.britishcouncil.org/learning-

faq-the-english-language.htm), presenting web seminars is an affordance for the 1 in 4 who

speak English, but a constraint for the 3 of 4 who do not. As such, a comment posted on the

GCLR website that indicated that GCLR was "hardly global" is valid and valued. Can a project

truly be global when only 25% are included? Further, the project's outreach is limited by

language and cost to those who can afford Internet access. Viewed critically, GCLR web

seminars serve only those who have Internet access.

Participation as Networked Activity

The website statistics and analytics evidence interest in a critical project that offers open

access to leading literacy scholars and scholarship. As an open forum, issues of dominance are

lessened; people from various geographic spaces may participate, not just those who can afford

to attend presentations that feature leading literacy scholars. Clearly, although not the newest of

technologies, web seminars continue to open possibilities for many across the globe who might

otherwise not have access. Additionally, the synchronous feature adds to the interest and the

interaction with scholars that many educators can interact through their publications. Participants

recognized that connection to scholarship presented in real-time was one of the most important

factors to their regular attendance; this suggests to us that networked technologies are significant

to participation. However, time zones are a clear constraint when access is limited to time zones

that favor the U.S. and the speaker's time zone. In fact, a number of those living in Europe joined

Allan Luke's web seminar even though it was 2:00 a.m. Within the past year, GCLR archived

web seminars; yet archived web seminars are not the same as being able to interact with

interested others in synchronous spaces. Live interaction provides an avenue to achieve a goal of

educating for a global citizenry (Author, 2010; Janks & Vasquez, 2011) with those who are

willing to engage digitally and critically in a vastly different but interconnected world. A project

such as GCLR has the potential to encourage transformative changes concerning literacy

research and the practices associated with literacy and literacy instruction. Participants can share

resources, such as represented in the Frank Smith excerpt (Figure 2), challenge and support

thinking, and network with interested others on research projects.

Participation as Disruptive Innovation

Finally, we see GCLR web seminars as disruptive innovation in which participation in

what, for many in the world, are new and emerging technologies spur imagination that leads to

innovation. Used in the disciplines of business and technology, "disruptive technologies" (later

termed disruptive innovation) was coined by Bower and Christensen (1995) to describe

innovations that improve a service or product that the market does not anticipate or expect, all

with an eye towards a future and different set of consumers. As a disruptive innovation, GCLR

web seminars critically position people to engage in literacy scholarship in a different way, one

that both resembles traditional formats (speaker's talk to an audience) but puts a twist on how

participation happens in such a format through chat and live interaction at the end with speakers.

We liken this to Janks' (2010) concept of "re-design," which enables us to envision alternate

possibilities for communication and representation. In light of re-design, participants in an online

critical web seminar series like GCLR can envision an alternative possibility of engaging with

scholars and scholarship in real time, can interact, respond, and move aside with others to discuss

issues, all within features of web seminar delivery platforms. The design of synchronous web

seminars like GCLR offers interested participants access to multiple perspectives, diverse ways

of interaction, and opportunities to shift dominant ideologies about language and power. Further,

web seminars as networked technologies threaten traditional formats by offering convenience

and low-cost/no cost opportunities to stay professional current. Learners and learning no longer

resides in physical spaces but have tremendous international outreach as evidenced by the

explosion of Massive On-line Open-Access Courses (MOOCs).

Implications for Research and Practice

We see interesting implications for research, teaching and scholarship. Although

literature does exist on online learning spaces, little research on synchronous participation in

online platforms designed for literacy scholars and educators is scant. More research, especially

into the importance of human interaction (e.g., seeing and reading the expressions of an

audience) in physical spaces (e.g., conferences, workshops) alongside human interaction in

online scholarship spaces, is warranted and needed. Should convenience and cost trump

attending conferences or workshops? Or would a disruptive innovation like free and open access

web seminars kill the conference as "video killed the radio star" (Woolley & the Camera Club, 1979). We do not see the professional conference moving away in favor of online learning; however, online engagement with scholarship provides access to those who are unable to participate physically in professional venues. In terms of teaching, web seminars designed with critical literacy in mind can offer educators and their students with invaluable real-time interaction with international scholars, and cutting edge research and thinking. Educators alongside their students can join in on global conversations about issues that matter. Finally, in terms of scholarship, with the oppressive plethora of mandates around literacy, access to critical scholarship that disrupts dominant ideologies underpinning legislation around literacy (e.g., assessment, teacher performance, English learners and learning) is critical. Online projects that speak against dominant ideologies are needed and necessary to garner a groundswell of support to take social action.

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Figures/Captions

Figure 1. ClustrMap captures concentrations of interest, location, and time of access.

Figure 2. Participants engaged "in the moment" and "assembled on the spot" conversations.

1	1:46:29 – *P1*	I LOVE Frank Smith's work.
2	1:47:03 – *P2*	me too! We use his text in our foundation course.
3	1:47:39 – *P1*	Yes, [to P2], Frank Smith makes sense
4	1:48:03 – *P2*	Yes, he's a slow read to understand and a reread to internalize!
5	1:48:07 – *P3*	Great book: Understanding Reading by Frank Smith
6	1:48:30 – *P4*	LOVE THAT BOOK! Smith is brilliant
7	1:48:42 – *P5*	[P6] made me practically memorize that book in the 70's!! Right
8		Mom?
9	1:48:42 – *P1*	We have indeed backed the wrong horse, [to Speaker].
10	1:48:58 – *P6*	yes, indeed!
11	1:49:02 – *P1*	I want [P6] to be my momma, too.
12	1:49:15 – *P5*	It was his first book before Understanding Reading-
13		Psycholinguistics and Reading?
14	1:49:26 – *P5*	Reading wWithout Nonsense?
15	1:49:35 – *P6*	Yes!

Figure 3. Participants discuss larger Discourses that underpin literacy issues.

1	2:06:07	*P1*	Well.... we all modify our speech depending on the audience.... in speaking,
2			and also in writing.
3	2:07:10	*P2*	I'm wondering if we are putting too much emphasis on Standard English- so
4			much that african american students are totally separately home life from
5			school life? Sounds like what did.
6	2:07:33	*P3*	Students need to know how and when to modify their speech and writing.
7			There is a discourse that students need to be able to reach.
8	2:07:43	*P4*	Whose language counts? school or home?
9	2:07:54	*P5*	but code switching is not just modifying our speech depending on the
10			audience. Code switching is switching between two languages and in this
11			case the standard English and African American English
12	2:08:03	*P1*	I don't think so.... I think we need to have high expectations (not that you
13			don't, [P2]!) for their speech and writing - because the truth is, they will
14			need to use traditional speech to succeed in middle-class society.
15	2:08:05	*P3*	School language eventually reaches into the work place.
16	2:09:48	*P6*	[P3] and [P2], I am torn about that as well. We need to allow students to use
17			their own language but point out when it is appropriate.
18	2:10:45	*P2*	I think that too much emphasis discourages social learning. What can we do
19			about this?
20	2:11:32	*P7*	while you are pointing out when language is "appropriate" you may want to
21			have a conversation on why it is appropriate who gets to define
22			"standard"…some historical context to the students

Figure 4. Bar graph indicates the growth across the project's existence, and makes visible the

extent to which Internet resources grow interest in a literacy project.
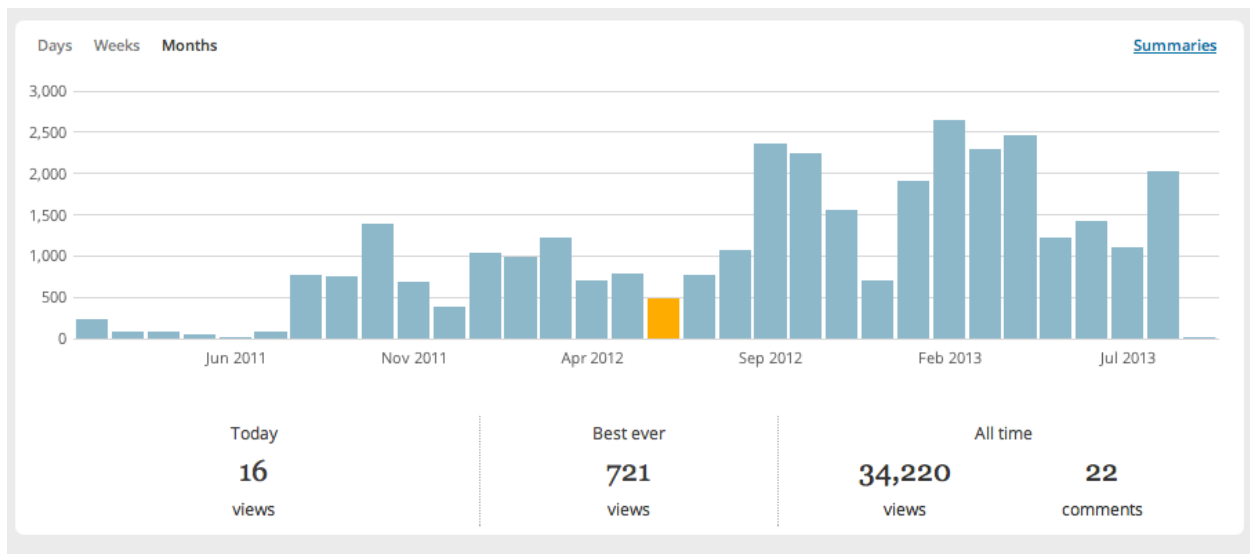
Table 1. Representative comments from speakers and participants.

	Affordances		Constraints	
	Content	*Technology*	*Content*	*Technology*
Participants	• Thanks again, all, this was again terrific. I am hooked! • Excellent content and speakers both last year and this year. • "I love Global Conversations. They are TRULY cutting edge and inspiring." • These seminars keep pushing the boundaries of my literacy and literacy education understandings	• Interaction with international scholars and scholarship • "It was amazing. I will come back for the rest of the lectures." • "You guys saved us a several thousand dollar plane ticket!" • "It was nice to see the presenter this time!" • Anonymity through usernames • Willing to take risks: speak online through chat but not in public forums like conferences	• Thanks for the typed discussion, as I had no sound. • Amazingly informative, give [the speaker] more time to talk. • It would be nice to have speakers from other places [than US, Canada, England, and Australia]; these seminars would be global	• "I finally figured out that I needed to update Java. If you put in the email announcement that it works best with the latest Java, it would probably help people with connection problems." • I would have loved to be able to download this. • Time zone issues • Software issues
Speakers	• "One hell of a large seminar. These are the kind of conversations we need to be having." • "These are great forums for international discussions" • "We have added these seminars to our doctoral courses." • "I'd like to present at 3:00 so that students I know in South America can attend."	• Dual presenting: "afforded the one not talking to interact with the chat area." • "Incredible to bring all these people together from all over the world on a Sunday night, Labor Day Weekend. It just speaks to the value of this work. Just wonderful!" • "I like that I am able to present from the comfort of home. I can just go to bed now!"	• "One hour is just enough time; more than that is too much time listening." • Cannot hyperlink to videos or webs in PowerPoint and cannot "fancy up the presentation." • PowerPoint is static in Elluminate and does not allow for effects	• "I couldn't see the audience. I couldn't gauge what they were thinking or if I needed to repeat something." • Stress of not being able to connect on the night of the seminar • "I wish I could have read the chat comments. I was so focused on my presentation that I couldn't respond."

Four Online Discussion Strategies: Perceptions of Seven Doctoral Students

Rebecca S. Anderson, Ph.D.
Literacy Professor
University of Memphis
rsandrsn@memphis.edu

Gretchen S. Goode
Ph.D. Student
University of Memphis
ggoode@memphis.edu

Jessica S. Mitchell
Ph.D. Student
University of Memphis
jmtchell@memphis.edu

Rachael F. Thompson
Ph.D. Student
University of Memphis
rthmpsn6@memphis.edu

Abstract

In the last few years, online courses have increased at rates inconsistent with available research about online best practices. Although past research has demonstrated increased course performance through effective online discussion boards, few studies have examined participants' perceptions of varying instructional strategies used to facilitate these discussions. The purpose of this study was to examine student perceptions' of the effectiveness of four online instructional strategies in creating online discussions. Specifically to the context of this study, we explored seven doctoral students' perceptions of the following four instructional strategies used for online discussions in a graduate literacy class: Problem-Based Learning, Discussion Web, 3-2-1 Strategy, and Case Study. We identified the strengths and challenges of each instructional strategy, offered four conditions for effective online discussion strategies, and suggested future research directions.

The expansion of online courses and programs in the past few years has been staggering. In fact, statistics showing the number of higher education students who have taken an online course has increased from 9.7% in 2002 (Allen & Seaman, 2011) to 46% in 2011 (Parker, Lenhart, & Moore, 2011). With this growth, it is clear that schools do not need to know more about attracting students to online courses and programs; rather, they need to know more about best practices for online teaching.

Fortunately, the literature about the delivery of online classes has been growing. This literature is especially critical for an emergent issue: it appears that students are dropping out of online courses and programs more quickly than face-to-face classes (Author, 2010; Park & Choi, 2009; Wang, Foucar-Szocki, Griffen, O'Connor, & Sceiford, 2003). Undoubtedly there are several reasons for this, but perhaps one solution is to ensure online discussions are engaging and meaningful. Since online discussions are a common denominator in online classes, and indeed for many are the heart of the online experience, it seems especially important that educators know how to plan and implement this instructional format (Koh, Herring, & Hew, 2010; Rourke & Kanuka, 2009; Roby, Ashe, Singh, & Clark, 2013; Schallert et al., 2009). Specifically, studies are called to demonstrate how online discussion boards increase student interaction (Schallert, et al., 2009), increase learning outcomes (LaPointe & Gunawardena, 2004), and increase course performance (Cheng, Paré, Collimore, & Joordens, 2011).

Many studies of online learning focus on measuring the overall depth of student learning (Garrison, Anderson, & Archer, 2001; Im & Lee, 2003; Meyer, 2003) or the effectiveness of instructional strategies (Kanuka, Rourke, & Laflamme, 2007; Richardson & Ice, 2010). Although some studies elicit student perceptions of online discussions (Chen & Wang, 2009;

Akyol, Garrison, & Ozden, 2009; Christopher & Tallent-Runnels, 2004), few examine the

participants' perceptions of varying instructional strategies. The purpose of the current study

was to explore seven literacy doctoral students' perceptions of four instructional strategies used

in online discussions to address Han & Hill's (2006) claim that: "Future research needs to focus

on how various strategies are employed in multiple contexts and how they might contribute to

the discussion" (p. 46). The following questions guided the research: 1) What were the strengths

of each instructional strategy? and 2) What were the challenges of each strategy?

Literature Review

Online courses have been defined traditionally as either hybrid courses or fully online

courses. Hybrid courses are also known as blended courses (Lorenzetti, 2004) and "combine

elements of face-to-face instruction with elements of distance teaching" (El Mansour &

Mupinga, 2007, p. 243). Unlike fully online courses where students meet entirely in virtual

environments, hybrid courses allow students to meet both in classrooms as well as in online

environments. In both hybrid courses and fully online courses, discussion boards are the key

means of online communication for students and instructors.

Discussion Boards

The literature suggests online discussion boards are advantageous when they provide an

equitable space for all students. These democratic spaces "allow participants who do not speak

in classes an opportunity to have a voice and no one dominates the discussion" (Ryan & Scott,

2008, p. 1639). This equality prompts more substantive discussion as well as increased

participation and sense of community (Baglione & Nastanski, 2007). Promoting community

through collaborative learning in an online classroom results in higher levels of critical thinking,

creativity, student initiative, and empathy (Chen & Wang, 2009; Palloff & Pratt, 2007; Richards,

2007).

However, such advantages associated with online discussions have been connected to

challenges as well. For instance, the role of time in online discussions can be a challenge for

instructors to respond to students who may perceive a timely response from their instructor as

necessary to their learning (Riley, Jensen, & Santiago, 2005; Schallert et al., 2009). Additionally,

the amount of time to prepare for discussions and respond thoughtfully has been reported as a

challenge (El Mansour & Mupinga, 2007). Even though some studies have shown that increased

time for student postings has been connected to deeper levels of student learning (Garrison,

Anderson, & Archer, 2001; Song & McNary, 2011), other studies have claimed that online

discussions do not reach the deepest degree of critical thinking solely based upon the amount of

time spent online as the majority of student postings in these studies remained at a medium level

of thought development (Kanuka et al., 2007; Christopher et al., 2004).

Other challenges associated with online discussions are sometimes linked to the

facilitator's role. Facilitators who fail to match tasks and purposes to online discussions have

encountered challenges in the classroom environment (Merrill, 2004). According to Pozzi

(2010), different types of tasks foster different types of interactions, with unstructured activities

creating more social interaction and structured tasks forcing more collaborative learning.

Garrison, Anderson, and Archer (2001), however, have argued that interaction alone does not

fully engage participants at higher levels of thinking, emphasizing design, structure, and

leadership as critical for learners to engage in deeper levels of thinking. Similarly, Ryan and

Scott (2008) found that the structuring of questions was key to stimulating online discussion,

claiming, "The use of closed questions and teacher-directed discussion may not lead students to making thoughtful contributions" (p. 1639). Overall, there are many variables that facilitators need to consider when selecting strategies that effectively promote online discussions (Fish & Wickersham, 2009).

Asynchronous Discussion Boards

Evidence has suggested that the application of online discussion paired with the overall organization of the online experience can have considerable influence on the depth of student learning online (Kanuka, Rourke, & Laflamme, 2007; Pozzi, 2010; Richarson & Ice, 2010). Discussions for online learning can be organized into two categories: synchronous and asynchronous. Synchronous discussions require students to participate at set periods of time, while asynchronous discussions allow them to participate with more autonomy and flexibility.

Research with asynchronous discussion boards has called for more studies to examine higher-order thinking and overall effectiveness (Andresen, 2009). Wise, Perera, Hsiao, Speer, & Marbouti (2012) have argued that there is a missing gap in the research of how individuals experience online asynchronous discussions, citing the importance of the connection between the engagement of the interaction and meaningful learning (Ho & Swan, 2007; Morris, Finnegan, & Wu, 2005).

We chose asynchronous discussions for the context of our study because it continues to grow in popularity (Northover, 2002; Parsad & Lewis, 2008) and because various studies support the advantages of this format. For example, a discourse analysis (Schallert et al., 2009) of discussion boards found more positive findings for generating discussion by "experience

sharing, idea explanation, and self-evaluation functions" (p.74) in asynchronous discussions

versus synchronous discussions. Furthermore, asynchronous discussion boards give students

more time to interact and reflect before responding (Ajayi, 2010; Beeghly, 2005; Nicholson &

Bond, 2003).

Theoretical Framework

Social constructivist theory was deemed an appropriate theory to guide this study because

from this perspective learners are seen as active, self-regulating seekers who construct

knowledge by building on previous experiences and through interacting with others (Palincsar,

1998; Vygotsky, 1978, 1986). Indeed, social interactions are a major tenet of this theory

(Esterberg, 2002), and as other researchers have noted (Murphy, Mahoney, Chen, Mendoza-

Diaz, & Xiaobing, 2005; Wickersham & McGee, 2008), student learning is enhanced in online

courses that embrace a social constructivist paradigm. As a result, understanding the social

aspect of teaching and knowledge construction is crucial to understanding participants'

perceptions of online discussion strategies (Ajayi, 2010; Gee, 2003; Jain, Jain, & Jain, 2011;

Song & McNary, 2011).

Methodology

This qualitative study was grounded in the work of Patton's (2002) explanation of

evaluation research: "When one examines and judges accomplishments and effectiveness, one is

engaged in evaluation. When this examination of effectiveness is conducted systematically and

empirically through careful data collection and thoughtful analysis, one is engaged in evaluation

research" (p. 11). We deemed Patton's methodology appropriate because the purpose of this

study was to examine student perceptions' of the effectiveness of four online instructional

strategies in creating online discussions, including strengths and challenges, of four online

discussion strategies. As a result, we identified a priori the two themes of strengths and

challenges for each online discussion strategy.

Participants

The study participants were seven literacy doctoral students enrolled at a large, mid-

south, urban university. At the time of the study, all participants were part-time students, with

six teaching in K-12 settings, and one serving as a district literacy specialist. Five participants

were white, two African-American, and all were females who had taken online courses. Six of

the seven had taken other graduate level classes together.

The professor, in her nineteenth year at the university, had taught numerous hybrid and

online graduate courses. Additionally, she had a background in conducting both action research

and technology-related research (Author, 2005). Like others in the field (Connelly & Clandinin,

1988; Holly, Arhar, & Kasten, 2009; McNiff & Whitehead, 2010), she valued the process of

systematically studying her practice, especially when engaging in innovative practices. Because

the structure of the class included the new twist of adapting instructional strategies to an online

format, and also because the doctoral students were eager to learn about conducting research, the

professor felt there was a clear fit between the class and action research. As a result, she invited

the seven students enrolled in the class to participate in the study. Although the students knew

they would not receive extra credit, all seven agreed to participate in the action research, which

included participating in the online discussions and gathering the data. When the course ended,

the professor invited all seven students to continue in the research process. At that time, three

students agreed to continue with the professor to analyze the data and write an article together on

their findings. The students who chose not to continue with the study all cited time constraints as the reason for not continuing this process.

The three students who did continue are referred to as student-researchers in the remainder of this paper. All three student-researchers were in the early part of their doctoral coursework. One taught elementary school and the other two taught high school English. All three had a strong interest in technology integration in the literacy curriculum and in online teaching.

Course Description

The goal of the course, *Composition: Theory and Practice,* was to provide in-depth knowledge of theory, research, and pedagogy as related to the field of composition in K-12 education. The course was a new offering for the university and was offered as a hybrid, alternating meeting one week for three hours face-to-face and meeting one week asynchronously online, meaning there was not a designated time for online discussions. One of the primary assignments of the class entailed eight weeks of reading and discussing the required text, Handbook of Writing Research (MacArthur, Graham, & Fitzgerald, 2006). During the first week of class, the professor and the seven students decided which chapters they would read and discuss, and each student signed up to be the discussion facilitator for a specific chapter. The professor based the decision to include student facilitators from previous studies portraying the benefits of shared learning responsibilities (Baran & Correira, 2009; Lock & Redmond, 2006). Four of the weekly discussions were face-to-face and four were online.

During the second class the instructor modeled how to facilitate a classroom discussion

using Paired-Retelling, an established literacy strategy where students retell a selection of a text

to a partner (Koskinen, Gambrell, Kapinus, & Heathington, 1988). During the first class she

explained how Paired-Retelling is used to foster collaborative discussions and assigned readings

for students to teach their partner. For the remaining seven discussions, the weekly student

facilitator, whether face-to-face or online, was free to select the discussion strategy she wanted to

use, although it had to be adapted from a documented educational instructional strategy. The

chosen online instructional strategies included: 1) Problem-Based Learning, 2) Discussion Web,

3) 3-2-1 Strategy, and 4) Case Study. All three student-researchers signed up to facilitate one of

the online discussions; a student who did not continue as a student-researcher facilitated the

online case study strategy.

Data Sources and Analysis

The same data were collected for each of the four online strategies. The week after each

online discussion, the professor conducted a focus group interview with all students (see

Appendix A) followed by the students' completing a survey with open-ended questions related to

the strategy and an anonymous rating scale (see Appendix B). Students interviewed each

facilitator individually (see Appendix C) and all interviews were audio-taped and transcribed.

Throughout the study, the professor and student-researchers recorded reflections, questions, and

insights in a research journal and at the end of the semester all online discussions were

downloaded.

The data were transcribed and analyzed at the completion of the study by the professor

and the three student-researchers. Analysis began by reading a data set in its entirety to gain

insights about that particular online strategy (Mishler, 1986). A data set for each strategy

included a: 1) focus group interview, 2) student survey, 3) facilitator interview, 4) research

journal, and 5) online discussion transcripts. Next, using open-coding, initial categories were

generated inductively for each data set (Strauss & Corbin, 1990). An emphasis was placed on

triangulating findings (Lincoln & Guba, 1985) by using multiple data sources. Collectively, the

categories generated were: relevance, organization, supports student learning, peer interactions,

engagement, time, communication, participation, effort, and technology. Analysis was

proceeded by: 1) sorting the categories by strengths or challenges, 2) refining the categories, 3)

returning to the data set for confirmation of hypotheses, and 4) identifying common underlying

themes. Reliability of the coding was enhanced by the four researchers first analyzing the data

individually, then meeting regularly as a research team, both online and face-to-face, to negotiate

the underlying themes. All seven students in the class received a copy of the findings and were

asked to critically analyze the interpretations of the study as it related to their understandings of

what occurred. Student email responses were used to confirm our findings. Our intentions were

to involve the "research participants in the construction and validation of knowledge" (Lather,

1986, p. 265). From this multi-level process of analysis, the strengths and challenges of each of

the four online strategies emerged. Unless otherwise noted, the findings represented in our

results were explicitly mentioned by at least two-thirds of the participants.

Findings

In this section, we introduce each of the four strategies that were used to promote online

discussions. We provide a brief description of how the strategy was used in this study, followed

by the findings that related to its strengths and challenges (see Table 1).

Table 1: Strengths and Challenges of Four Instructional Strategies Adapted for Online

Discussions

Discussion strategy	Strengths	Challenges
Problem-Based Learning		
Prepares students for real-life problems by introducing a problem scenario. Students first analyze the problem before determining a path to solution with minor facilitation from instructor	• Focuses on relevant and meaningful problems • Engages and motivates students • Links theory and practice	• Requires adequate time to complete • Relies on a well-developed, meaningful problem • Needs a problem broad enough to meet the needs of all students
Discussion Web		
Generates discussion on controversial topics by researching both sides and presenting the cases. After discussion, students take a stance and defend their opinion.	• Promotes higher-level thinking • Fosters open-mindedness	• Requires controversial topic • Creates discomfort for some students
3-2-1 Strategy		

Discussion strategy	Strengths	Challenges
Connects students to the text by providing a structured discussion format. After reading, students summarize 3 main ideas, find 2 interesting issues, and create 1 question for further research. Students then discuss one another's ideas.	• Provides focus for reading • Promotes student autonomy • Facilitates comprehension	• Requires equitable reading assignments • Limits the scope of reading topics • Needs clear directions
Case Study		
Presents relevant issues to students in multiple steps. Students make initial judgments before they are given additional information in segments. Students continue to build and shape their learning throughout the case.	• Activates prior knowledge • Allows for technology integration • Connects to teaching context • Promotes thoughtful reflection	• Relies on well-developed materials • Requires extensive time for the facilitator

Problem-Based Learning Strategy

The first strategy, Problem-Based Learning (PBL), originally was developed as a strategy

in the medical field to prepare students for realistic situations they would encounter in their

careers (Schmidt, Rotgans, & Yew, 2011). PBL is defined as providing "learning opportunities that are relevant to the students, the goals of which are at least partly determined by the students themselves" (Gallow, 2000, para. 1). Hmelo-Silver (2004) broadened the learning context of this strategy, explaining it is a student-centered pedagogy designed to help students learn content knowledge through problem solving. Advocates of PBL have emphasized that it is a constructivist approach to learning where students engage in self-directed learning and teachers serve as facilitators (Barrows, 1996; Gijselaers, 1995). In these environments, both face-to-face and online, documentation of increased critical thinking skills has emerged (Sendağ & Odabasi, 2009). Critics of PBL, on the other hand, have argued that students are cognitively overloaded if too much information is added too quickly, and therefore caution that the strategy may not be suited for novices (Sweller, 2006; Sweller & Cooper, 1985; Cooper & Sweller, 1987). It is also noted that studies are needed to investigate technological scaffolds and online effects of PBL (Henry, Tawfik, Jonassen, Winholtz & Khanna, 2012).

In our study, the online facilitator positioned students in a real world context by selecting a relevant educational issue for the seven literacy doctoral students: how to allocate funds for a countywide literacy program. Students were expected to work as a committee with different district roles and arrive at a unified grant proposal for solving this problem. On the first day of the discussion unit, students read and responded to the description of the grant that omitted details about how the money would be divided and spent. Students also read a description of the county and the goals of its literacy program. On the day of discussion, students discussed how to divide into research specialists for each division needing research, i.e. technology for beginning

writers, technology for writing in the content areas, technology for writing with special populations, etc.

On the next day of discussion, students read the same anchor chapter in their textbook concerning writing with technology. They discussed the implications the research had on their specific area with their partners, and on the following discussion day, read and responded to other group's postings. At the conclusion of the discussion unit, students individually ranked the ways that they thought the money should be spent along with a brief explanation and corresponding citations.

The researchers identified three strengths as expressed by the participants for using the PBL strategy for online discussions: 1) it focuses on relevant and meaningful problems, 2) it engages and motivates students, and 3) it links theory and practice. Both the students and facilitator found it relevant and meaningful because it entailed real-world, authentic problems that connected theory to practice, as the following student explained on the survey:

> To me, it's very frustrating when I'm given an assignment that I can't see any relation to what I'm doing or what I plan to do, and so [the facilitator] did a great job of finding this problem that applied to all of us.

Furthermore, students reported being engaged and motivated to invest more time and energy in discussions that were meaningful to them, especially when these discussions linked theory and practice, as illustrated in this student's survey:

> I knew that if I had to rank these areas [grant funds], I'd know enough about them and understand what they were, to say which one I thought was the most useful, and which

one I thought was the least useful. So I went back and read the chapter way more in depth than I would have if I had not been asked to rank all five.

There were three main challenges as reported by the participants in association with using the PBL strategy: 1) it requires adequate time to complete, 2) it relies on a well-developed, meaningful problem, and 3) it needs a problem broad enough to meet the needs of all students. Notably, both the facilitator and students reported time issues. These time-related frustrations were associated primarily with expecting a lot of work in a short period of time. This led students to suggest that several weeks are needed to complete online PBL discussions. Other challenges related to creating a relevant problem and meeting the needs of all students. As one participant discussed during the focus group interview, a professor needs to: "know your students and what motivates them, so that you can develop a situation that they're all interested in and motivated to participate in."

In sum, these findings suggest that Problem-Based Learning is ideal for linking theory and practice with real-world situations when creating an online discussion. Indeed, it is easily used with current, relevant topics. It may take, however, a skilled instructor to understand the complexities of creating and pacing PBL online discussions that are relevant to all students.

Discussion Web Strategy

The discussion web strategy offers a framework that allows students to discuss both sides of a controversial issue (Alvermann, 1991). Students are encouraged to provide evidence, work in groups to consider all perspectives, and refine their own thinking before writing their final

individual views on an issue. This strategy has been shown to promote interactive learning,

provide structure for analyzing difficult texts, and support independent learners (Buehl, 2001).

In our study, the facilitator introduced the discussion web strategy in the form of a

graphic organizer. This organizer included a space for students to list pros and cons of the topic.

Students were asked to work in groups to answer the question: Should we use automated-graders

for writing assessments? After reading the text chapter and additional related online materials,

each group posted evidence both in support of and against automated-graders. After reading

other groups' evidence, each group next reached a consensus related to the topic and posted it for

the class. During the final step, students wrote their own position statement, then posted and

responded to each other's papers.

According to the data of the participants, there were two major strengths of using the

online discussion web strategy: 1) it promotes higher-level thinking, and 2) it fosters open-

mindedness. Students overwhelmingly agreed that the discussion web promoted higher-level

critical thinking, perhaps even more deeply than a face-to-face debate. As this student explained:

> I think it's really better than what you think of as a typical debate, because in a typical
>
> debate you've done all your preparation before you come in and talk to each other. In
>
> this case [online], it led to a different preparation and then we talked and I went back and
>
> forth with what I thought and things other people were bringing up. I know I even added
>
> to my own ideas. I was like, 'Oh, wait, I found something new.' In a typical debate
>
> situation, you don't have that opportunity to go back and do more research in the middle.

The second strength of this strategy was that it promoted open-mindedness through peer interaction. Because multiple students in this study admitted that they highly valued the opinions of their peers, they were willing to recognize their preconceived biases and eager to explore alternative viewpoints, as evidenced during an interview: "It was just a lot of fun going back and forth because we were just looking at it from two different points of view and then having an opportunity to discuss that; I thought that was really rich."

On the other hand, the researchers found two challenges as expressed by the participants in association with the discussion web strategy: 1) it requires controversial topics, and 2) it creates discomfort for some students. First, since it is topic-dependent, facilitators should select controversial and relevant topics as this facilitator explained during an interview: "I think you have to be careful about what you're using this strategy with because you have to use it with something that has a pro and a con." During the interview, the students agreed that the "match" between the chapter topic and the strategy was a key element to the success of the discussion and the learning. Thus, the researchers found that the planning of the strategy can be challenging for the facilitator, who must weigh the participants' background knowledge and the perceived relevance of the topic. Additionally, the researchers found that participants viewed the facilitator as effective when providing clear directions, expectations, timelines, and feedback.

The second challenge when using the discussion web strategy was some students expressed discomfort when they disagreed with their peers. Although students reported they knew one another from previous classes, and generally felt comfortable with one another, a few reported they felt insecure about sharing their writing and thoughts, as this student cautioned in her free response:

I think that it is great that our class has a community in which we can debate with one another's ideas but still respect one another as people. I think that possibly in some classes that might not be the case, and professors might have to give students more guidelines about how to respond to one another appropriately.

In sum, these findings suggest that the discussion web is an effective online strategy for encouraging students to be open-minded and for promoting higher-level thinking during online discussions. Although there can be some discomfort whenever peers disagree, topics are perhaps debated more deeply online than face-to-face. The facilitator's role is viewed as critical for ensuring success by selecting a relevant, controversial topic with multiple viewpoints, and creating a safe environment for students to share their thoughts.

3-2-1 Strategy

Grounded in the field of literacy pedagogy, the 3-2-1 strategy has been reported to help students connect to informational texts by summarizing key ideas from their readings and personalizing the reading by asking questions (Zygouris-Coe, Wiggins, & Smith, 2004). Typically, this strategy requires students to identify three main points, two supporting or interesting details, and one question after reading a passage. Essentially this strategy helps students focus on what they know and reveals their uncertainties about the topic, generating student-centered discussions around their ideas and questions.

In this study, the 3-2-1 strategy was adapted by first asking students to read the chapter entitled, "Relations among Oral Language, Reading, and Writing Development." The student-researcher facilitator, with knowledge of the others' teaching experiences and interests, assigned

two students to each of the chapter sections: oral development, reading comprehension, and new

directions. The students next summarized their sections in three main points. Then, they

commented on two research studies discussed in the chapter, and finally, revealed one area for

further research. Students were asked to post and provide peer feedback a minimum of three

times during the week. The first posting was their own responses to the 3-2-1 instructions; the

second was to comment on their partner's responses, as well as to another classmate who had

responded to a different section. The third posting required students to investigate their own

questions and post follow-up materials, then respond to one other student who had done the

same.

According to the data, participants reported that there were three strengths of the 3-2-1

Strategy: 1) it provides focus for reading, 2) it promotes student autonomy, and 3) it facilitates

student comprehension. In particular, all students mentioned becoming quickly focused on their

reading as a strength of this strategy, as explained in the survey: "Because students are explicitly

told what to read for during each of the three steps, they become quickly focused on their

learning, allowing for meaningful, critical readings." The 3-2-1 strategy was also connected to

student autonomy because students formulated their own questions about the assigned reading.

A student explained during a focus group interview that having this choice was motivating and

allowed students to tailor the assigned readings to their research interests by having the ability to

"[pick].... a question and move in a different direction." Finally, students reported that the

strategy increased their comprehension of the course material because they collaborated and

engaged in meaningful peer conversations.

Three specific challenges were expressed while using the 3-2-1 strategy: 1) it requires equitable reading assignments, 2) it limits the scope of reading topics, and 3) it needs clear directions. Although the facilitator reported that the strategy was easy to modify, students explained it was somewhat ambiguous and frustrating unless they received explicit, clear guidelines. For example, in the survey, a student shared her need for clear organization:

> ...but at the end when I was trying to find my research article (it took me a couple of days to find it) and then when I posted it, I didn't know where to post it, because we had so many discussions and things going on. I thought, do I respond to my original log?

Similarly, students expressed frustration when they recognized that some students had longer passages to read and respond to than others.

Moreover, it was a challenge for the facilitator to use a strategy that focuses on reading material while at the same time encouraging students to connect theory to practice, as the facilitator noted in her interview:

> I would change my directions to make sure [I] ... encouraged more of the going out and researching on your own from the beginning. If you're trying to get people to look at furthering that in-depth discussion on how the reading applied to them, because I think that that's definitely what it can be used for, just have people look and say, 'not that I want you to [remember all of] this, I want you to pull out what you think is most applicable and what interests you the most to go forward with'.

In sum, 3-2-1 was deemed as an appropriate strategy for reading and discussing assigned texts online because students reported being focused on their reading very quickly. However, it

appears students view this strategy as less appropriate for connecting theory and practice. Even though the strategy is easy to modify, variables such as student backgrounds and equitable considerations for reading assignments were cited as needs to be examined before implementation of this strategy.

Case Study

The case study strategy has been widely applied to fields such as law, social science, and medicine, and it involves an in-depth, longitudinal analysis of a single issue, event, problem, or critical incident in a real-life setting (Boehrer & Linsky, 1990; Christensen, Garvin & Sweet, 1991; Christensen & Hansen, 1987; Merseth, 1991). Case studies generally are based on real events and tell a story involving issues or conflicts that need to be resolved; however, the results generally do not have a right or wrong solution.

In this study, three online cases were used from the online Southern Poverty Law Center's Teaching Diverse Students Initiative (1991) that all related to multiculturalism and writing instruction, the topic of that week's discussion. Information was revealed to students in small increments, allowing them to form judgments and question their assumptions while at the same time encouraging them to read articles and view videos from experts in the field. Students read the premise of their case studies, answered some initial questions about the case, and responded to their assigned partner's initial impressions. Then, students reviewed materials on the website that included additional details about the case, research articles, and videos of experts. After gathering this additional information, students once again answered questions and responded to their partners. Finally, students were asked to make connections between the assigned class reading, a chapter entitled "Teaching Writing in Culturally Diverse Classrooms,"

and the case. Students posted these reflections and then responded to their partners and one

other student.

According to the data from the participants, the case study method had four clear

strengths: 1) it activates prior knowledge, 2) it allows for technology integration, 3) it connects

to teaching context, and 4) it promotes thoughtful reflection. The most evident theme was the

activation of students' prior knowledge that forced them to examine their own

assumptions. Students, as explained in the survey, appreciated that the case studies allowed

them to first "form an initial impression." Having the time to pause and reflect provided them a

sense of accomplishment when they realized how much their thinking had evolved over time, as

this student explained during her interview:

> I think that [reflection time] is key to showing where you're starting from, so you have a
>
> place that you realize 'this is where I am' and then you get to the end and you're like 'this
>
> is how far I came'.

In this study, the case study strategy integrated a variety of online resources, and students

found the use of technology motivating and useful, as the following student explained during a

focus group interview:

> I enjoyed your video. It was just kind of fun to start off that way, to have that, you know
>
> that there's something about technology, just like our kids... it's motivating having that
>
> piece of technology there in the beginning.

Additionally, students reported that viewing the videos of experts helped solidify the

participants' learning and connection to practice, which in turn prompted thoughtful reflection

and diverse online discussions. Both students and the facilitator noted the importance of having

a well-developed case with multiple resources. They also noted that these resources are

beneficial for teachers to implement into their own teaching contexts.

Specifically, there were two challenges reported from this strategy: 1) it relies on well-

developed materials, and 2) it requires extensive time for the facilitator. Clearly, the biggest

concern was the challenge of locating appropriate resources, as the facilitator discussed during

the interview:

> I think I would warn [a] professor that it's not something that's easy to do. I was very
>
> fortunate to find the resources that I have. If you throw out something that is not as well
>
> developed, your students are not going to actually do well. I thought that this resource
>
> was very well put together. I think that that's the biggest message that I learned out of all
>
> this, is that these resources are out there; it's just a matter of finding them.

Naturally, this can be a time-intensive process for facilitators to locate, develop, and constantly

update thoughtful and complex cases.

In sum, the case study strategy was reported as having the potential to make learning real

and enriched. Participants reported that the variety of media, connections to the classroom, and

gradual release of information in organized steps allow them to examine their individual

assumptions and biases, which was key to promoting the online discussion. Finding a variety of

well-developed online materials or creating your own, however, could prove to be a daunting

task for a facilitator. Considerations for ample planning and location of quality resources should

be taken into account.

Discussion

According to the findings, students stated that all strategies promoted student learning

and discussion. Perhaps this was because the students were all either an online or face-to-face

discussion facilitator, or perhaps it was because they were participants of this study. Obviously,

this is one limitation of the study. What is also important to note, though, is that in addition to

the strengths of the strategies, students also identified the challenges. It is from these findings

that we offer the following four conditions for effective online discussion strategies: 1)

alignment to course learning outcomes, 2) unique considerations for planning, 3) integration of

technology tools, and 4) adoption of student-centered approaches to learning.

Condition One: Effective Online Discussion Strategies Require Alignment to Course

Learning Outcomes

It is evident from the findings and consistent with the literature (Ajayi, 2010; Beeghly,

2005; Ryan & Scott, 2008; Pozzi, 2010; Tyler-Smith, 2006; Wu, 2004) that different strategies

impact online discussions in a variety of ways. One positive impact results from coordinating

discussion strategies and intended course objectives. For instance, if you want students to read,

comprehend, and discuss dense and challenging material, then you might choose the 3-2-1

Strategy, which is appropriate for an in-depth study of the reading. However, if you want

students to examine a controversial issue, then you might select the Discussion Web Strategy; if

you want students to ground their learning in real world problems, then you might use the

Problem-Based Learning or the Case Study Strategy. When instructors are clear about what

students should learn, and understand the strengths and challenges associated with the variety of

online strategies, they can make an informed decision about how to structure online

discussions. This finding directly aligns with Lyons and Pinnell's (2001) constructivist principle that emphasizes the importance of students' active participation. When instructors select appropriate strategies, then students know what is expected of them and they can quickly become actively engaged in the class. While this class was a literacy course, the strategies were chosen not because they were literacy strategies, but because of the match between the desired learning outcome and the content of the readings each week. We suggest that this same process can also be used with other content area classes.

Condition Two: Effective Online Discussion Strategies Require Unique Considerations for Planning

The effectiveness of the strategies, unsurprisingly, was not the strategy itself, but its implementation. Our study, similar to others, suggests that designing and implementing online discussion strategies requires an extensive amount of time (Norton & Hathaway, 2008; Riley, et al., 2005; Schallert et al., 2009). We found that both students and facilitators struggled with managing time to complete the units thoroughly. For the facilitator, ensuring that each strategy can be completed in a manageable time frame and then finding the time to consistently give feedback to students was of utmost importance. Students became frustrated when they felt that they could not complete the assignments in a timely manner due to rushed deadlines and other class assignments. This finding relates to Lyons and Pinnell's (2001) constructivist principle that instructors need to provide additional experiences for learners who have not developed needed conceptual understanding. In this study, most students felt that they needed more than one week to complete the tasks involved with each strategy satisfactorily. We concluded students were not afforded adequate time for their learning and the facilitators did not have time for re-teaching.

Unlike face-to-face classes, this implies that the planning and organization of the strategy needs to be fully developed before students begin accessing the online discussion. Planning the online discussion strategy down to the very detail is critical. Many factors, including time limits, due dates, technical issues, and directions, need to be fully laid out at the beginning of an online course. Modifying assignments and deadlines during the process is difficult in an asynchronous environment; perhaps the best suggestion is simply to remember that timelines are essential, yet they must be achievable.

Condition Three: Effective Online Discussion Strategies Require Integration of Technology Tools

Facilitators also need to keep in mind the level of media and technology involvement of today's students. While the definitions of the strategies used in this study did not call for media as a necessary component, the integration of technology served as an engaging factor for the students: indeed, students liked using the blogs, podcasts, and videos required during the online discussions, and they wanted to see more of this practice. This link between technology integration and student learning is consistent with Lyons and Pinnell's (2001) constructivist principle for developing teachers' conceptual knowledge through conversation around shared experiences. The online resources added an additional dimension to discussion, one that all students used to build their online discussions. This conclusion is also consistent with other researchers in the field who currently report students want technologies such as wikis, multi-media, and Internet projects used in their online courses (Author, 2010; Hurt, Moss, Bradley, Larson, Lovelace, & Prevost, 2012; Roby, Ashe, Singh, & Clark, 2013). Online instructors need to stay abreast of current adaptations of technology for online classes by learning from

experienced colleagues, reading current research in this area, participating in professional

development opportunities at conferences and universities, and learning from their own students.

Condition Four: Effective Online Discussion Strategies Require Adoption of Student-Centered

Approaches to Learning

Interestingly, many strategies are described in the literature without mention of a

theoretical perspective. We acknowledge that we selected four different strategies that were

grounded in a constructivist, student-centered learning paradigm, and we offer two guidelines to

promote such online student-centered learning strategies.

First, knowing your students is key to any online strategy. We concluded that throughout

this study, the facilitators' role continually evolved in response to students' needs. At the

beginning of each strategy's implementation, the facilitators were planners. From deciding

which strategy would best involve students with the content and produce the desired learning

outcomes, to selecting resources, the facilitators were engrossed in making decisions. Once

those decisions were made and communicated, the facilitators' role shifted to one of answering

questions. At this point, the facilitators had to be available to referee the questions and ignite the

discussions. Then, once students were engaged, the facilitators became a provider of feedback,

not only reading and monitoring participation, but also encouraging critical thinking through

thought-provoking questions. The role of the facilitator is a role that is connected to knowing

your students. Similar to Fosnot's (1996) constructivist perspective, we suggest that when

instructors assume facilitators' role, and students find the online discussions relevant and

meaningful to them, they become motivated and actively engaged in their learning and assume

responsibility for their learning.

Second, students want to engage in relevant, meaningful, and useful dialogues. They

appreciate online discussions that link theory and practice. Additional researchers have

supported this claim, emphasizing that learning is enhanced when students are engaged in

debates, inquiry, and higher-level thinking (Baker & Wedman, 2000; Duckworth, 1987). It

takes, however, a skilled instructor to understand the complexities and challenges of creating

higher-level online discussions. It can be challenging for an instructor to select a real-world

problem that meets all students' needs. For example, prior to a class' beginning, how many

instructors know and understand their students well enough to clearly delineate a fully developed

controversial issue, along with associated requirements that are manageable and timely?

Similarly, at what point in the semester do students feel they are part of a safe learning

environment where they are not penalized for disagreeing with their peers or facilitators? To

ensure instructors and students get to know one another as quickly as possible, we suggest that

during the first two weeks of an online course instructors include activities such as everyone

introducing themselves, posting a PowerPoint about themselves, or interviewing and writing an

introduction about a partner.

Suggestions for Future Research

This was a preliminary study that began unraveling the contexts for using various online

discussion strategies. The study was limited by time constraints: we implemented four online

strategies during one semester. We suggest that further research be conducted using each

strategy for extended periods of time, perhaps one strategy per semester. Additionally, because

time was brought up as an issue in the findings, future studies would be helpful in determining to what degree time is a factor in online discussions.

Due to our interest in the qualitative nature of this specialized context, we also consider the limitations of the sample of participants. First, we ponder the extent to which seven participants limits the study. On one hand, we were able to spend the abbreviated time available to gather multiple pieces of information from each participant regarding the multifaceted complexities of their experiences. However, we also recognize that further research with larger classes would provide additional insights about issues such as facilitator time during the feedback process and how larger group dynamics affect online discussions. Next, we also consider the extent to which the relationships in this study affected the nature of the discussions. The participants in this study all were at least mildly acquainted with one another; several had previously spent time together in face-to-face classes. As we recognize these relationships impacted the familiarity of the participants in the discussions, we suggest future research to further explore this complex phenomenon. Designing a study in which students have not had such social dynamics, previous encounters, and hybrid learning environments could further confirm our findings.

With the explosion of online courses in colleges and universities, and the use of online learning in public school classrooms growing, we feel that the strategies researched here could be used at any level; however, because we studied only the perceptions of doctoral students, additional studies are needed. Studies at other levels would increase the body of knowledge for the use and application of these online discussion strategies. We also note that there is a need for the exploration of different strategies. As online courses and programs continue to grow,

additional studies will expand our insights on creating effective online discussions that keep

students motivated to continue their coursework and not drop out of their online programs.

Finally, as scholars continue to explore the heuristic nature of varying contexts in which

online discussions occur, we believe a more critical perspective could be developed involving the

specialized contexts of online learning. Blending both social constructivist theory and theories in

New Literacies, for example, could yield a more precise understanding of the ways students and

instructors interact together online. Scholars could compare the ways these understandings

solidify and extend current understandings of social learning theories. As more theories

involving online contexts are refined, it is our hope that the applicable nature of this research will

ground studies to consider the ultimate quality of education in such environments.

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Appendix A

Focus Group Interview Questions

1. Could you tell me what you would say if you were asked by an online professor to tell you about the _____ online discussion strategy that you used this week.

2. The professor is especially interested in knowing how you approached the _____ strategy?

3. Did this strategy help you learn new information this week? If so, how?

4. What do you think are the critical factors for having successful online discussions using the _____strategy?

5. The professor next asks you to tell you some things that he really needs to know about this strategy before he uses it.

6. Could you describe how you feel about using the _____online discussion strategy in a future online course? Why do you feel this way?

7. What kind of feedback would you like to give _____ about the strategy that she used this week?

8. Anything else you want to tell the professor about what you especially liked about this strategy?

9. Anything else you want to tell the professor about the issues and concerns you have with this strategy?

10. Anything else you want to share about this strategy?

11. Any questions for me?

Appendix B

Anonymous Rating Survey

Reflecting on _____ Online Discussion Strategy

1. What worked?

2. What didn't work

3. How could you strengthen/modify the strategy?

4. Would you recommend that instructors use this strategy in online courses? Why or why

   not?

5. What other comments or information can you share about this strategy?

Anonymous Rating Scale	
Criteria	Rating
Nurtures and supports students' learning	
Shows students are learning	
Promotes students' learning	
Is relevant to the way students learn	

Encourages student reflection and self-assessment	
Includes real-world information	
Fosters study autonomy	
Promotes active learning	
Promotes student interaction and collaboration	
Motivates student learning	
Enables me to contribute comfortably to the online discussion	
Enables me to contribute comfortably to my peers' online discussion postings	
Note: Each participant rated each discussion strategy on a scale of 1 to 5, with 1 being lowest and 5 being highest.	

Appendix C

Facilitator Interview Questions

1. Could you tell me what you would say if you were asked by an online professor to tell you about the _____online discussion strategy that you facilitated?

2. What role did you play as facilitator of this strategy?

3. Did the discussion meet/exceed your expectations?

    a. If so, how? If not, why?

    b. If so, why? If not, why?

4. What didn't work with your strategy?

5. Is there anything else that you want to share about what worked with your strategy?

6. What would you change about the strategy after using it?

7. Would you recommend this strategy to other instructors? Why or why not?

8. Is there anything else that you would like to share about using this strategy?