Survey of Developmental Students' Print and Online Metacognitive Reading,

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Abstract

This quantitative study is a comparative analysis of developmental students' print and online support metacognitive strategy use. More specifically, a study was conducted utilizing the Metacognitive Awareness of Reading Strategies Inventory (MARSI) to measure developmental college students' awareness and perceived use of support reading strategies while comprehending print and online academic texts. The findings show significance in four of nine support metacognitive reading strategy uses.

Introduction

Reading instructors are often guided by their knowledge of reading comprehension skills to accelerate learning to students in college-level developmental reading courses. Thus, a growing body of research points to the importance of incorporating metacognitive skills into classroom practice. In the last ten years, there has been an increase in college students' engagement in hybrid and online courses in which online reading strategies are a requirement for the comprehension of academic content from web-based resources. Research suggests that "new skills and strategies may be required" (Castek, Coiro, Hartman, Henry, Leu, & Zawilinsky, 2010) to comprehend the more complex understanding of academic texts on the Internet, unlike those of the traditional print texts (Afflerbach & Cho, 2009; Coiro, 2011). According to Leu, O'Byrne, Zawilinski, McVerry and Everett-Cacopardo (2009), traditional print comprehension differs from online print comprehension. Leu, Coiro, Castek,

Hartman, Henry, and Reinking (2008) suggests that the difference between online and print comprehension is online reading initially involves "a question or problem" (p. 323) or "to solve problems and answer questions" (p. 323). Such self-regulatory or metacognitive skill and strategy requires learners to view online reading with a new magnitude or purpose for comprehending academic texts.

While researchers have investigated college students' uses of metacognitive reading strategies with only print texts, the increased usage of digital text mediums in student populations has been largely ignored. This neglected topic demands further research. There lies a disparity in the research and pedagogy of college reading compared with other disciplines that falls under the auspice of reading research (Stahl & King, 2009). Stahl and King's (2009) investigations in providing a historical overview of college reading research found the majority of studies indicating college reading as primarily secondary sources, rather than primary sources, establishing a lack of clear distinction between "college reading, learning assistance and developmental education." Although college students continue to read print-based materials, for example, textbooks, books, articles, this study will serve as an exploratory tool in enabling educators to be better informed of their students' metacognitive reading gaps as they instruct students transitioning from comprehending academic texts from print to online mediums.

Theoretical Approach

Tarricone (2011) explains that the term metacognition is a complex construct that is not easily definable, yet her attempt is similar to other researchers on metacognition: "knowledge and awareness of processes and the monitoring and control of such knowledge and processes" (p. 1). This definition is based upon Flavell's (1976), the father of metacognition,

theory that "metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them…" (p. 232).

The construct of new literacies (Leu, McVerry, O'Byrne, Zawilinski, Castek & Hartman (2010; Coiro, 2008) is based upon four assumptions: (1) new literacies include the new skills, strategies, dispositions, and social practices that are required by new technologies for information and communication; (2) new literacies are central to full participation in a global community; (3) new literacies regularly change as their defining technologies change; and, (4) new literacies are multifaceted, and our understanding of them benefits from multiple points of view.

Review of Literature

Pressley and Afflerbach (as cited in Afflerbach & Cho, 2010) researched strategies of traditional print expert readers. These researchers determined that expert readers utilize three specific strategies: identifying and learning text content, monitoring the act of reading, and evaluating different aspects of reading. Afflerbach and Cho (2010) indicate that these specific strategies involve "monitoring… establishing goals and overseeing progress toward reaching them during reading, and identifying challenges to comprehension and working to fix them" (p. 202).

While traditional and online texts share some similar characteristics, comprehension of online texts is a multifaceted process. Online reading strategies differ greatly with textual (print) reading strategies (Leu, Castek, Hartman, et. al, 2005). Afflerbach and Cho (2010, p. 204) indicate that these strategies of reading online texts include: (1) Evaluating the quality of text; (2) Overviewing before reading (determining what is there and deciding which parts to process); (3) Looking for important information in text and

paying greater attention to it than other information; (4) Relating important points in text to one another in order to understand the text as a whole; (5) Activating and using prior knowledge to interpret text; (6) Relating text content to prior knowledge (especially as part of constructing interpretations of text; (7) Inferring information not explicitly stated in text; (8) Determining the meaning of words not understood or recognized (when a word seems critical to meaning construction); and (9) Evaluating the qualities of text.

Researchers in the area of new literacies agree that new skills are required to function in the digital world (Tracey, Storer, & Kazerounian, 2010). According to Coiro (2003), these new literacy skills require "fundamentally new thought processes" (p. 459). As applied to online reading comprehension, these distinctive literacy strategies include: locating, analyzing, synthesizing, and communicating information (Coiro, 2007; Leu, 2007; Leu, et. al., 2005). Online reading comprehension is a more self-directed text construction process (Coiro & Dobler, 2007; Leu, Zawilinski, Castek, Banerjee, Housand, Liu, & O'Neil (2007). Research concludes that five processing practices required when reading on the Internet include: (a) reading to identify important questions; (b) reading to locate information; (c) reading to evaluate information critically; (d) reading to synthesize information, and (e) reading and writing to communicate information (Leu, Kinzer, Coiro, & Henry, 2013; Leu, Zawilinski, Castek, Banerjee, et. al., 2007).

In some cases, as students read online texts, they are utilizing "both new and traditional reading comprehension skills" (Leu, Coiro, Castek, Hartman, Henry, & Reinking, 2008, p. 323). When reading from any particular medium, online or print form, the reader must interpret signs and strategize (Scolari, 2009). This cognitive process involves the reader activating schema and questioning the text. Walsh

(2004) states, these similarities of online and print texts are "in the meaning-making and interpreting process" (p. 9).

According to Walsh (2004), meaning-making includes: (1) knowledge that any test is part of a particular 'genre"; (2) readers adjusts their expectations according to text type or purpose; (3) various schemata are activated - background knowledge, knowledge of topic and genre; (4) an interaction between reader and text; (5) understanding and interpreting at cognitive & affective levels; (6) understanding, analyzing, and critiquing ideologies, point of view, positioning; (7) activation of imagination; (8) information is obtained; (9) there is a specific context, discourse and coherence; and (10) skills specific to each type of text need to be activated by the reader (p. 10).

Walsh (2004) adds that while there are similarities in reading online texts, there are also differences. These differences include the addition of visual images – layout, frames, links and hyperlinks; use of senses such as visual, tactile, hearing, and kinesthetic; interpersonal meaning; visual style such as animation, graphics or frames; visual imagery such as color, motifs, icons; and reading pathway – non-sequential and non-linear vectors (p. 11). Walsh states that these differences do not always occur separately; in fact, online texts, as previously addressed, share similar aspects as print texts (Coiro & Dobler, 2007).

Researchers have discovered that learning is not didactic. In fact, when a student learns a new concept, he or she does not inherently process this information into long-term memory; but rather, a structured learning experience involving the use of notes, reminders, search, and learning triggers (McGowan, 2014). This new educational framework, the Learning Actions Model, involves personalizing and refining the learning experience for the learner in which

learning takes place within real-time in the specified learning environment, i.e., online.

One particular type of online text is the eText, an electronic version of a written text. This may include historical documents, literature, articles, and textbooks, to name a few (Wahl & Duffield, 2005). These documents or electronic resources can be manipulated to meet the students' needs while reading and can be displayed in a myriad of ways. Examples include changing the size and color of the visual text, underlining or bold facing new vocabulary, changing the text structure from summary to outline view, viewing an inserted audio clip or graphic, and utilizing an online dictionary (Wahl & Duffield, 2005).

In the current study, developmental college students' perceptions towards their metacognitive support reading strategy use while reading print and online texts was examined. The focus of this research project evaluated two questions:

(1) Are there significant differences in print and online metacognitive support reading strategies used by developmental students when reading academic texts?

(2) To what extent do developmental college students utilize support metacognitive reading strategies when comprehending print and online academic texts?

Methodology

Participants

The participants for this study consisted of 73 students attending a public college in the southwest corridor of the US who were enrolled in undergraduate classes in developmental English and who had completed responses to a questionnaire concerning their print and online metacognitive reading strategies of an expository academic text.

Instrumentation

The revised Anderson (2003) Online Survey of Reading Strategies (OSORS), a 38-item questionnaire developed for second language speakers of English were adapted for this study from the Mokhtari & Sheorey (2002) Survey of Reading Strategies (SORS), a 30-item questionnaire developed for native speakers of English. The Cronbach's alpha for the overall Online Survey of Academic Reading Strategies (OSOARS) was .92. The reliabilities for each subsection of the OSOARS: Global, .77; Problem Solving, .64; and Support, .69, and the SOARS: Global, .87; Problem Solving, .77; and Support, .68, respectively (Keller Boudreaux, Franceschini, & Garrett, in press). Thus, the questionnaires have been proven to be valuable resources in instrument development, with a 0.93 reliability reported on the MARSI (SORS) instrument (Mokhtari & Sheorey, 2002) and 0.92 reliability reported on the OSORS instrument (Anderson, 2003).

Each of the items on the OSOARS are associated with one of three broad groups: the first group consists of seventeen items and centers on the global reading strategies of students; the second group consists of eight items and deals with problem solving strategies; and the third group consists of nine items and concerns students' use of support strategies. With respect to each of the items within each group, respondents were asked to indicate their level of agreement on a five-point, Likert-type scale, where a value of "1" meant "I never or almost never do this"; "2" meant "I do this occasionally"; "3" meant "I sometimes do this";"4" meant "I usually do this"; and a value of "5" meant "I always or almost always do this."

Along with five questions concerning the respondent's demographic characteristics, the items were entered in Survey Monkey, and a link to the questionnaire

shared with instructors in four transitional and developmental courses during the spring 2012 semester. After reading a print and online academic text, the instructors issued the Survey Monkey link to their students on two separate occasions to complete the metacognitive survey. Instructors did not provide the academic texts assigned to the participants.

Data Analysis

Quantitative data were coded and analyzed using Statistical Package for the Social Sciences (SPSS) version 20.0. The data were analyzed descriptively and statistically. Means and standard deviations were calculated for Likert-scaled items, and *t*-tests were conducted to identify significant differences in the nine metacognitive support statement means.

Results

Research Question 1: Are there significant differences in print and online metacognitive support reading strategies used by developmental students when reading academic texts?

9 scale means (M) and standard deviations (SD) were computed for 73 students in developmental classes who had complete data for support strategies and both media (Table 1).

Results from the t-tests ($\alpha = .05$) in Table 1 show that four out of the nine mean differences for each question were statistically significant between respondents' online and print metacognitive reading strategies. The most significant differences in responses involved the following survey questions: "While reading texts, I translate from social/everyday English to academic English," "While reading texts, I think about information in both social/everyday English and academic English," "I underline or circle information in the text to help me remember it," and "I ask myself questions I like to have answered in the text".

Table 1
Descriptive statistics for developmental students for support strategies scales by medium Results of Paired-sample t-test and Descriptive Statistics for Metacognitive Support Strategies with Print and Online Texts

Support Strategy	t	df	p	Std. Error Mean	95% CI for Mean Difference
I take notes while reading to help me understand what I read.	.772	72	.442	.160	-.195, .441
When texts become difficult, I read aloud to help me understand what I read.	1.17	72	.246	.164	2.77, 3.11
While reading texts, I translate from social/everyday English to academic English.	*2.19	72	.032	.137	.027, .575
While reading texts, I think about information in both social/everyday English and academic English.	*2.21	72	.030	.130	.028, .547

I underline or circle information in the text to help me remember it.	*2.93	72	.004	.168	.158, .828
I use reference materials such as dictionaries to help me to understand what I read.	-1.05	72	.297	.183	-.556, .172
I paraphrase (restate ideas in my own words) to better understand what I read.	-.128	72	.236	.160	-.128, .512
I go back and forth in the text to find relationships between ideas.	-.430	72	.286	.140	-.430, .129
I ask myself questions I like to have answered in the text.	*2.64	72	.010	.130	.084, .601

* $p < .05$.

Table 2
Means and Standard Deviations Computed from Student Responses for Print and Online Support Reading Strategies

Support Print/Online Reading Strategies	Print M	SD	Online M	SD
I take notes while reading to help me understand what I read	2.92	1.19	2.79	1.25
When texts become difficult, I read aloud to help me understand what I read.	3.71	1.38	3.52	1.24
While reading texts, I translate from social/everyday English to academic English.	2.89	1.23	2.59	1.28
While reading texts, I think about information in both social/everyday English and academic English.	3.12	1.25	2.84	1.22

I underline or circle information in the text to help me remember it.	3.30	1.32	2.81	1.49
I use reference materials such as dictionaries to help me to understand what I read.	2.93	1.35	3.12	1.28
I paraphrase (restate ideas in my own words) to better understand what I read.	3.48	1.16	3.29	1.29
I go back and forth in the text to find relationships between ideas.	3.15	1.07	3.30	1.15
I ask myself questions I like to have answered in the text.	3.40	1.29	3.05	1.20

Research Question 2: To what extent do developmental college students utilize support metacognitive reading strategies when comprehending print and online academic texts?

As Table 2 indicates, for developmental college students, the means of individual support print strategy use range at a high 3.71 range and online strategy use at a high 3.52 range (mean of 3.5 or higher); a medium print strategy use range of 3.48 - 2.89 and online strategy use range of 3.30–2.59 (mean of 2.5 to 3.4); and a null print and online strategy low range usage (mean of 2.4 or lower) indicating a majority medium strategy use of support print metacognitive strategy use.

Discussion

This research sought to answer two questions involving the usage of reading strategies employed by college students:

(1) Are there significant differences in print and online metacognitive support reading strategies –used by developmental students when reading academic texts?
(2) To what extent do developmental students utilize support metacognitive reading strategies when comprehending print and online academic texts?

The results of this current research indicated that irrespective of media, a significant difference exists in student-reported use of both support print and online strategies while reading academic texts. Developmental students reported greater use of mid range support strategy use.

The results of this study also reveal that developmental students reported similar use of support metacognitive reading strategies with print and online texts. Such similar use includes survey questions such as: "When

texts become difficult, I read aloud to help me understand what I read," "I paraphrase (restate ideas in my own words) to better understand what I read," and "I ask myself questions I like to have answered in the text." The results of this study also indicate differences between the groups. The most significant differences in responses involved the following survey questions: "While reading texts, I translate from social/everyday English to academic English," "While reading texts, I think about information in both social/everyday English and academic English," "I underline or circle information in the text to help me remember it," and "I ask myself questions I like to have answered in the text". Based upon the results of this study developmental college students, irrespective of medium, indicated very high strategy use in reading aloud when the text becomes difficult.

Griffith and Ruan's (2005) research supports the results of this study. The researchers' findings revealed that powerful teaching strategies involve ensuring that students have a clear interrelation between their interests and their reading processes. The authors also indicate that metacognitive instruction should "teach students to assess and sustain their interest throughout the reading process" and that "teaching for strategies should be overemphasized than teaching for skills" (p. 12- 13). When this occurs, students are likely to manipulate, monitor and control their reading comprehension strategies yielding better academic performance (Brosnan, Demetere, Hamill, Robson, Shepherd, & Cody, 2002).

Conclusion

The study revealed some discernible trends in support metacognitive reading strategies. The majority of developmental students moderately use support reading strategies when reading print and online texts. Mokhtari and

Reichard (2002) state that support reading strategies, "primarily involved [sic] use of outside reference materials, taking notes, and other practical strategies that might be described as functional" (p. 252). These findings indicate that developmental students are utilizing support strategies to comprehend print and online texts, but with some difficulty. In other words, students are not fully utilizing the "support mechanisms aimed at sustaining responses to reading" (p. 253).

These findings support the research of Afflerbach and Cho (2009) and Coiro (2011) who found that new reading skills and strategies may be required for online text. The current results contribute to the framework of the new literacies theory (Castek, Zawalinski, McVerry, O'Byrne, & Leu, 2008; Leu, O'Byrne, Zawalinski, McVerry, & Everett-Cocapardo, 2009) that involves the conceptualization of literacy as applied to comprehending academic texts on the Internet.

Recommendations for Practice

These results have important pedagogic implications. To improve thinking skills, teachers of developmental students must begin to rethink the concept of cognition and how students process information (metacognition) (Keller Boudreaux, Franceschini, & Garrett, in press). Metacognition is a retrieval process in which teachers of developmental students model "challenging questions, optimal timing, corrective feedback, and metacognitive reflection" (Littrell-Baez, Friend, Cassamise, & Okochi, 2015, p. 682). Second, as Sheorey and Mokhtari (1994) have argued, "what we teach in developmental college reading courses is helpful…not only for developmental students but for all beginning college students" (p. 165). According to Wilson and Conyers (2014), "Explicit instruction and coaching in metacognition should emphasize that it helps us [readers] think smarter" (para. 6).

Wilson and Conyers (2014) suggest that metacognition instruction in classrooms should follow several guidelines. These guidelines include: (1) Underscore *how* students are learning as well as *what* they are learning. Share the goals of learning activities in advance, and guide students to plan strategies and monitor their progress toward achieving those goals; (2) Model your own use of metacognition by thinking out loud. When reading aloud, make—and correct—mistakes and show how you use context to establish the meaning of unfamiliar words. Predict what might happen in a science experiment. Talk through the steps of solving a math problem; (3) Call attention to the usefulness of metacognition in making academic gains. For example, "This project obviously took work and planning! How did you accomplish that?"; (4) Add steps to encourage self-reflection into lessons and learning; and (5) Connect the metacognitive strategies you're using in the classroom to students' future education and careers. For example, say "How might monitoring and managing your stress levels come in handy when you're preparing for a job interview?"

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