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Comprehensive Examination for Cognition and Instruction: Article Review

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Part I: Adaptation of Azevedo and Cromley (2004)

Learning to read while reading to learn:

Scaffolding self-regulated reading and learning with the Internet

Article Review Task - Part I

Read the study by Azevedo and Cromley (2004) conducted with adults. In four pages, describe how you would conduct this study with elementary or middle school students to inform classroom instruction. Summarize your changes in these areas:

- Research question(s)
- Rationale (literature review)
- Methodology
- Design (identify major dependent and independent variables)
- Analysis

In a brief summary paragraph, explain your decisions.

Azevedo, R., & Cromley, J. G. (2004). Does training on self-regulated learning facilitate students' learning with hypermedia? *Journal of Educational Psychology, 96*(3), 523-535.

Rationale and Literature Review. Numerous empirical studies of self-regulated learning offer a framework with which to examine how students learn in closed hypermedia environments (e.g., Azevedo, Cromley, & Seibert, 2004; Azevedo, Guthrie, & Seibert, 2004; Winne & Stockley, 1998). Each of these studies found that training students to regulate aspects of their learning with hypermedia leads to superior gains in learning. In contrast, very little is known about how students self-regulate their learning in unbound Internet environments (e.g., Alexander, Graham, & Harris, 1998). We do know that Internet research tasks have rapidly become part of the middle school curriculum (Becker, 2000) and that expository text comprehension of printed and Internet text is a vital component of success in middle school (Biancarosa & Snow, 2004). Thus, it is critical that we begin to examine how best to foster the strategic reading processes required to navigate expository texts on the Internet (Coiro, 2003; Leu, Kinzer, Coiro & Cammack, 2004). Consequently, while Azevedo & Cromley (2004) posit that “hypermedia environments have the potential for fostering students’ learning about complex topics” (p. 523), a new literacies perspective (Leu et al., 2004) considers the Internet as this generation’s defining technology for information, communication, and especially for learning. Further, instruction that equips students with the strategies to successfully navigate and comprehend unbound Internet environments will better prepare students for the skills they will use when they enter the world of work (e.g., Bruce, 1997; Gilster, 1997).

To date, a few studies have explored the nature of cognitive strategies required to search and read on the Internet (e.g., Coiro & Dobler, 2003; 2004; Guinee, Eagleton, & Hall, 2003; Hill & Hannafin, 1997). Others have begun to investigate college students’ online reading strategies in the context of self-regulation (e.g., Rogers & Swann, 2004; Whipp & Chiarelli, 2004). However, no study, to my knowledge, has used quasi-experimental methods to investigate (a) how middle school students employ particular self-regulation strategies for web-based reading or (b) how instruction may best facilitate the use of self-regulated reading processes on the Internet.

Research Questions. In this study, I will compare the effectiveness of instruction that scaffolds middle school students’ self-regulated reading of Internet text to instruction that provides students time to practice reading on the Internet without additional teacher scaffolds. I will investigate the effects of these two conditions on (a) students’ conceptual understanding of the circulatory system and (b) students’ self-regulatory reading processes as they search and read on the Internet to learn more about the circulatory system. This work will address two research questions:

- (1) After controlling for general reading ability, does (a) scaffolding students to regulate their reading on the Internet influence their conceptual understanding of the circulatory system more than (b) providing students free time to search and read on the Internet?

(2) How does scaffolded instruction influence students' ability to regulate their reading on the Internet?

Design. This quasi-experimental study will use a 2 X 2 pretest-posttest, comparison-group design with two independent variables, two sets of dependent variables, and one covariate. The independent variables include two comparison interventions: one group of students will receive four sessions of scaffolded instruction on Internet self-regulated reading (ISRR) and a second group of students will receive four sessions of Internet reading practice (IRP) with no additional instruction (more details are provided below).

The two sets of dependent variables are related to students' conceptual understanding of the circulatory system and their use of self-regulated reading behaviors on the Internet:

(a) *Conceptual understanding of the circulatory system.* Changes in understanding will be measured with pre-post achievement data on three variables: (1) matching; (2) labeling; and (3) mental models (drawing and essay component), as determined by performance on a test adapted from Azevedo & Cromley (2004). The tasks will be administered in an online interactive environment that includes click/drag functions for the matching and labeling tasks, an embedded word processing form for the essay, and an electronic drawing tool for the drawing component. Each section will be scored using procedures outlined by Azvedo & Cromley.

(b) *Internet self-regulated reading (ISRR) behaviors.* Pre-post process data will be derived from student think-aloud protocols that capture the self-regulatory reading behaviors participants employ as they read within search engines and informational websites to learn more about the circulatory system. The set of ISRR variables (see Appendix A) will initially be derived from self-regulated learning (SRL) processes identified by Azevedo, Cromley, & Seibert (2004). Additional variables will be incorporated into this study's ISRR model to capture affective dimensions of self-regulated reading (e.g. Horner & Shewry, 2003; Whipp & Chiarelli, 2004) and other self-regulatory reading behaviors students enact while reading in unbound Internet environments (e.g., Bilal, 2000; Coiro & Dobler, 2003; 2004; Eagleton, 2003). Pretest data from verbal protocols will be used to further adapt this model to fit the self-regulatory behaviors observed in the context of this study. Posttest process data from participants in the treatment and comparison group will be analyzed using this adapted ISRR model.

This research design will include a covariate of *general reading ability*, which will be determined by students' standardized reading scores on the Connecticut Mastery Test administered in the spring of sixth grade. Reliability coefficients for this test are above .85. Unlike Azevedo & Cromley's (2004) study, scores for each of the three variables related to conceptual understanding will be adjusted for any pre-existing differences on this covariate.

Participants. Fifty students in two seventh grade classrooms from a southeastern Connecticut middle school will participate. This particular middle school was selected for two reasons: First, the population represents a diverse range of reading abilities, minority ethnic populations, and socioeconomic levels. Thus, the findings from this study will be more generalizable to students in other diverse school district settings. Second, the circulatory and digestive systems are part of the district's general science middle school curriculum. From a pool of consenting parents and students, students will be randomly assigned to the Internet Self-Regulated Reading (ISRR) treatment condition (n=25) or Internet Reading Practice (IRP) comparison group (n=25).

Pre-Posttest Procedures. This study will be carried out over the course of one week in the school's two computer labs (see Appendix B). A five-part pretest will be administered to students in both conditions three days prior to the intervention (see Appendix C). For Part 1, students will be asked to complete an Internet Reading Task that requires them to search for, locate, and read three relevant informational websites to learn as much as they can about the circulatory system in 45 minutes. Parts 2-5 will follow the protocol established by Azevedo & Cromley (2004) to measure pre-conceptual understanding of the circulatory system with the matching, labeling, drawing, and essay tasks. After the pretest, students in each condition will receive different treatments.

Intervention Procedures. In the ISRR training condition, students will participate in four 45-minute training sessions on how to regulate their reading while using Internet search engines and informational websites to learn about the digestive system (a different, but related topic to avoid teaching directly to the test). Prior to the experiment, two self-regulation training modules would be designed to use an Internet Reciprocal Teaching (IRT) model (Leu & Hartman, 2004). This model includes reciprocal interaction between students and teacher and the gradual release of responsibility for carrying out comprehension and learning tasks. It follows the general pattern of traditional Reciprocal Teaching (Palinscar & Brown, 1984), but helps students acquire the self-regulated reading strategies needed to plan, predict, monitor, and evaluate their choices while reading Internet text. Sessions 1 and 2 will focus on self-regulatory processes employed while reading within search engines and Sessions 3 and 4 will focus on processes employed while reading within informational websites. A sample lesson is presented in Appendix D. On Day 5, a posttest (identical to the pretest in Appendix C) will be administered. During the posttest, participants will be specifically instructed to use the ISRR strategies modeled in the training sessions as they read on the Internet to learn about the circulatory system.

In the comparison-group condition, students will be given an identical pretest and posttest. In this group however, participants will have four 45-minute sessions in the computer lab to practice using search engines and

reading informational websites while reading to learn about the digestive system, but no teacher-directed support will be given. During all four sessions, participants will be asked to work individually without seeking help from a teacher or peer. This will avoid confounding issues since one aspect of reciprocal teaching involves collaborating and sharing ideas among learners and teachers. During the posttest, participants will be instructed to use the strategies that work best for them as they read on the Internet to learn about the circulatory system.

Analysis. To answer research question 1, I would conduct three separate 2 (condition: ISRR training, IRP) X 2 (time: pretest, posttest) analyses of covariance (ANCOVA) to analyze the shift in (1) readers' mental models and scores on the (2) matching and (3) labeling tasks over time. In the event of a significant interaction, follow-up independent sample t-tests would then evaluate differences in the means for each variable between conditions at pre and posttest. My hypothesis is that instruction in self-regulated reading strategy use will lead to a significant shift in conceptual understanding of the circulatory system (from pretest to posttest) as measured by all three scores, even after controlling for general reading ability. This hypothesis is informed by two theories of literacy learning. First, readers who are strategic, motivated, knowledge driven and socially interactive (all elements of IRT instruction) increase their tendencies to learn from reading (Baker, Dreher, & Guthrie, 2000). Second, less skilled readers of printed text may bring new sets of literacies and motivations to their interactions with Internet texts (Leu et al., 2004). In turn, these new literacies may help facilitate comprehension and engagement with expository texts while reading on the Internet.

To answer research question 2, I would conduct a series of chi-square analyses following the procedures specified in Azvedo & Cromley (2004) to determine whether or not there were significant differences in the distribution of students' use of ISRR variables on the posttest across the two conditions. I hypothesize that, during Internet searching and reading, the ISRR condition will have significantly more participants who frequently employ the ISRR key variables they learned to use in the training sessions as compared to the IRP condition. If the hypotheses for both research questions 1 and 2 were accepted, these differences would suggest that using Internet Reciprocal Teaching strategies to scaffold middle school students' self-regulated reading of Internet text (rather than just providing time to practice reading on the Internet) is associated with a higher use of self-regulatory reading variables and superior gains in content area learning. Also, because the training and testing sessions would be administered over the course of five days, this study (compared to Azevedo & Cromley, 2004) would reveal more information about how well students retained their knowledge of self-regulated reading strategies over the course of 1-3 days, instead of applying it to a posttest that immediately followed instruction.

Part II: Reading Research Quarterly Review of Steinkuehler, C. A., Black, R. W., & Clinton, K. A. (2004).

Researching literacy as tool, place, and way of being. *Reading Research Quarterly*, 40, 95-99.

Article Review Task - Part II

You have been asked by the editors of Reading Research Quarterly to review the study by Steinkuehler (2004). This comes from an epistemological tradition that is probably somewhat unfamiliar: cognitive ethnography using discourse analysis. Provide a 3-page review of this article to the editors, following their guidelines (attached). Concentrate on the most problematic issues in the article and any suggestions you have that will improve the study. Provide appropriate citations, where necessary. You should recommend to “accept with minor revisions”, “revise and resubmit”, or “reject”.

Reading Research Quarterly Guidelines For Writing Reviews

This information is available online at: http://www.reading.org/publications/for_reviewers/rrq.html

Steinkuehler, C. A. (2004). Learning in massively multiplayer online games. In Y. B. Kafai, W. A., Sandoval, N. Enyedy, A. S. Nixon, & F. Herrera (Eds.), *Proceedings of the Sixth International Conference of the Learning Sciences* (pp. 521–528). Mahwah NJ: Erlbaum. Retrieved January 17, 2005 from <http://www.scholar.google.com/scholar?hl=en&lr=&ie=UTF-8&q=cache:G0ve-zJf33gJ:www.sit.wisc.edu/~steinkuehler/papers/SteinkuehlerICLS2004.pdf+Learning+in+massively+multiplayer+online+games>

Summary: This study used cognitive ethnography and discourse analytic methods to investigate the forms of socially and materially distributed cognition that emerged as individuals interacted within massively multiplayer online videogames (MMOGs). The author described the world of massively multiplayer online gaming, outlined four research questions framed in a “learning sciences perspective”, and presented one illustrative analysis of selected data and preliminary findings specific to learning for play within these virtual spaces. The author concluded that we do not yet know enough about cognitive processes embedded within social online gaming practices to begin leveraging gaming technologies toward educational ends.

Generally, the manuscript does not explicitly reference reading or literacy in an academic context; rather, the author explores how individuals learn cultural and cognitive practices embedded within a virtual multiplayer online video game. Consequently, the rationale and results (in their current form) are of limited importance to the literacy field. In addition, I have several concerns related to a) the nature of the research questions; b) the lack of detail about participants and data collection procedures; and c) the lack of sufficient data and analysis to address the research questions posed. Given these concerns, I recommend that the manuscript not be accepted. However, there are several well-written and important aspects to this study that beg further investigation and the attention of educational researchers in any field. Below, I discuss my concerns and recommendations.

Rationale and perspective of learning: One issue for this work is the ambiguity of why this study is important and for whom. Who is the audience? Is it literacy researchers, instructional designers, literacy educators, or some combination of these? A more clearly defined audience may help readers better understand the context within which the findings might be considered most relevant. In addition, the author describes a “widespread interest in online communities and virtual worlds in the field of educational research” (see p. 2) but fails to adequately describe specific reasons for this interest. The author may want to reference, for instance, recent work by Angela Thomas (in press) that highlights the range of literacy events required in virtual worlds. One might also discuss Tori Manninen’s (2001) taxonomy of rich cognitive interactions related to higher level thinking found to occur in the context of networked multi-player gaming environments. Examples such as these may strengthen the argument that exploring online videogaming practices is an important area of educational research.

I also found myself wondering how the author might address the arguments posed by a new literacies perspective (Leu, Kinzer, Coiro, & Cammack, 2004). Such a perspective suggests the ability to navigate and comprehend networked information texts (e.g., Internet webpages and search engines) is crucial to academic and work success. For this reason, Leu et al. argue that *more* attention should be paid to investigating the cognitive

processes required to navigate digital *information environments* while solving real-life problems compared to exploring how individuals interact within *narrative gaming environments* for entertainment and socialization. I wonder how the author might explicitly address the tensions between these two divergent research paths. For example, how does the author perceive the relevancy of Internet learning in schools in comparison to learning in videogame environments? Similarly, what has the author learned thus far about the social practices of video gaming for entertainment that can explicitly inform those who study or shape the social practices of online literacy learning in the classroom? I believe attempts to openly address the current tensions among those investigating the role of technology in literacy learning would more accurately reflect the current research climate and would be of interest to a wider audience.

Nature of research questions: A second concern with this manuscript has to do with the relevancy of the research questions for the reading community. If this work were to be published in RRQ, some attention should be paid to if and how one's identity within a virtual video game influences the ways he/she may interact with more traditional literacy practices (e.g. reading printed books, writing stories, orally exchanging ideas, etc.) or other digital literacy practices (e.g., reading webpages, using search engines, posting to weblogs, etc). As such, I would recommend that future research in this area consider an additional research question: What import does participation in a virtual gaming community have for the (in-school and out-of-school) *literacy* learning practices of its members? By considering this question, new insights about cognitive video gaming processes may then be used to inform a virtually non-existent area of reading research.

Methodology: I found the methodology section of this work to be especially problematic in terms of rigor and precision. Virtually no detail was provided about the participants in this study. We have no idea of the number of total participants involved, nor does the author provide demographic or contextual information about any of the participants. The author refers generally to unstructured and structured interview formats and the collection of "community documents" (see p. 5) as part of a cognitive ethnography, but the manuscript lacks any specific details that would enable another researcher to replicate this work. Further, I would like to know much more about the procedures used to analyze and code the data sources mentioned. Were multiple ethnographers involved or just one? What precise coding schemes were used and were these schemes grounded in current models of discourse analysis? What attempts were made to establish intra-rater and/or inter-rater reliability for the interpretive data? Finally, this study provides only one small excerpt of data from one real-time gaming sequence. Several more examples of similar and different exchanges, within and across participants, should be included in a clearly defined

results section before any attempt is made to discuss the discourse patterns that emerged within this particular MMOG. The author may want to refer to a recently published RRQ study that employed discourse analytic methods (see, for example, Rogers, 2004) as a model of the rigor and precision expected in manuscripts suitable for publication in this journal.

Recommendations: Despite these concerns, this study contains at least two important ideas that should not be overlooked. First, although the author may disagree, I noticed several parallels between the principals of supported learning associated with a Learning Sciences perspective (e.g., provision of “just in time” information in the context of a relevant goal-driven activity – see p. 8) and research-based instructional practices grounded in social cognitive perspectives of literacy learning (e.g., reciprocal teaching [Palinscar & Brown, 1984], transactional strategy instruction [Pressley, El-Dinary, Gaskins, Schuder, Bergman, Almaso, & Brown, 1992] and Concept Oriented Reading Instruction [Guthrie, Wigfield, & Perencevich, 2004]). I would encourage the author to elaborate further on the explicit links between supports found in virtual gaming environments and those already shown to be effective for increasing reading achievement and student engagement in academic learning environments. I believe these connections may strengthen the rationale for more research dedicated to exploring the potentials of gaming technologies in literacy education.

Secondly, I believe the author’s warning of how little we still know about learning within gaming environments begs the attention of instructional designers, educational researchers, and practitioners in any field. If this insight is not communicated to the reading community, literacy researchers and educators may blindly follow suggestions to incorporate principles of virtual gaming technologies into educational interventions (e.g., Shaffer, Squire, Halverson, & Gee, 2004) before having any data-driven reasons for doing so. For this reason, I believe the manuscript has promise. I hope my comments prompt the author to consider a revision and submission to another journal. With more rigor and precision, this work may begin to clarify for the reading community the potential impact that identity construction in gaming environments may have on other literacy practices in and out of school.

Part III: What Works, When, Why, and for Whom? - A New Vision for The What Works Clearinghouse

Article Review Task - Part III

Now that you have reviewed two very different approaches to research, describe your stance to the position in the supplemental work below, taken by Steinkuehler, Black, and Clinton (2004). How diverse should we be with research methods on questions of new literacies? Which principles should guide us? Frame your response around how you would revise the What Works Clearinghouse (<http://www.whatworks.ed.gov/>) and the role you believe this should play with informing public policy and classroom instruction in reading and literacy instruction. You may refer to each of the studies in Parts I and II if you wish. Cite other research as appropriate. Take up to 5 pages to write your response.

Steinkuehler, C.A., Black, R.W., Clinton, K. A. (2004). Researching Literacy as Tool, Place, and Way of Being. *Reading Research Quarterly*. 40, (1), 7-12.

The What Works Clearinghouse (WWC) was established in 2002 by the U.S. Department of Education's Institute of Educational Sciences (IES) "to provide educators, policymakers, and the public with a central, independent, and trusted source of scientific evidence of what works in education" (see <http://www.whatworks.ed.gov/>). This online database, inspired in part by the No Child Left Behind legislation (NCLB, 2002), reflects the current administration's emphasis on "scientifically based research" for improving student achievement. In addition, its presence highlights the increasing federal role in helping the education community "locate and recognize credible and reliable evidence to make informed decisions" (IES, 2003). On the one hand, the push for educational research to be more rigorous and useful is a step forward for the literacy community (see, for example, Tobin, 2005). Unfortunately, in this case, the vision set forth by the current WWC standards appears to be punitively narrow in ways that undermine the efforts of educational researchers and professional educators working to best prepare students for their futures in a digital information society.

In this paper, I seek first, to explore three central issues that depict the narrowness of the WWC standards, particularly with regards to research in new literacies. Then, I propose a series of suggestions for how the WWC might broaden its vision in ways that (a) recognize the range of diverse research methodologies required to capture the complexities of effective literacy instruction with technology, and (b) depoliticize the findings from quality educational research and its dissemination to those who make decisions about curriculum, instruction and educational policy.

My arguments are framed within three perspectives associated with new ways of thinking about literacy and research. First, a new literacies perspective posits that the nature of literacy is rapidly changing as new information and communication technologies (ICT) emerge (Coiro, 2003; Lankshear & Knobel, 2003; Leu, Kinzer, Coiro, & Cammack, 2004). Consequently, any synthesis of research-based literacy practices should consider how best to prepare students for the new sets of reading and writing strategies these new technologies require. Second, in contrast to the WWC standards, others suggest scientifically based research in education should include "a range of research designs (experimental, case study, ethnographic, survey) and mixed methods (qualitative and quantitative) depending on the research questions under investigation" (Eisenhart & Towne, 2003, p. 31). As such, many have effectively argued for more flexible research designs in education to account for context-specific variability and differences in implementation (e.g., Chatterji, 2004; Creswell, 2003; Dillon, 2005; Johnson & Onwuegbuzie, 2004). Third, changing conceptions of literacy, as shaped by new technologies, demand new research methodologies (e.g.,

Bruce & Levin, 1997; Kinzer, 2003; Lankshear & Knobel, 2003). Consequently, the literacy community should be encouraged to carry out quality research that employs new methods for capturing the “radically different forms [of literacy use] due to the unique characteristics and properties of digital media” (Steinkuehler, Black, & Clinton, 2004, p. 99). In the context of these perspectives, I believe the current WWC standards require researchers of new literacies to work within the parameters of a rigidly narrow set of learning outcomes, research methodologies, and practices for review and dissemination.

A narrow set of learning outcomes. The WWC indicates a topic is chosen based on its relevancy for improving student achievement. However, in a research climate defined by urgent calls for interventions that address higher-level reading comprehension for middle and high school students (Biancarosa & Snow, 2004; RAND Reading Study Group, [RRSG] 2002), multiliteracies (e.g., Cope & Kalantzis, 2000; Healy, 2000) and new information literacies (e.g., Educational Testing Service [ETS], 2003; Leu et al., 2004; Smolin & Lawless, 2003), the WWC has limited the range of literacy topics selected for systematic review to studies of interventions in beginning reading (i.e., decoding and word recognition) and adult literacy (i.e., basic education and functional skills). Given the research community’s strong knowledge base of effective early reading interventions (National Institute of Child Health and Human Development, 2000; RRSG, 2002) and the growing importance of ICT in people’s everyday lives (e.g., ETS, 2003; Partnership for 21st Century Skills, 2004), it no longer makes sense to limit the public’s attention to issues of early literacy or skills-based instruction. From my perspective, a more logical research agenda would expand our attention toward topics that analyze interventions associated with the challenges of learning how to read, write, and communicate within increasingly complex digital spaces. As such, the WWC’s topical offerings do not at all reflect the central issues for improving student literacy achievement in today’s global information society.

A narrow set of methodologies. A second concern is that the WWC limits its definition of legitimate research to those studies that employ randomized field trials and statistical controls. As a member of the research community exploring new literacies in classroom contexts, I agree with others who argue that these constraints complicate our attempts to find “firm footing within a rapidly changing landscape of computer mediated communication and digital literacies” (Steinkuehler et al., 2005, p. 95). Feuer, Towne, and Shavelson (2002) state, “No method is good, bad, scientific, or unscientific in itself. Rather, it is the appropriate application of a method to a particular problem that enables judgments about scientific quality” (p. 8). Moreover, many researchers agree that

when little is known about the most important variables to examine or when existing theories do not apply, qualitative exploratory approaches are most appropriate (e.g., Creswell, 2003; Kamil, 2004; Stake, 1995).

To illustrate, the literacy community has employed diverse non-experimental methodologies to effectively advance our understanding of the rapidly changing nature of literacy practices within electronic environments. Recently, researchers have investigated the learning effects of technology use on literacy using methods such as formative experiments (e.g., Reinking & Watkins, 2000), verbal protocols (Azvedo & Cromley, 2003; Palinscar & Dalton, 2004), and mixed methodologies (e.g., Paterson, Henry, O'Quin, Ceprano, & Blue, 2003; Wyatt-Smith, 2004). Others are exploring designs that capture new dimensions of literacy and technology use in Internet learning environments (e.g., Coiro & Dobler, 2004; Eagleton, 2003; Leu & Hartman, 2004), online gaming contexts (e.g., Steinkuehler et al., 2005; Thomas, in press) or across virtual time and space (e.g., Lankshear, 2003; Leander, 2002). Studies such as these contribute to the critical knowledge base from which future causal research questions about new literacies may one day be derived. Thus, while there is value in large-scale research efforts that seek answers to policy makers' questions, the federal government's disregard for the contributions of qualitative and mixed-method studies is counterproductive to building a solid line of research in the area of new literacies.

A narrow set of practices for review and dissemination. My third concern is the slow rate with which studies are reviewed, summarized, and published on the WWC's website. In the past 60 days, zero studies have been added to the math topic, which is the *only* area for which studies are currently being analyzed. This pace is in stark contrast to the sense of urgency for informed decision-making that the federal government has created among the educational community at large. Further, the WWC's procedures for review and dissemination are relegated to traditional practices that make little use of the potentials of new ICTs being explored by other associations dedicated to efficiently sharing findings from quality research (e.g., Bingham & Coleman, 1996).

A New Vision for the What Works Clearinghouse

Given my concerns about the current state of the WWC, I propose a series of suggestions framed in two parts. The first set of suggestions addresses the question: *How might the WWC broaden its vision to recognize the range of diverse research methodologies required to capture the complexities of effective literacy instruction with technology?*

1. Broaden the WWC's mission to recognize contemporary definitions of literacy and research methodologies. From a new literacies perspective (Leu et al., 2004), the WWC restricts the public's understanding of literacy and research to traditional definitions of each, without considering more contemporary approaches

intended to capture the complexities of learning and doing research in a digital world. One way to broaden this perspective would be to develop a companion website designed to provide space for summaries of research on (a) topics such as multiliteracies, critical literacies, and new information/communication literacies; and (b) studies that explore emerging methodologies for research in electronic environments (e.g., Kinzer, 2004; Wyatt-Smith, 2004). The WWC may want to refer to the website for the Center for Applied Research in Educational Technology [CARET](2004) as an exemplary model of how to categorize and communicate findings from diverse studies employing a range of methodologies (see <http://caret.iste.org/>). Also useful is Cradler & Cradler's (2002) framework for "the implementation and assessment of educational programs, with specific applications of technology" (p. 48).

2. Issue a call for studies that explore new forms of literacy and the use of ICT for content area learning.

Efforts should be made to help the public realize the criticality of studies that explore diverse notions of literacy and how best to facilitate content area learning within complex digital environments. We need to consider not only ways in which literacy plays out in the context of narrative environments (i.e., online fanfiction or multi-player virtual video games), but also in the context of online information environments (i.e., webpages, search engines, weblogs) that have become this generation's defining technology for information, communication, and learning. Optimally, studies should explore how authentic learning experiences with ICT (e.g., Leu & Hartman, 2005; Leu, Leu, & Coiro, 2004) impact content area learning and/or how this learning carries over to workplace environments.

3. Broaden the scope of research questions to inform a diverse group of stakeholders. Currently, all of the studies that meet the WWC standards for evidence focus on providing the "right answers" rather than on capturing the complexities of teaching and learning in today's classroom (Dillon, 2005). The WWC should expand their definition of effective practices to provide space for research questions that address the needs of policy makers (e.g., *What works best for the collective group?*), academic researchers (e.g., *When and why is a particular intervention or methodology most effective?*), and classroom teachers (e.g., *How and for whom is the intervention most effectively implemented?*). Hence, the title of my paper: "What works when, why, and for whom? A new vision for the What Works Clearinghouse."

A second set of suggestions addresses the question: *What efforts might the WWC take to depoliticize the findings of quality educational research and its dissemination to those who make decisions about curriculum, instruction and educational policy?*

1. Look to scholars, not politicians, to identify topical research priorities. Many of the major literacy organizations have issued position statements or standards that explicate ways students must become proficient in the new literacies of ICT (e.g., International Reading Association, 2001; International Society for Technology in Education, 2004; National Council for Teachers of English, 1996). Similarly, the International ICT Literacy Panel (ETS, 2003) is currently piloting “large-scale assessments intended to inform public policy *and* diagnostic measures to test an individual’s skills associated with ICT” (p. iii). The WWC should look to *these* organizations for direction when clarifying critical priorities for research in the new literacies that define our children’s futures.

2. Provide a more timely dissemination of findings while anticipating the potential of new online peer-review processes. Rapidly developing open-source technologies (e.g., Open Source Technology Group, 2005) provide up-to-the-minute information accessible from anywhere in the world. As a research community, we should be exploring these technologies while anticipating their capabilities for more efficient dissemination of research in various stages of development. Similarly, new visions of a distributed online peer-review process (e.g., Bingham & Coleman, 1996) provide new potentials for informing others in and across research communities of progress made while waiting for manuscripts to be published by more traditional means. In this way, the WWC would be working to ensure that research-generated knowledge leads, and does not follow, the changing landscape of new technologies that generate even newer literacies.

3. Recognize that teachers, not programs, make a difference. Recent studies show clearly that teachers and schools have an enormous impact on student achievement (e.g., American Educational Research Association, 2004; Wenglinsky, 2002), particularly with regards to technology use (Coiro & Leu, 2003). Even Grover Whitehurst, director of the Institute of Education Sciences, stated that when translating scientific research into design or practice, “the proportions, time, and sequence is critical, not just the ingredients” (Whitehurst, 2004). However, studies featured on the WWC are not designed to consider teacher differences in implementation. Further, no attempts are made to specify implementation procedures should a school choose to adopt one of the “research-based” programs. If the intent of the WWC is truly to improve student achievement, it should not only invite, but also highlight submissions from studies gathering evidence related to *effective practices* rather than *effective programs*.

In conclusion, although researchers from other perspectives may have a different set of recommendations for the WWC, I believe changes that address these six provisions will help to broaden the federal initiative in ways that empower policymakers, literacy researchers, and classroom teachers to make more informed decisions about what research methodologies and instructional practices work best for their unique literacy learning purposes.

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Appendix A

ISRR Classes, Additional Variables, Descriptions, and Examples
(Additional variables were derived from the studies referenced at the bottom of the table)

Class ^a & Additional Variables	Description	Example
Planning^a		
<ul style="list-style-type: none"> • General task goals^{b, c, e} • Short term specific goals toward general task^{b, c, d, e} • Prior knowledge of topic activation^{b, c, d} • Prior knowledge of technology feature activation^{b, c, d} • Task switching^c 	<ul style="list-style-type: none"> • Stating generally what is expected to be obtained • Stating series of related sub-goals in a certain sequence • Searching memory for relevant topical prior knowledge • Searching memory for relevant technical prior knowledge • Stating new set of subgoals 	<ul style="list-style-type: none"> • “I’m looking for information about the white color in tigers” • “I’m looking to click on multimedia and then the video”. • “I’m clicking here because habitat means where you live” • “I think I know – you press the arrow to make it play and then the bar moves” • “I’m going to try a different planet and see what I find”.
Monitoring^a		
<ul style="list-style-type: none"> • Reaction to judgment^{c, f} • Changing reading pace^{c, d} • Getting back on track by following a new path^{b, c, d} • Verify validity of information • Adapting search terms^{b, c, d} 	<ul style="list-style-type: none"> • Self-reflection about an earlier judgement or choice • Switching from skim/scan to read or vice versa • Being lost and needing to get reoriented • Wondering if information is true • Refining or changing search terms 	<ul style="list-style-type: none"> • “I think I chose the wrong link back on the main page.” • “Now I’m reading more carefully - just this paragraph.” • “I’m gonna start over at the homepage.” • “Do you think that picture is real?” • “I tried ‘garbage’ and it didn’t work – maybe I’ll try ‘trash’.”
Strategy Use^a		
<ul style="list-style-type: none"> • Predicting what lies beneath a hyperlink^{b, c} • Adapting a strategy to a new context^c 	<ul style="list-style-type: none"> • Predicting what lies beneath a hyperlink^{b, c} • Recognition of different cues along with similar ones 	<ul style="list-style-type: none"> • “If I click here, it will probably take me...” • “Ask Earl is kind of like Ask Jeeves, but here you have to...”
Affect/Interest/Attributions^a		
<ul style="list-style-type: none"> • Task value statement^{b, e, f} • Statement of persistence^{b, c} • Statement of patience^{b, c} • Statement of self-confidence^{b, c, f} • Self-efficacy of book reading^c • Self-efficacy of Internet reading^{b, c, f} 	<ul style="list-style-type: none"> • Expressing valuable purpose for reading • Expressing eagerness to continue • Expressing awareness that it takes a while to find an answer • Expressing confidence that a computer glitch is not their fault • Expressing belief about ability to read in printed contexts • Expressing belief about ability to read in Internet contexts) 	<ul style="list-style-type: none"> • “Hey, this will help for my science class.” • “It’s got to be there so I’ll keep trying.” • “It’ll probably take me a few different clicks to get there.” • “Oh, I’m getting an error message – I’ll try again later” • “I’m pretty good at finding the answer in books”. • “Am I dumb or what? It never takes me this long in a book!”

^aThe class already includes variables presently in the SRL model defined by Azevedo, Cromley, & Seibert (2004)

^bBilal (2000)

^cCoiro & Dobler (2003; 2004)

^dEagleton (2003)

^eHorner & Shewry (2003)

^fWhipp & Chiarelli (2004)

Appendix B

Pretest, Posttest, and Intervention Schedule for Treatment and Comparison Groups

	Friday	Monday	Tuesday	Wednesday	Thursday	Friday
Treatment	Pre-test:	Intervention:	Intervention:	Intervention:	Intervention:	Post-test
Internet Reciprocal Teaching lessons on Internet Self-Regulated Reading (ISRR) strategies	45 minutes Internet Reading Task 30 minutes 1. match 2. label 3. draw 4. essay Topic: <i>Circulatory System</i>	45 minute Internet Reciprocal Teaching lesson on ISRR strategies for reading to locate information <i>using search engines</i> Topic: <i>Digestive System</i>	45 minute Internet Reciprocal Teaching lesson on ISRR strategies for reading to locate information <i>using search engines</i> Topic: <i>Digestive System</i>	45 minute Internet Reciprocal Teaching lesson on ISRR strategies for reading to locate information <i>within web pages</i> Topic: <i>Digestive System</i>	45 minute Internet Reciprocal Teaching lesson on ISRR strategies for reading to locate information <i>within web pages</i> Topic: <i>Digestive System</i>	45 minutes Internet Reading Task 30 minutes 1. match 2. label 3. draw 4. essay Topic: <i>Circulatory System</i>
Comparison	Pre-test:	Intervention:	Intervention:	Intervention:	Intervention:	Post-test
Internet Reading Practice (IRP) with no teacher-directed or peer support	45 minutes - Internet Reading Task 30 minutes - 1. match 2. label 3. draw 4. essay Topic: <i>Circulatory System</i>	45 minute Internet Reading Practice (IRP) for locating information <i>using search engines</i> Topic: <i>Digestive System</i>	45 minute Internet Reading Practice (IRP) for locating information <i>using search engines</i> Topic: <i>Digestive System</i>	45 minute Internet Reading Practice (IRP) for locating information <i>within web pages</i> Topic: <i>Digestive System</i>	45 minute Internet Reading Practice (IRP) for locating information <i>within web pages</i> Topic: <i>Digestive System</i>	45 minutes Internet Reading Task 30 minutes 1. match 2. label 3. draw 4. essay Topic: <i>Circulatory System</i>

Appendix C

Internet Reading Task (Pretest and Posttest are identical)

Part 1:

Use the Google Search Engine (<http://www.google.com>) to locate, bookmark, and read three websites about the circulatory system. The three websites you select should help you learn as much as possible about

- a) the different parts of the circulatory system and their purpose;
- b) how they work both individually and together; and
- c) how they support the human body.

You will have 45 minutes to complete this portion of the task.

You may take notes using a word processor or the paper that is next to your computer.

When you are finished, click on the icon for Quiz and login with the username and password you were given.

Parts 2-5:

There will be four tasks to complete.

- A. Matching: Drag the dot after each of the 16 words on the left side of the screen and link it to its corresponding definition on the right side of the screen. When you are finished, click to go to next page.
- B. Labeling: Drag the appropriate label from the words at the bottom of the screen and click them into their appropriate location next to the diagram. When you are finished, click to go to next page.
- C. Drawing: Use the electronic drawing tool to draw the path of blood throughout the body, ensuring that the path includes the heart, lungs, brain, feet, and hands (flow).
- D. Essay: Click in the blank box beneath your drawing. Please type everything you can about the circulatory system. Make sure you explain what you know about the different parts and their purpose, how they work both individually and together, and how they support the human body.

SAMPLE OF WHAT A STUDENT MAY ACCESS FOR ACCOMPLISHING THIS LEARNING GOAL:

NOTE: Although the reading material for each student may be different (due to the nature of the task), an effective search for the purposes of this task may include learning from websites such as the following:

1. A Google search with the keywords “Parts of the circulatory system” resulted in these 4 websites:
 - a. Circulatory System:
<http://hes.ucf.k12.pa.us/gclaypo/circulatorysys.html> (consists of several webpages to navigate with information about the function of the circulatory system, each of its parts and nice colored and labeled diagrams of the various parts).
 - b. Heart and Circulatory System from Kid’s Health:
http://kidshealth.org/parent/general/body_basics/heart.html (mostly text with all key vocabulary terms bolded and embedded into the text)
 - c. Human Body Adventure:
http://vilenski.org/science/humanbody/hb_html/circ_system.html (simple web site that identifies each of the parts, uses a left frame to identify links within the site and contains an online quiz for review)
 - d. The Circulatory System Online Learning Thinkquest
<http://library.thinkquest.org/25896/> (contains drawings of the different parts and helpful information created by 3 teens in Singapore).

A student with effective searching skills could locate and bookmark relevant websites such as these in as little as 5 minutes and have 35 minutes to navigate, read and learn within and across the websites.

Appendix D

Sample Lesson: Internet Reciprocal Teaching lessons on Internet Self-Regulated Reading (ISRR) strategies
Internet Reading Context: Reading Within Webpages

Using a LCD projector, the site will be viewed by all students simultaneously in a large print format. Teachers preview three websites and introduce the information displayed on the homepage of each website. Teachers highlight how each website presents different types of information about the digestive system.

Reciprocal Teaching Cue Cards

These cards function as prompts to help students remember the strategies and their purpose

<p>Predict</p> <ul style="list-style-type: none"> • Explain what kinds of information will be contained on this webpage. • Explain if the information will help meet your learning goals. • Use cues from the website (illustrations, icons, graphics, or subtitles) to support your prediction. • Identify which hyperlinks will help you navigate through the text to gather information. • Describe the types of information you predict will be linked to the hypertext. 	<p>Question</p> <ul style="list-style-type: none"> • Ask questions that begin with who, what, when, where, why, or how. • Ask main idea questions that aid in identifying key ideas. • Ask questions that have under-the-surface answers. • Ask questions about the navigational path choice as it relates to constructing a clear summary. • Ask questions about how well the information addresses your particular learning goal(s).
<p>Clarify</p> <ul style="list-style-type: none"> • Look for words, phrases, or icons that are not clear. • Discuss the words or concepts you find confusing. 	<p>Summarize</p> <ul style="list-style-type: none"> • Include the main ideas, not all the details. • Keep it concise and focused. • Stick to the point.

This is a sample set of directions for scaffolding self-regulated reading strategies while reading websites to learn more about the digestive system.

- 1) The teacher directs students to look at the first website and **predict** whether or not it will have information relevant to their learning goals. The teacher directs students to look at the title bar, the location, and labels of the main navigational hyperlinks on the homepage, any annotations following these hyperlinks, any icons or animations, and the main text on the homepage. Students use this information to **predict** what types of information will be found on this page and where hyperlinks (selected by the teacher) lead. Discussion focuses on ISRR variables associated with *goal setting*, *monitoring*, and the *use of effective strategies* while skimming and scanning the homepage of a website (e.g., predicting what lies beneath each hyperlink) to learn more and evaluate the relevancy of the website. The teacher also models comments associated with *affective dimensions* of ISRR such as how they may not find the answer on the first click (persistence) or how a link that is broken is not because of anything they did (self-confidence/attributions).
- 2) The RT groups read the textual information revealed upon selecting particular hyperlinks. Students should be encouraged to consider the meaning communicated in animations, images, video or audio clips on each web page. As demonstrated in the modeling phase, the group rotates leaders and each guides the group through the target ISRR strategies. The leader points out words, images, animations, or electronic features that they do not understand or are having trouble accessing. This information will be discussed and **clarified** by the group. Appropriate *monitoring* and *reading strategy use* should be clarified here. This is also a good opportunity for the teacher to clarify learning goals (e.g., *goal setting*) or any student's misunderstandings of text or electronic media (or to ask other students in the classroom to clarify).
- 3) A strategy leader within each group generates two **questions** and the students within the group answer. One question should focus on *content* and the other should focus on ISRR strategies (effective or ineffective). The teacher may wish to model good questioning strategies while thinking aloud to scaffold students' questioning processes.

(Appendix D continued next page)

Appendix D (continued)

- 4) The leader in each RT group **summarizes** what they learned from the multiple pages within this website, both in terms of content and strategy use. The teacher can further model summarizing so that summaries remain focused on important points. Describe how the choice of navigational path and access of hyperlinks helped build the summary. The teacher should model and summaries to focus on both the content learned about the digestive system as well as about effective and ineffective ISRR strategies.
- 5) Group leadership rotates as each new leader begins at a new website. Groups will **predict** where the embedded hyperlinks from this website may lead, using clues about where they were led by the hyperlinks on previous homepages. Discussion should focus on similarities and differences between the structure of the different websites, which was easiest to navigate (and why), and which had the most relevant answers to their learning goals (and why). Groups will discuss learning goals and monitoring strategies at each new page and/or website.

The same procedure can then be followed for each new series of hyperlinks on the target website. The teacher can choose to focus on predicting the path of several hyperlinks deeper down the website's structure (away from the homepage) or the teacher can choose to return to the site's homepage to select another main navigational hyperlink with which to repeat the process. After three websites have been explored, the teacher can have students share their summaries, identify the best website for their purposes, generate an overall strategy for the entire text, and clarify any lingering misunderstandings.

APPENDIX E

Article Review Task

The purpose of this task is twofold. First it is intended to evaluate your ability to “...demonstrate your knowledge of the field, your ability to analyze and synthesize the field, and to communicate these skills in writing” (*Cognition and Instruction Comprehensive Examination Policy Statement*). A central issue in the field currently is an epistemological one: How should we study the nature of new literacies? To understand this issue, it is essential to be conversant with the range of methodologies being used in new literacies research. This is especially true given the observation in a recent article on new literacies where Steinkuehler, Black, and Clinton (2004) observe, “...the phenomena of study are ever widening while the range of methods considered legitimate for their investigation is increasingly narrowed.” (p. 7) Thus, one purpose is to provide an opportunity for you to demonstrate your ability to be critically thoughtful of research taking place within the methodological diversity that defines our field today, even as some seek to constrain this diversity.

There is also a second purpose derived from your pedagogical statement. You argue that, “Rapid transformations in technology suggest that we can no longer expect learning theory, research methodologies, and curriculum standards to remain steady while we investigate their plausibility in our work.” Research methods are changing and increasingly diverse methodologies are being brought to bear to understand issues in new literacies. This suggests that knowing how to learn new methodologies, may be as important as knowing a particular methodology. One of the research methods in these papers in these papers was taught to you and one is likely to be somewhat new to you. We include the unfamiliar methodology because our second purpose is that we wish to see how well you know how to think critically and thoughtfully about a somewhat new approach to inquiry, at least one with which you are not especially familiar.

Having said all this, we also recognize that this task is longer than is normally presented in this portion of the exam. We believe, however, that you are capable of accomplishing the task, as daunting as it may appear, and look forward to reading your responses

Part I

Read the study by Azevedo and Cromley (2004) conducted with adults. In four pages, describe how you would conduct this study with elementary or middle school students to inform classroom instruction. Summarize your changes in these areas:

- Research question(s)
- Rationale (literature review)
- Methodology
- Design (identify major dependent and independent variables)
- Analysis

In a brief summary paragraph, explain your decisions.

Part II

You have been asked by the editors of *Reading Research Quarterly* to review the study by Steinkuehler (2004). This comes from an epistemological tradition that is probably somewhat unfamiliar: cognitive ethnography using discourse analysis. Provide a 3-page review of this article to the editors, following their guidelines (attached). Concentrate on the most problematic issues in the article and any suggestions you have that will improve the study. Provide appropriate citations, where necessary. You should recommend to accept with minor revisions, revise and resubmit, or reject.

Part III

Now that you have reviewed two very different approaches to research, describe your stance to the position in the supplemental work below, taken by Steinkuehler, Black, and Clinton (2004). How diverse should we be with research methods on questions of new literacies? Which principles should guide us? Frame your response around how you would revise the What Works Clearinghouse (<http://www.whatworks.ed.gov/>) and the role you believe this should play with informing public policy and classroom instruction in reading and literacy instruction. You may refer to each of the studies in Parts I and II if you wish. Cite other research as appropriate. Take up to 5 pages to write your response.

THE STUDIES TO REVIEW

Azevedo, R., & Cromley, J. G. (2004). Does training on self-regulated learning facilitate students' learning with hypermedia? *Journal of Educational Psychology*, 96(3), 523-535.

Steinkuehler, C. A. (2004). Learning in massively multiplayer online games. In Y. B. Kafai, W. A. Sandoval, N. Enyedy, A. S. Nixon, & F. Herrera (Eds.), *Proceedings of the Sixth International Conference of the Learning Sciences* (pp. 521–528). Mahwah NJ: Erlbaum. Retrieved January 17, 2005 from <http://www.scholar.google.com/scholar?hl=en&lr=&ie=UTF-8&q=cache:G0ve-zJf33gJ:www.sit.wisc.edu/~steinkuehler/papers/SteinkuehlerICLS2004.pdf+Learning+in+massively+multiplayer+online+games>

THE SUPPLEMENTAL WORK

Steinkuehler, C.A., Black, R.W., Clinton, K.A. (2004). Researching Literacy as Tool, Place, and Way of Being. *Reading Research Quarterly*. 40, (1), 7-12.

Reading Research Quarterly Guidelines For Writing Reviews

This information is available online at: http://www.reading.org/publications/for_reviewers/rrq.html