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Disrupting Students' Online Reading and Research Habits: The LINKS Intervention and its Impact on Multiple Internet Text Integration Processes

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Abstract

This study is about eight dyads of ninth grade students conducting collaborative online research on topics related to their science curriculum. It measures the impact of a teaching intervention called LINKS (Learning to Integrate InterNet Knowledge Strategically) on four dyads' use of ten online reading strategies hypothesized to support multiple Internet text integration processes relative to their control-group peers. Results showed that LINKS, as administered in this study, had no statistically significant impact on the frequencies, relative frequencies and relative duration of strategies used during a series of five online inquiry sessions relative to the control group. In their written persuasive arguments at posttest, however, treatment participants were found to integrate information from a more diverse set of websites than control participants. Although more research is needed, this study shows that LINKS disrupted participants' reading and writing processes in ways that nudged them toward more integrative action.

Keywords: dyadic online inquiry, academic digital literacies, multiple Internet text integration, teaching intervention

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Introduction

Foundational research on reading strategies has demonstrated that good comprehenders flexibly monitor, fix up and synthesize understandings from printed texts (Alexander & Jetton, 2000; Duke, Pearson, Strachan & Billman, 2011; Pressley, 2000; Pressley & Afflerbach, 1995). In classrooms, teaching interventions such as Reciprocal Teaching (Palincsar & Brown, 1984) that target acquisition and application of reading strategies through gradual release of responsibility from teacher to students, and that include peer collaborations, seem especially supportive of learning gains, in part, because they help students to know which reading strategies to use, when, and how (Duke, et al., 2011; Gersten, Fuchs, Williams & Baker, 2001; Mokhtari & Reichard, 2002; Pressley & Gaskins, 2006; Van Keer, Verhaeghe, & Taylor, 2005).

Studies of *online* reading comprehension and strategies application have shown that expert online readers flexibly engage reading strategies, too (Afflerbach & Cho, 2009; Cho & Afflerbach, 2015; Coiro & Dobler, 2007). With printed texts, good readers set a reading purpose, cue their background knowledge, preview text structures and use them to both predict and infer meaning (Goldman & Rakestraw, 2000). Good comprehenders of print also monitor, fix, clarify, visualize and summarize their understandings by questioning the text, and thinking aloud (Duke et al., 2011; Kucan & Beck, 1997). And although online readers do all of these things, the unique contexts, media, and purposes for Internet reading seem to drive the cueing and prioritization of particular strategies over others (Coiro & Dobler, 2007; Zhang & Duke, 2008). Because the Internet is open, readers must be incredibly strategic about the ways they construct their reading trajectories. As Cho and Afflerbach (2015) write, good Internet readers "use strategies for *realizing* and *constructing* potential texts as they negotiate the multiple texts, spaces, and reading choices encountered in Internet reading" (p. 505).

In school, strategies that enable readers to realize and construct potential texts become most important during Internet research and writing tasks (Kiili, Mäkinen & Coiro, 2013). Without the ability to locate, evaluate and synthesize understandings of topics from multiple Internet texts, students can easily become lost online. Rudderless in an infinite sea of search results, hyperlinks, media, and perspectives, students who become lost are less able to learn, participate, and communicate their understandings than those who actively apply strategies for realizing and constructing texts more effectively (Bråten, Strømsø & Britt, 2009; Goldman, Braasch, Wiley, Graesser & Brodowinska, 2012; Hargittai & Hinnant, 2008; Wiley et al., 2009; Thompson, 2013). Especially troubling are analyses that show how variation in students' use of these strategies can be explained, in part, by family income (Hargittai & Hsieh, 2013; Leu, et al., 2014). In the span of a generation, the Internet has become yet another space where those who have higher wealth also acquire the advanced literacies skills that contribute to, and reinforce their positions of privilege (DiMaggio, Hargittai, Celeste & Shaffer, 2004; Hargittai & Hsieh, 2013). Teaching all children the strategies they need to read printed and Internet texts has, therefore, become a critical issue of social justice.

To reverse this troubling divide, research must identify methods of instruction that enable all students to acquire the foundational online reading strategies that will allow them to read, write and participate on the Web (Dwyer, 2016; Mozilla Learning Network, 2016). Although hundreds of studies now describe classroom activities designed to engage students in a range of digital literacies activities in school, relatively few have designed and measured the impact of online reading strategies interventions on students' ability to construct integrated understandings of what they have found and read during online research activities in school (e.g., Kiili, 2013; Kiili, Laurinen, Marttunen & Leu, 2012).

Informed by an integrated set of theoretical frames and research on reading strategies instruction both offline and online, the current study responds to this need. It measures the impact of one instructional intervention called LINKS on a small group of grade nine students' online reading and writing activities, and compares their activities with those of a comparison group.

Theoretical Frameworks

The design, questions and methods of this study are built on several complementary theoretical assumptions. Although this study focuses specifically on students' learning and use of particular strategies while conducting research on the Internet, it is assumed that reading engages not just cognitive processes, but also social and cultural knowledge that inextricably shapes understandings of texts (Pearson, 2009; RAND Reading Study Group, 2000). It is also assumed that where the reading activity takes place (i.e., in school; on the Internet) will cue particular ways of constructing understanding, and that these constructions will be shaped by social and cultural expectations about reading, developed through participation in school and on the Internet (Brown, Collins & Duguid, 1989; Lave & Wenger, 1991; Vygotsky, 1978). It is assumed that reading strategies can be learned, particularly through gradual release of responsibility from teacher to learners (Duke & Pearson, 2002; Duke et al., 2011; Pearson & Gallagher, 1983) and that peer-to-peer negotiation of meaning during reading is supportive of comprehension (Palincsar & Brown, 1984; Kiili, 2012; Wilkinson & Son, 2011). Moreover, is assumed that if students have a more fully stocked cognitive toolkit of reading strategies, they will be more able to construct understandings of multiple texts more dynamically and flexibly as they criss-cross the ill-structured web landscape (Spiro & DeSchryver, 2006).

In this study, participants are asked to construct integrated understandings of topics by finding and reading multiple Internet texts. Integrated understanding means the weaving together of ideas from one text with ideas from others so that understanding of the topic is not just a list of disconnected threads, but rather more like a tapestry. The construction-integration model of reading comprehension (Kintsch, 1998; Kintsch & van Dijk, 1978) and the documents model of multiple text integration (Britt et al., 2013; Perfetti et al., 1999; Rouet, 2006), suggest that readers construct a model of understanding within a single text by first building a text base, and then a situation model for the text. As readers integrate multiple situation models, it is assumed that they must consider relations among texts. These relational, or integrative strategies are taken as unique to the task of synthesizing understanding across and among information sources. It is also assumed that integration of meaning is recursive and iterative; that through a process of cognitive bricolage, a coherent model of understanding is constructed (Britt, Rouet, & Brasch, 2013; Perfetti, Rouet & Britt, 1999; Rouet, 2006).

Thirdly, the multimodal nature of Internet texts is assumed (Kress, 2003). As outlined in the dual-level Theory of New Literacies (Leu, Kinzer, Coiro, Castek & Henry, 2013) it is assumed that students would need to engage multiple, multimodal and multifaceted literacies, and apply new forms of strategic knowledge to construct meaning.

Finally, it is also assumed that writing supports the construction of integrated understandings (e.g., Klein & Rose, 2010; Langer, 1986a, 1986b; Newell, 2006) and that trace evidence of integration processes are evident in participants' written arguments. As such, the organization and content of students' written arguments are taken to represent a constructed version of students' understanding.

Literature

Based on studies of expert multiple text integration with printed, and online texts, a set of strategies was identified for inclusion in an instructional intervention designed to support students' progression toward more expert habits of strategy use. The reading strategies literature that informed *what* to teach is reviewed first. It is followed by a review of research that informed the instructional methods, or the *how* to teach.

What to Teach?

The "what" of the LINKS intervention, summarized in Table 1, includes ten reading strategies that coalesce around five categories: focus on reading purpose and relevance, compare and contrast information, evaluate trustworthiness, cue pre-existing knowledge and self-regulate.

Focus on reading purpose and relevance of text options. To construct a documents model of understanding (Rouet, 2006) good readers of multiple Internet texts evaluate potential texts for content relevance (Rouet, 2006; Wiley et al., 2009). For middle-schoolers labeled as proficient online readers (Coiro & Dobler, 2007) text relevance is often assessed through a process of forward inferencing at the search engine results page (SERP), before a text is chosen for closer reading. For example, one student in Coiro and Dobler's study used information from the snippet text to anticipate the relevance of a website before clicking on the link, "I'll probably go to 'Tiger Basics' because it says after the link 'tiger facts, physical characteristics,' and that kind of stuff...I think it might show their habitat, I guess." (p. 232). Afflerbach and Cho (2009) also describe initial evaluation of content utility or relevance as one strategy for "realizing and constructing potential texts to read" (p. 82). They note that good readers "sample goal-related information at the initial stage of reading to establish a dynamic plan to achieve one's own goal" (p. 82). Given these findings, teaching students how to identify and determine relevance based on reading purpose, and how to make inferences about the relevance of texts from cues at the

SERP, such as the snippet text and the URL, were taken as important strategies to include in the intervention.

Comparing and contrasting information. Offline, good multiple text integrators corroborate relevant facts, looking for similarities and differences among the texts they read (Rouet, Favart, Britt & Perfetti, 1997; Stahl, Hynd, Britton, McNish & Bosquet, 1996; Wineburg, 1991). After reading texts closely, and extracting salient content, good readers weigh the relative value of the information they've gathered to construct an integrated documents model of understanding that includes multiple ideas (Cerdán & Vidal-Abarca, 2008; Kintsch, 1998; Rouet, 2006). Given these data, comparing and contrasting information were included as essential strategies in the intervention.

Evaluate trustworthiness using multiple cues. People who expertly integrate multiple texts, evaluate trustworthiness of information using a range of heuristics and cues. Offline, they use sourcing cues such as authorship to indicate text value (Wineburg, 1991; Rouet, 2006). Online, they use content provided in the snippet text, and clues in the URL (Afflerbach & Cho, 2009; Braasch, Bråten, Strømso, Anmarkrud & Ferguson, 2013; Braten, Stromso & Britt, 2009; Coiro & Dobler, 2007). Experts also seem to leverage signals of trustworthiness from text structure and aesthetic design (e.g., Lindgaard, Dudek, Sen, Sumegi, & Noonan, 2011; Wang & Emurian, 2004), text genre, its' intended audience, purpose, tone and feel (Afflerbach & Cho, 2009). Importantly, college students who are better at identifying the trustworthiness of texts have also been found to learn more content from their online research (Wiley et al., 2009). Those who learn more also seem to engage qualitatively sophisticated reasons for their choices (Goldman et al., 2012). Teaching students to flexibly evaluate trustworthiness using diverse cues (e.g., text structure, text genre, aesthetic design, authorship credentials, snippet content, URL

structure) was therefore considered essential.

Pre-existing knowledge of topic. McNamara and Shapiro (2005) note that the construction of a cohesive situation model from multiple linked hypertexts is dependent on the structure of the hypertext environment itself, and also on the reader's pre-existing domain knowledge. Readers with more content knowledge are more able to construct meaning in open hypertext systems whereas readers with less content knowledge benefit from hypertext environments that explicitly cue the relationships among texts. This evidence suggests that novice online readers and multiple text integrators could benefit from knowing something about the topic before they begin to read online. The intervention therefore asked students to cue and share their background knowledge before searching for information sources.

Self-regulation of strategy use. Expert online readers, in comparison to weaker readers, also seem to engage self-regulatory strategies that allow them to strategically manage their focus on purpose, relevance, trustworthiness, and on the similarities, differences and connections between and among texts (Afflerbach & Cho, 2009; Azevedo & Cromley, 2004; Azevedo & Witherspoon, 2009; Balcytienne, 1999; Bråten & Strømsø, 2011; Dwyer, 2010; Eveland & Dunwoody, 2000; Goldman et al., 2012; Sevensma, 2013). In their study of better and poorer undergraduate learners, Goldman et al. (2012) found that better learners' stated reasons for leaving websites also reflected "greater planfulness and goal-directedness" (p. 370) than reasons given by those who learned less during the study. It would seem that an important part of what to teach would therefore be how to engage in planful goal setting throughout the research process. For this reason, the intervention explicitly cued students to progressively monitor what they had come to understand and to identify what they still needed to learn through additional search cycles. In the intervention, this strategy is named *Continually Update Understanding.*

The [(PST^2) + $(iC)^3$] strategies framework was developed in response to this body of research. Outlined in Table 1, the framework names the strategies and includes a list of questions that treatment participants in this study were taught to ask themselves.

How to teach these skills?

For adolescents, the reading and multiple text integration strategies outlined above have been shown to improve with practice (Strømsø, Bråten, & Samuelstuen, 2003) and instruction (Braasch et al., 2013; Britt & Aglinksas, 2002; Wiley & Voss, 1999; Wiley et al., 2009). The design of the task prompt itself may also be an essential support for integrative processing. Wiley and Voss (1999) found that students produced the most integrated and causal essays in response to prompts that asked them to form an argument from multiple information sources presented on a website. Based on this finding, LINKS task prompts were designed accordingly. Each prompt asked students to write persuasive arguments for a particular audience, based on what they had read from multiple online information sources.

Promising instructional methods for teaching online reading and inquiry processes seem to align with the most widely supported methods for teaching reading comprehension as well. In an Irish school district serving disadvantaged populations of children over a two-year time period, Dwyer (2010) used a formative and design experiment (Reinking & Bradley, 2008) to test the impact of an instructional environment that sought to "scaffold the development of effective online reading and information-seeking strategies [...], within an integrated classroom curriculum, through a series of linked interventions." (p. 74). Importantly, students in her study worked collaboratively with peers and in groups. Her instructional methods drew heavily from (a) Guthrie's Concept Oriented Reading Instruction (CORI) model, which combines strategy instruction with conceptual knowledge instruction in science, and methods that support readers'

motivation and engagement with texts (Guthrie et al., 1996; Guthrie, McRae & Klauda, 2007; Guthrie & Wigfield, 2000; Guthrie, Wigfield & Klauda, 2012). She also borrowed methods from Palincsar & Brown's (1984) Reciprocal Teaching framework that emphasizes four essential comprehension strategies: predicting, questioning, clarifying and summarizing, along with more general strategic comprehension monitoring. In this model, teachers use gradual release of responsibility (Duke & Pearson, 2002; Duke et al., 2011; Pearson & Gallagher, 1983) moving from direct instruction to student-led discussions of their own reading strategies that are socially supported and positioned within learners' zones of proximal development (Vygotsky, 1978). Within the gradual release of responsibility model, Dwyer found three instructional strategies to be particularly supportive of online strategy development: (a) brief, but explicit strategy instruction using think-aloud techniques (Kucan & Beck, 1997; Newell & Simon, 1972), (b) adaptive scaffolding that was just-in-time and responsive to students' immediate learning needs, and, (c) peer-to-peer collaboration (p. 361).

The Teaching Internet Comprehension to Adolescents (TICA) project (Leu & Reinking, 2005a), the goals for which are to increase the use of Internet reading comprehension strategies to concomitantly improve (a) reading online and offline, (b) academic engagement and, (c) achievement among middle-schoolers at risk of dropping out (Leu & Reinking, 2005b) has also adopted a version of Palincsar & Brown's (1984) reciprocal teaching model (Leu, et al., 2008) with promising results. As measured by specific Online Reading Comprehension Assessments (ORCA), scores on a paired-samples t-test for treatment students who received the Internet Reciprocal Teaching (IRT) intervention were significantly higher in the second year of the TICA study (Leu et al., 2008, p. 333). Consistent with Dwyer's instructional methods, IRT also prescribes teacher-led instruction, collaborative modeling of specific online reading

comprehension strategies, and gradual release of responsibility until students engage in their own online inquiries (Leu et al., 2008, pp. 328-330).

Together, these findings suggest that an integrated gradual release of responsibility model for online reading instruction that includes teacher modeling, responsive dialogic scaffolding, peer collaboration and opportunities for student inquiry could support progression toward more expert online reading and integration of ideas. Previous studies have shown general gains in online reading comprehension skills with strategies instruction (Castek, 2008; Dwyer, 2010; Leu et al., 2008). However, it is not yet clear how to design strategies instruction that supports the development of multiple text integration skills in particular. The LINKS intervention was designed to address this need by leveraging the promising instructional methods reviewed above.

LINKS

Based on an examination of promising methods for offline and online reading comprehension instruction, the LINKS intervention included seven integrated instructional elements, implemented in the following order: (a) dyadic discussion of reading prompt, reading purpose and background knowledge; (b) quick, direct introduction and review of $[(PST)^2 + (iC^3)]$ strategies and supporting questions, by teacher; (c) teacher modeling of strategy use for the purpose of constructing an integrated understanding of topics from multiple texts via a series of three screencasts that gradually release responsibility to students over three intervention sessions; (d) 30 minutes of dyadic online reading and inquiry; (e) guided teacher questioning that prompts application of $[(PST)^2 + (iC^3)]$ strategies during reading; (f) note taking that requires students to change ink color to delineate information gathered from different information sources; (g) writing a persuasive argument independently for 20 minutes.

The intervention is called *L*earning to *I*ntegrate Inter*N*et *K*nowledge *S*trategically

(LINKS). The acronym articulates the intervention's purpose. Knowledge, in this case, stands for the schemas students build from the processes of gathering, evaluating and integrating information from multiple texts. The word LINKS is synonymous with integration, or synthesis and connotes the Internet's fundamental property—the hyperlink, often *link* for short.

Research Questions

This study asks two questions:

1. What impact, if any, does the LINKS intervention have on students' use of online reading and integration strategies hypothesized to support integration of meaning from multiple information sources during Internet inquiry?
2. What impact, if any, does the LINKS intervention have on trace evidence of integration processes in students' written persuasive arguments?

Method

Design

A repeated measures design with one control group and one treatment group was used to explore the impact of LINKS on (a) application of strategic processes during dyadic online inquiry, and (b) evidence of integration in individual students' written persuasive arguments.

Participants were purposefully assigned to dyads. Dyads were then randomly assigned to treatment or control condition. Each participant was part of one dyad for the duration of the study. Non-independence was assumed during online inquiry; members of dyads were considered indistinguishable (Kenny, Kashy & Cook, 2006). Participants wrote persuasive essays independently, however.

All participants completed five online inquiry sessions focused on topics related to the state science curriculum. Dyad 4 completed the study in seven weeks. Six others completed the

six sessions over 10 weeks. Dyad 5 completed it in 11 weeks. This variability reflected the logistical realities of the school-based contexts in which the study was conducted.

Pretest (session 1) and posttest (session 5) followed the same format for both groups. For the treatment group, the LINKS intervention was administered by the researcher, as teacher, during the three practice sessions (sessions 2, 3 and 4). For the control group, these three sessions offered a comparable online inquiry experience, but without the LINKS teaching intervention. For control dyads, the researcher was present, and checked in to see what the students were reading, but offered no guided questioning to support strategies use.

Participants

Results for eight purposefully selected dyads (16 participants) are reported in this study. Participants were recruited from two schools—one public and one independent— in a Midwestern state. All participants were in the first semester of ninth grade. The average age of participants at the start of the study was 14 years, eight months (or 14.67). On a self-report survey, 11 students self-identified as white/Caucasian, three as Black/African American, one as South-Asian and one as Persian/Middle Eastern. All minority students attended the independent school.

Assignment to dyad. Participants were purposefully matched to dyads using two factors: (a) similarity of scores on the Woodcock Reading Mastery Passages Comprehension Subtest (version III) (Woodcock, 2011) (WRMT), and (b) students' given preferences of partner, as stated on a free-choice form. This approach was informed by evidence that offline reading comprehension scores are statistically significant predictors of online reading comprehension scores (Coiro, 2011) and evidence that the degree to which students trust or like their partners influences their collaborative reading outcomes (Dirks, 1999; Kiili, Laurinen, Marttunen, & Leu,

2012). It was hypothesized that students reading at similar levels who also expressed interest in working together would have a higher probability of performing as well as possible on each inquiry session.

Eight dyads were purposefully selected for this analysis from among the 11 dyads who finished the study so that control and treatment groups were as balanced as possible on their pretest online reading scores, school, and self-reported racial/cultural identity. The gender distribution of the purposefully selected dyads, 11 girls, 5 boys, reflects the general gender disparity in the larger sample (14 girls and 8 boys completed the study). The control group included three girl-girl dyads and one boy-boy dyad. The treatment group included one boy-girl dyad, two girl-girl dyads, and one boy-boy dyad.

Self-report survey data for the eight dyads showed that participants were generally familiar with the Internet. All participants reported Internet access at home, and at school. At school, 14 (87.5%) participants reported using Google searches to find information about topics, and visiting websites in school for specific purposes as directed by a teacher. Eleven (68.75%) reported using library resources such as online databases to find information for projects.

Research Context

Both schools were located in communities with median household incomes that exceeded the state median. In the public school, 22% of students qualified for free or reduced-price lunch. Free/Reduced-price lunch data were not available for the independent school, although admissions policies explicitly focused on inviting a student body that reflected the racial, economic, religious and social diversity of the surrounding community; tuition payments were also prorated to family income.

Both schools were equipped with high-speed Internet via wifi in all classrooms. Both schools provided laptops on carts for teachers to use in classrooms. Desktop computers were available for student use in media information centers and computer labs in both schools. In both schools, students were excused from classes to participate in the research study.

Online Inquiry Tasks

The inquiry prompts followed a consistent structure for each of the five sessions. Each prompt introduced an issue inspired by a curriculum expectation and then asked students to read about the topic and write a persuasive argument. Both groups received the same prompts. For example:

Practice Session Prompt 2

Curriculum Expectation: Describe peaceful technological applications of nuclear fission and radioactive decay. (P 4.12A)

Anti-nuclear advocates say there are no safe uses of nuclear energy. However, many countries around the world use nuclear fission peacefully to meet their energy needs. Are the peaceful uses of nuclear fission important enough to outweigh the risks?

Using multiple, trustworthy Internet texts of any type (e.g., print, photos, video, graphics, charts, figures, tables etc.) read about the risks of nuclear fission and the peaceful uses of this technology. Then, using what you have learned, write a persuasive argument for leaders of a country considering nuclear power that would convince them of whether to use nuclear fission or not.

Screencasts

To maintain a consistent teaching experience for all dyads, the researcher recorded a series of three screencasts for treatment and control participants (Techsmith, 2012a). For the treatment

condition, the first screencast included modelling of all [(PST^2) + $(iC)^3$] strategies. The second focused uniquely on the integrative strategies -- identify important information, compare, connect and continually update. The third included modelling with less thinking aloud so that participants could identify the strategies that were being used.

The control group screencasts were designed to include the same web-based content as treatment participants saw and read, but no think-aloud scaffolding was provided to them. Instead, control participants were asked to read the websites silently on the screen. The time given for reading each web-based information source was the same in both versions of the screencasts. All screencasts can be found at http://mschirahagerman.com/research/links-intervention/.

Data Collection and Analysis: Evidence of Strategy Use during Online Inquiry Sessions

Audio, video and navigational clickstream data. For all online inquiry sessions, audio, picture-in-picture video, and navigational clickstream data were recorded using Morae Recorder screencapture software (Techsmith, 2012b). The recordings, each approximately 30 minutes in length, were then imported to Morae Manager where they were reviewed, transcribed (audio) and coded for evidence of strategy use.

Notes and background knowledge. All participants were asked to record relevant or important information on transparency film using colored pens to indicate change of information source. Treatment participants wrote their background knowledge on one transparency film. They used the second to record details during the 30-minute online inquiry session. Using two films permitted separation of background knowledge from other information acquired or considered during the inquiry session. Control participants used the first transparency sheet to record notes or ideas that occurred to them during silent reading of "starter texts" through their

screencast viewing time, but were not explicitly instructed to record what they already knew on the topic. Since it was hypothesized that awareness of background knowledge would promote integration of multiple texts in the treatment condition (e.g., Anderson & Pearson, 1984; Kintsch, 1998; McNamara & Shapiro, 2005) notetaking on the first transparency film was framed differently for the groups.

Coding for Strategy Use

Unit of analysis. Codes were assigned to *strategic episodes*, defined as actions, decisions, exchanges and/or explanations that appeared connected to the same strategic online reading process (Kiili, 2013). Given that video, audio, and clickstream data were simultaneously analyzed for evidence of strategic processing, codes could be based on evidence from one, two or all three of these modalities. A new strategic episode was assumed to begin when evidence for a new strategic process became evident.

Coding methods. Strategic episodes were coded deductively for processes that aligned with the $[(PST^2) + (iC)^3]$ framework (Miles, Huberman & Saldaña, 2014, p. 75). Each inquiry session was coded for evidence of students' discussion of reading purpose (A), and prior knowledge (B), use of search key words or phrases (C), selection of an information source (D), discussion of text type (E) and evaluation of trustworthiness (F). I also coded evidence of participants identifying important (relevant) information (G), making comparisons to prior knowledge (H), connecting to other texts (I) and continually updating their understanding (J). Additional codes were added through inductive coding of the data (Miles et al., 2014, p. 81). In particular, a code was added to differentiate discussion of trustworthiness before selecting an information source from the Search Engine Results Page (F) and discussion of trustworthiness during reading (Y). A code was added for the series of processes students engaged to construct

understanding within a single text (M), for moments when reading was tangential to the reading purpose, for the broad procedural or technical questions that they asked, and for their notetaking processes. Codes were also developed for researcher scaffolding in the treatment group and researcher check-ins in the control group. In sum, 3006 episodes were identified in the set of 40 videos recorded by these eight dyads.

Interrater agreement. To test the validity of the codes and the reliability of their application to the data, coding progressed through two phases of constant comparison (Glaser & Strauss, 1967; Miles et al., 2014) and interrater agreement.

Phase 1. A set of 6 purposefully selected videos, three treatment, and three control group, were initially transcribed and coded to develop consistent coding methods. The first iteration of the coding manual was reviewed with an expert colleague. These discussions focused on the structure, meaning, and consistent application of the codes. The expert colleague coded 40 randomly selected excerpts. All coding differences were resolved through discussion, review of the original video data, and careful review of definitions. The refined codes and nuanced interpretations discussed during this session informed all subsequent coding of video data. Although we negotiated agreement on a random sample of codes, this phase of interrater agreement was designed to identify and resolve problems at an early stage (Bazeley, 2013) so that subsequent analyses would be more reliable. Revisions to the coding scheme based on these discussions were applied to the first six videos and to the remaining 34.

Phase 2. Once all video process data had been coded, the same expert colleague coded a random sample of 264 strategic episodes. Interrater agreement was very high (Landis & Koch, 1977, p.165) k=.874, p<.001. All differences were resolved by viewing and discussing the original video evidence.

Finally, all process codes were updated and checked a third and final time to ensure consistency.

Data Collection and Analysis: Evidence of Integration of Multiple Texts in Written Arguments

Persuasive essays. After reading and talking with a partner for 30 minutes, each participant wrote a persuasive argument in response to the topic prompt. This writing was done independently, for 20 minutes, in individual Google documents.

Integration rubric. I developed a scoring rubric for evidence of integrative processing in students' written persuasive arguments. The Trace Indicators of Integration (TII) rubric included a set of ten indicators of integration that were informed by both the ORCA-Open (Leu, Coiro, Kulikowich, Sedransk, Everett-Cacopardo, McVerry et al., 2012) and the theoretical foundations for the definition of multiple text integration as iterative, recursive, framed by purpose, and supported by writing itself. All criteria were scored on a three point scale (0, 1, 2). The minimum score on the rubric was 0, the maximum 20. The rubric is provided in Appendix.

For each essay, integration was evaluated immediately after watching, transcribing and coding the corresponding online inquiry processes. The immediacy of this process was methodologically important so that each writer's reading process was fresh in my mind as I evaluated trace evidence of integrative processing in each persuasive argument.

Interrater agreement. Interrater agreement for the essays was within an acceptable range (k = .617) (Landis & Koch, 1977; Bakeman & Quera, 2011). All differences were resolved through discussion and review of the evidence. Final index scores were carefully reviewed to ensure adequate evidence to support each value judgment and consistency in coding following from those discussions.

Results

Pretest Comparison of Reading Scores

Woodcock Reading Mastery Test (WRMT) Passages Subtest scores for treatment and control participants were compared to determine pretest differences between groups on this validated measure of reading comprehension ability. Shapiro-Wilk tests showed that the assumption of normality was met for treatment (W=0.958, p = .793) and control groups (W = 0.925, p = 0.472) on this measure. Assumptions of homogeneity of variance, as determined by Levene's test, were also met F (1,14) = 0.493, p = 0.494. An independent samples t-test was therefore justified. The null hypothesis was retained. Mean scores on the WRMT at pretest (n=16) did not differ statistically between groups (t = -0.075, p = 0.942). Given this finding, equivalent offline reading comprehension skill, a known predictor of online reading comprehension skills (Coiro, 2011a), was assumed between groups.

LINKS and its Impact on Strategic Processing During Inquiry [RQ1]

Several between-group comparisons were conducted to determine the impact, if any, of the LINKS intervention on strategy use during inquiry. Pre-test vs. post-test comparisons were made, as were repeated measures comparisons that included the three treatment sessions. Comparisons included: (a) the total sums of strategies used at pre-test vs. post-test between and within groups, (b) frequency counts of specific strategies at each stage of the study, (c) relative frequencies of strategies use, and (d) relative duration of strategies used.

Comparison of mean total strategies. The mean number of strategies applied by treatment and control groups was taken as a macro-level indicator of participants' strategic processing during inquiry. Total frequencies of strategic episodes for each dyad were defined as the sum of all [$(PST)^2$ + (iC^3)] codes, plus M (constructing understanding within a single text)

and Y (trustworthiness during close reading) codes. The null hypothesis was retained for within groups and between groups differences. Mean frequencies of all strategies applied at pre-test and post-test were compared with repeated measures ANOVA; assumptions of homogeneity of variance and sphericity were met. There was no statistically significant main effect of session $F(1,6) = 1.048$, $p = .345$ within groups, meaning that frequency totals for strategic processing episodes did not differ between pretest or posttest in treatment and control conditions. Likewise, the interaction of session and condition was not statistically significant $F(1,6) = .816$, $p = .401$. The type of treatment received had no statistically significant impact on the mean number of processing strategies applied during inquiry activities. Treatment participants did not use more or fewer strategies, overall, than control group participants.

Strategy-by-strategy frequencies comparisons. Although groups did not differ at pre-test or at post-test on the total number of strategies used, the next series of comparisons focused on the mean between-groups frequencies of each strategy code. A series of non-parametric Mann-Whitney U tests were conducted to compare group means because assumptions for normality and homogeneity of variance were not consistently met for all data. Nearly all null hypotheses for between group differences on individual strategies frequencies were retained; only one post-test difference was determined between groups. The frequencies distributions of control and treatment groups on the Pre-Existing Knowledge code were found to differ statistically $U=0.00$, $p = 0.029$, $Z = 2.38$, $r = .84$. This finding suggests that treatment participants discussed and then wrote down their pre-existing knowledge at posttest as they had been taught to do during the intervention but that comparison group students did not engage this strategy as often.

Strategy-by-strategy relative frequencies comparisons. For each strategy at each moment in the study, I compared mean relative frequencies as a way to explore the patterns of strategy use between groups. Relative frequencies were calculated by dividing sum frequency counts by the sum total of all strategies used at each session. This was calculated for each dyad. A mean was then taken for treatment and for control groups. Mann-Whitney U tests were used to compare distributions for all relative frequencies. Analyses of relative frequencies were identical to analyses of frequencies. Null hypotheses were retained for all post-test comparisons, except one: *Pre-existing Knowledge* episodes at Posttest $U = 0.00$, $p = .029$, $Z = 2.36$, $r = .83$ did differ between groups.

Comparisons of relative duration of strategy use. Relative duration is a measure of the proportion of time spent using a given strategy. To calculate relative duration, I used onset sequence data collected in Morae (Techsmith, 2012) for each code. The difference, in seconds, between the onsets of two sequential codes was taken as the duration of the first code. When graphed, the data reveal remarkably consistent patterns of time use. Figures 1 and 2 show that at posttest, all participants spent the most time searching and selecting texts and identifying important information in texts that they selected to read. Pretest data showed the same patterns. No statistically significant difference of mean duration for any strategic process was found between groups.

LINKS and its Impact on Trace Indicators of Integration in Persuasive Arguments [RQ2]

Trace indicators of integration in persuasive essays index. Mean values for the trace indicators of integration index (TII Index) were compared. Table 2 shows descriptive statistics for treatment and control groups for the five essays. Figure 3 shows comparisons of mean TII scores graphically.

The Shapiro-Wilks test confirmed the assumption of normality was met for all treatment distributions but not for control group essays at practice session 3 (essay 4) or at posttest (essay 5). Given these violations, non-parametric tests were used to compare between-group differences and within group change over the course of the study on the TII measure. No statistically significant between-groups results were found at any point in the study on the TII index score, including at posttest, $U = 27.5$, $Z = -.483$, $p = .645$.

Results of Friedman's ANOVA, which tests repeated-measures change **within groups**, were not statistically significant for control or treatment groups. For the control group, c^2 (4) = 4.189, $p = .381$. For the treatment condition, c^2 (4) = 7.709, $p = .103$. Given the increase in the mean TII scores seen at practice session 1, and then maintained by the treatment condition over the remainder of the study, mean differences between pre-test and practice session 1 were compared using the Wilcoxon signed-rank test. The result was not strictly significant at the alpha = .05 level, $Z = -1.895$, p = .058. However, the effect size, $r = .67$ suggested an effect worthy of consideration. A Wilcoxon signed-rank test that compared the pre-test scores with scores at practice session 2 were, in fact, statistically significant , $Z = -2.384$, $p = .017$, $r = .84$.

Analysis of discrete indicators of integration. Consistent with the scoring rubric for the ORCA-Open (Leu et al., 2012) which uses evidence of intertextuality, and integration of details from two websites in a written product, comparisons of scores on three rubric items provided a more granular view of students' integrative processing in their written arguments. Measures of (a) inclusion of information from more than one Internet text, (b) the use of corroborating information from two or more Internet texts, and (c) the use of counter-facts to the main argument that were collected from websites not used to inform the main argument were

compared for groups. Evidence of students' use of integration of background knowledge in their written arguments was also compared.

Results of a Mann-Whitney U test showed that at pretest, control and treatment groups seemed equally likely to include information from more than one Internet text in their written arguments $U = 20.00$, $Z = -1.852$, $p = .064$. The same was true at posttest $U = 28.00$, $Z = -1.00$, $p = .317$. The groups were also equally likely to include corroborating information in their written arguments from two or more Internet texts at pretest, $U = 26.00$, $Z = -.77$, $p = .441$. They were also equally likely to include corroborating facts from two or more texts at posttest $U = 20.00$, $Z = -1.852$, $p = .064$.

On their use of counter-facts to the main argument and the use of background knowledge in their written arguments, control and treatment groups were, however, found to differ at posttest. Specifically, the rubric accounted for the inclusion of counterpoints to the central argument collected from one or more sources that were *different* from the sources used to construct the central argument. This criterion was designed to tap into students' process of gathering and use of multiple perspectives from multiple texts. On this criterion at pre-test, the control condition mean rank (10.56) was statistically significantly higher than the mean rank for the treatment condition (6.44) $U = 15.5$, $Z = -2.031$, $p = .042$, with an effect size $r = .51$ meaning that the control participants were more likely to show evidence of this process in their essays at the start of the study, and that the size of that effect was large (Cohen, 1992). At posttest, however, the means were flipped. The mean rank for the treatment condition was 10.50 and for the control, it was 6.50 with $U = 16$, $Z = -1.936$, $p = .053$, $r = .48$. Although this between-groups comparison was not strictly statistically significant at the .050 level of alpha, the size of the effect at posttest was large. Moreover, a within-group pre-post Wilcoxon Signed Ranks

comparison for the treatment condition on this criterion was statistically significant $Z = -2.236$, $p = .025$, $r = .79$, suggesting that by posttest, treatment participants were able to include more counterpoints in their essays that they gathered from texts that were not also used to construct their main argument. Again, the calculated effect size was large for this pre-post difference (Cohen, 1992). In contrast, the pre-post Wilcoxon Signed Rank comparison for the control group revealed no statistically significant difference $Z = -1.265$, $p = .206$. For the control group, it therefore cannot be said that the pretest and posttest scores were sampled from different populations. Together, these data suggest that more change occurred in the treatment condition on this criterion of counterpoint use than in the control condition.

Finally, and consistent with the strategies analyses, treatment participants were also found to have integrated more evidence of background knowledge in their posttest written arguments than the control group, $U = 11.5$, $Z = -2.45$ $p = .014$ $r = .61$. At pretest on this criterion, however, the groups were found to have been sampled from the same population, $U = 28.00$, $Z = -1.00$, $p = .317$. Moreover, the Wilcoxon Signed Rank comparison for pretest vs. posttest mean ranks revealed a statistically significant within-group difference for the treatment group, $Z = -2.33$, $p = .02$, $r = .83$, suggesting that at posttest, the treatment participants, who were found to make more explicit note of their prior knowledge on the topic while reading, also included that knowledge more often in their argumentative essays. The control condition did not change on this criterion between pretest and posttest, $Z = 0.00$, $p = 1.00$.

Discussion

Based on these results, the general theme of the LINKS intervention story is one of disruptive promise rather than general, conclusive impact. LINKS nudged treatment participants toward new processes of strategic and integrative action during online inquiry and writing of

persuasive arguments in ways that were not evident for the control group. Findings suggest moderate, targeted disruption of reading and writing processes, rather than wholesale transformation. As shown in figures 1 and 2, all students applied a remarkably consistent set of strategies in remarkably similar patterns at posttest, and yet, two important signals suggest that LINKS nudged treatment participants toward more strategic, integrative action.

First, during dyadic online inquiry, treatment participants engaged more discussion of background knowledge at posttest than the control group. Evidence of students' background knowledge was also more prevalent in treatment participants' posttest arguments, perhaps because they made more explicit note of it to begin with and it was therefore more frequently evident during analysis. If discussion of background knowledge is especially supportive of understanding, as a study by Wilkinson & Son (2011) found, then LINKS may have supported activation of this particularly important multiple text integration strategy in ways that were not available to the control group students.

Secondly, at posttest, treatment participants did use information in the development of counter arguments that could be traced to a broader set of information sources than were used by the control group. Given the complexity and the importance of multiple, multimodal Internet text integration skills development, this evidence suggests that LINKS enabled treatment participants to leverage a broader set of information sources as they constructed a persuasive argument in response to an academic prompt. Given findings that many adolescents struggle to construct an integrated mental model of understanding from multiple texts (e.g., Cerdán & Vidal-Abarca, 2008; Sevensma, 2013; Wineburg, 1991) this study offers a promising point of departure for future research and for teachers searching for methods that could support development of advanced digital academic skills.

Colwell, Hunt-Barron & Reinking (2013) have argued that pedagogies which develop "ingrained, spontaneous use of strategies for locating and evaluating information on the Internet when completing academic tasks" (p. 314) are especially challenging to cultivate, and that "spontaneous transfer to more authentic tasks is the acid test that should be the measure of an intervention's success" (p. 315). For most strategies, LINKS did not pass the acid test, and yet, the observed intractability of most strategic actions does raise several important questions for future research.

First, why didn't treatment students engage more strategies known to be used by expert multiple text integrators more frequently, after receiving an intervention designed to support this? One answer could simply be that the visible, audible, spontaneous application of discrete strategic actions during online inquiry, as defined in this study, takes more time and practice for grade nine students to develop than was available to them in this study. Given that LINKS concomitantly presented treatment participants with a set of ten strategies to engage during dyadic online inquiry, it may simply have been the case that three intervention sessions were not enough to support changes in patterns or frequencies of strategy application, or at least not enough to support more significant strategic shifts than those that occurred in a group of control condition participants who practiced the tasks without the LINKS intervention. To address this question, future research of LINKS should offer students more time. On this point, the 50-minute time constraint (i.e., 30 minutes for reading, 20 minutes for writing), which is the length of many high-school class periods, might also have limited participants' strategic actions. If participants were allowed, for instance, to research a question for as long as they felt they needed, would strategic actions change? Would more comparisons to background knowledge, consideration of contrasting perspectives between and among texts occur? Would students stop to update their

understandings more often, or would they take more time to take stock of next steps? These questions are especially pertinent to the design of classroom inquiry activities and future research.

The reported findings also beg the question of why cueing background knowledge was the only strategy, explicitly taught, that transferred in any statistically significant way to treatment participants' posttest inquiry process, and also to posttest argumentative writing. McNamara and Shapiro (2005) found that the construction of a cohesive situation model from multiple linked hypertexts was dependent on the structure of the hypertext environment itself, but also on the reader's pre-existing domain knowledge. Readers with more content knowledge in McNamara and Shapiro's study were more able to construct meaning in open hypertext systems whereas readers with less content knowledge benefitted from hypertext environments that explicitly cued the relationships among texts. Measured comparisons of pre-existing knowledge were not part of this study, but LINKS did prompt treatment students to write down and talk about everything they already knew, as a dyad, about a topic before they started to search for information. This extended dialogue, before students began their online inquiry process, may have allowed students to begin their search more aware, at least, of what they did know. Whereas other strategies were engaged by students on the fly, in quick succession as they tried to build an understanding of the topic from new information sources, the dialogic construction of a common background knowledge text, even before students searched for, evaluated, or read any information may explain this statistically significant result.

Importantly, this study did not measure or compare how much students knew on each topic, the veracity of participants' background knowledge, or whether students were more or less likely to recognize flaws in their background knowledge as a result of their online inquiry

processes. Although "compare with background knowledge" was among the strategies explicitly modelled during LINKS, treatment students were not found to engage this strategy more often than their control group peers during reading and research. Future work should examine how to engage this particular strategy so that ultimately, adolescent online readers learn to critically examine their own pre-existing assumptions as they construct an integrated understanding of an academic topic. Moreover, future designs should include a measure of students' background knowledge on each of the topics so that analyses can ascertain whether pre-existing knowledge predicts choice of texts during online inquiry for an argumentative purpose, or even use of those texts in the construction of written arguments.

Results of students' use of trace indicators of integration in their written arguments have important implications for teachers. Although we might expect steady improvement in students' ability to construct an integrated understanding of topics with practice and with instruction, data for the treatment condition suggest that teachers might see a quick improvement in traces of integrative action, followed by a plateau. The control group saw no analogous bump during treatment sessions 1 and 2 in their TII index scores, suggesting that the think aloud modeling of strategies did offer treatment participants some support. For grade nine students, LINKS may be especially helpful as online inquiry and multiple text integration activities are introduced. Also, teachers can gain useful insights into students' integrative processing by asking them to explicitly cite the information sources they used to write their persuasive arguments. Treatment participants used information from a broader set of information sources to construct counter arguments in their writing at posttest, but this type of integrative trace is impossible to see if students do not take careful notes and cite information sources. Students might also benefit from

examples that show what it looks like to use multiple sources of information to construct primary and counter arguments in a persuasive essay.

Fundamentally, strategies instruction in reading comprehension, whether online or offline, is meant to help students know when, how and why to engage particular processes to meet particular reading and writing goals (Duke et al., 2012; Pearson, 2009). Certainly, the LINKS intervention was designed to scaffold precisely the skills that Azevedo & Witherspoon (2009) identify as essential for self-regulated learning, understanding, and problem solving in hypermedia contexts, namely, "planning processes such as activating prior knowledge, setting and coordinating sub-goals that pertain to accessing new information […] coordinating several informational sources, generating hypotheses, extracting relevant information from the resources, re-reading, making inferences, summarizing, and re-representing the topic based on one's emerging understanding through taking notes and drawing" (p. 321). With its protocols very closely aligned with those outlined by Azevedo & Witherspoon, LINKS may have scaffolded self-regulatory processes for treatment condition participants in ways that supported greater integrative thinking at certain moments during the study, including at posttest for two key criteria of integration. This hypothesis is speculative, of course, but future research should examine evidence of self-regulatory processing for students who have received the LINKS intervention. And, given the social-justice issue raised by studies that have revealed income-based disparities in Internet reading and participation (e.g., Hargittai & Hseih, 2013; Leu et al., 2014), future work must include children living in communities where mean household incomes are lower than national and state averages.

Limitations

Results should be interpreted cautiously because of methodological limitations. Primarily, the between-groups comparisons reported here are based on just eight dyads, a small sample size. Essay comparisons included just 16 cases, with eight participants' data in each group. Non-parametric tests were used to compare groups. Future research with more participants will be required to make stronger inferential claims about the impact of the LINKS intervention on students' multiple Internet text integration skills during online inquiry and as evidenced in written arguments.

Another limitation is the variability in timing of practice sessions. Although efforts were made to ensure all dyads participated at generally equal intervals at each phase of the study, scheduling conflicts resulted in variability that could have influenced the general impact of the intervention as well as the control experience.

Also, the intervention was delivered on a pull-out basis in students' schools rather than with full classes of students. Although a pilot study with a group of sixth-grade students suggests that instruction of $[(PST^2) + (iC)^3]$ strategies can support online inquiry (Hagerman & White, 2013) the instructional method described here has not been implemented with full classrooms of students. Future studies should involve older high school aged students as well so that in time, developmental trajectories of multiple Internet text integration processes can be constructed.

Conclusion

Given the need for methods of instruction that support students' development of online reading comprehension strategies and multiple Internet text integration skills, the LINKS intervention offers teachers a point of departure. In addition to articulating the rationale for its design, this study offers preliminary evidence of the intervention's impact on grade 9 students' ability to (a) engage a set of strategies known to be used by expert multiple text integrators

during inquiry activities in school, and (b) write persuasive arguments that demonstrate integrative thinking a measured on a range of criteria. Most significantly, at posttest and in comparison with a control group, participants who received the LINKS intervention more frequently used information in the construction of written counterpoints from websites that had not been used to construct their central arguments. Though perhaps only evidence of a *nudge* in a promising direction, it does raise important questions that can inform future research. LINKS may have provided an organizing framework that enabled treatment participants to regulate their integrative actions in ways not available to control group participants. Future investigations of students' emergent multiple Internet text integration processes should explore this hypothesis, and modify the intervention so that it is delivered over a longer period of time in diverse classroom settings, with more students, and in ways that place more explicit focus on modeling the types of integrative actions students can make in written arguments.

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Table 1

[(PST^2) + (iC)^3] Strategies and Supporting Questions

Pre-Reading	**P: Purpose** What do we have to learn about? What do we have to create with this information? **P: Pre-existing knowledge** What do we already know about this topic?
For Finding, Previewing and Evaluating	**S: Search** What search terms should we use? **S: Source selection** Which of these sources looks most promising, and why? **T: Type of Text** What type of text is this? Does this help us understand more about the information it provides before we select it? **T: Trustworthiness** How trustworthy is this source?
MOUSE CLICK/CHOICE	
During Close Reading	**I: Identify important information** What information can we use to meet our reading purpose? **C: Compare to pre-existing knowledge** How does this information compare with what we already know? **C: Connect to other texts** How does this information connect with information that we have read in other texts? **C: Continually update understanding** What does our overall understanding of the topic look like now?

What do we still need to learn, find, or figure out?

Table 2

Summary of Mean TII Scores for Control and Treatment Groups

	Control		Treatment	
	M (SD)	95% CI	M (SD)	95% CI
1 Pretest	13.13 (1.73)	[11.93, 14.32]	9.00 (4.84)	[5.65, 12.35]
2 Practice 1	12.75 (2.66)	[10.93, 14.56]	12.25 (3.81)	[9.60, 12.90]
3 Practice 2	11.12 (3.31)	[8.82, 13.41]	12.50 (3.89)	[9.81, 15.20]
4 Practice 3	12.88 (3.09)**	[10.77, 14.99]	11.12 (2.99)	[9.05, 13.20]
5 Posttest	11.00 (2.39)**	[9.34, 12.66]	11.00 (3.42)	[8.62, 13.37]

**Normality assumption violated.

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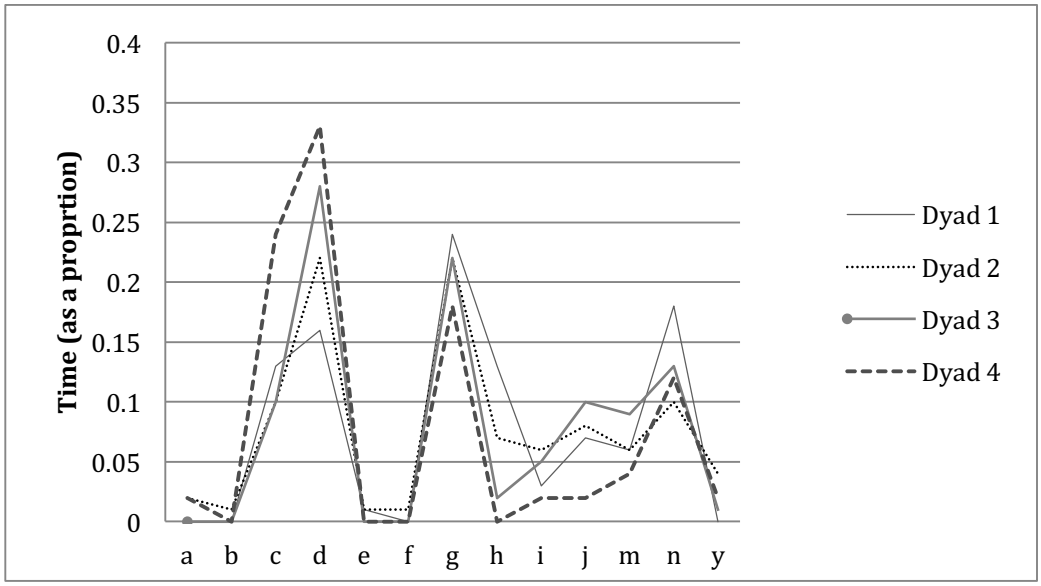

Figure 1. Control group. Posttest relative duration of strategies use. *Coding Legend* a: Purpose, b: Pre-existing Knowledge, c: Search, d: Source Selection, e: Type, f: Trustworthiness, g: Identify Important Information, h: Compare to pre-existing knowledge, i: Connect to other texts, j: Continually Update, m: Close reading of a single text, n: Notetaking, y: Evaluating trustworthiness while reading a text.

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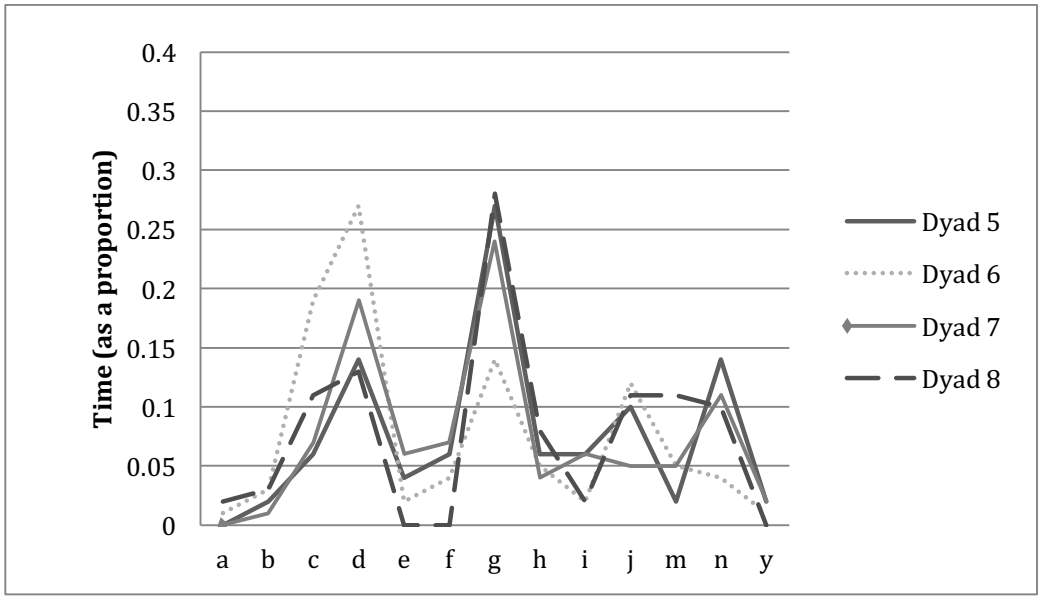

Figure 2. Treatment group. Posttest relative duration of strategies use. See Figure 1 for coding legend.

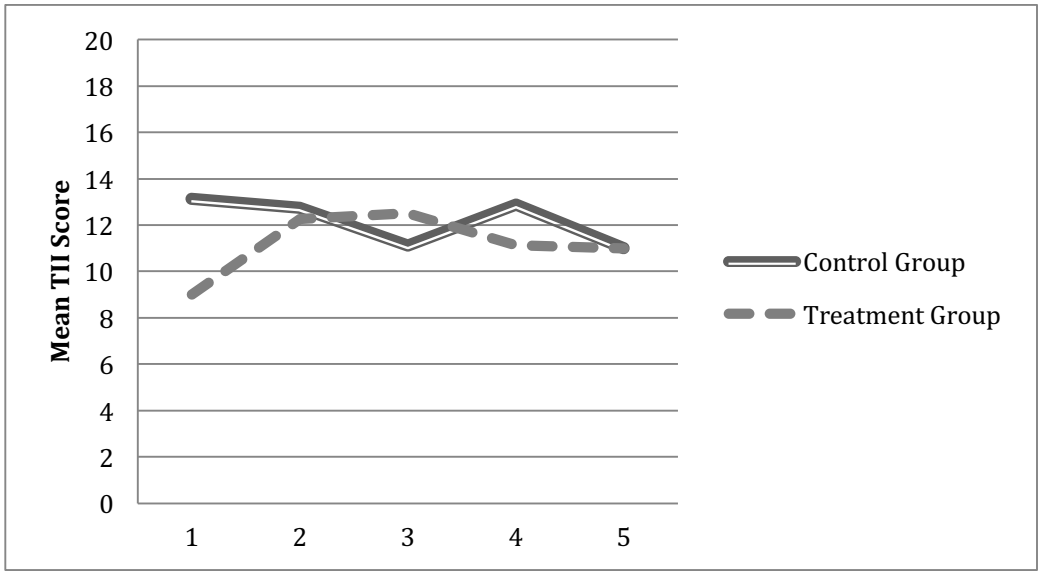

Figure 3. Mean Trace Indicators of Integration Index scores for both groups on all five essays.

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Appendix

Trace Indicators of Integrative (TII) Index Rubric

Criterion	**Score** 0 = no 1 = somewhat, or one example; meets minimum 2 = yes definitely, or more than one example; exceeds minimum	**Evidence/Justification**
Does the persuasive essay make an argument consistent with the expectations outlined in the topic prompt.		
Does the persuasive essay include information learned from more than one source?		
Does the persuasive essay include information learned from more than one medium?		
In the persuasive essay, is the central argument/position grounded in corroborating facts from two or more websites/texts?		
Does the persuasive argument include counterpoints to the central argument collected from one or more sources different from the sources used to construct the central argument?		
Does the persuasive essay integrate facts that were recorded as part of the author's bank of pre-existing knowledge?		
Does the essay provide evidence for construction of an integrated mental model of understanding: Is there evidence of integration of information across texts and/or within texts, and/or with background knowledge?		
Does the persuasive essay include linguistic markers indicative of integration (e.g., seriation, transitional phrases that connect ideas, connectives, parallel structures that show an integrated understanding)		
Does the persuasive essay include explicit reference to source information [i.e. mention of author, a reason for why we should trust this information]?		
Does the persuasive essay include a thesis/synthesis statement that communicates an integrated understanding of the topic?		