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441

Carita Kiili

# Online Reading as an Individual and Social Practice

JYVÄSKYLÄN YLIOPISTO

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## ABSTRACT

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The aim of the study was to clarify how upper secondary school students locate and evaluate information and engage in content processing when they use the Internet as a source for writing an essay either in an individual or collaborative reading situation. Another aim was to illuminate how student pairs co-construct meaning and knowledge when they read on the Internet in order to explore a controversial issue. Further, the study clarified how the construction of an argument graph promotes students' collaborative online reading. Two teaching experiments were arranged. In both experiments, the students were asked to write an essay on a given topic and search for source material for their essay on the Internet. In the first experiment, the students ($n$ = 25) worked individually and in the second experiment the students ($n$ = 76) worked in pairs. In the second experiment, the half of the students constructed an argument graph whereas half of the students took notes during online reading. Data consists of either think-aloud and interaction protocols, screen captures, and students' essays. The quantitative-based qualitative approach was applied to analyze the data.

The study found that some individual and collaborative readers had considerable difficulties in locating information. It was also found that the students more frequently evaluated the relevance of information than credibility of information in both individual and collaborative reading situation. Further, collaborative reading of online information, within an argumentative framework, seems to promote content processing that goes beyond simple gathering of facts. However, the differences in the way in which students interacted with one another were remarkable. When some students engaged in co-construction of meaning and knowledge, the other students had a stronger preference for working alone. Furthermore, the depth of content processing during online reading was related to the quality of students' essays in both individual and collaborative reading situations. Finally, it was found that the construction of an argument graph may promote students' collaborative online reading, in particular, their synthesizing processes.

Keywords: argument graph, collaborative reading, information evaluation, online reading, reading strategies, secondary school, source-based writing

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## LIST OF EMPIRICAL STUDIES

Sub-study I
Kiili, C., Laurinen, L., & Marttunen, M. (2008). Students evaluating Internet sources: From versatile evaluators to uncritical readers. *Journal of Educational Computing Research, 39*(1), 75–95.

Sub-study II
Kiili, C., Laurinen, L., & Marttunen, M. (2009). Skillful Internet reader is metacognitively competent. In L. T. W. Hin & R. Subramaniam (Eds.), *Handbook of Research on New Media Literacy at the K-12 Level: Issues and Challenges* (pp. 654–668). Hershey, PA: IGI Global.

Sub-study III
Kiili, C., Laurinen, L., Marttunen, M., & Leu, D. J. (in press). Working on understanding during collaborative online reading. *Journal of Literacy Research.*

Sub-study IV
Kiili, C. (in press). Argument graph as a tool for promoting collaborative online reading. *Journal of Computer Assisted Learning.*

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# 1 INTRODUCTION

Literacy defines us as humans. Literacy also defines our intellectual and economic well-being, both as individuals and as nations. These basic truths become even more important as nations shift from a material-intensive to meaning-intensive societies (Wilenius, 2011). In the meaning-intensive society the significance of culture, creativity, and human capital are pronounced. The other important shift is the shift from individual to collective awareness (Wilenius, 2011). Nowadays, people are almost every day updating their knowledge in various local and global networks. Although they respond individually to the ideas presented through networks, they are aware of and deeply involved in collective communities through which knowledge evolves.

The rapid proliferation of the Internet makes both of these shifts possible. Actually, the Internet and new mobile devices have already made our lives more meaning-intensive as they offer almost a constant access to huge amount of information. The Internet makes it possible to share culture, ideas, and creative processes with ease. Since the Internet enables both almost immediate communication between people and their active participation in society, people's collective awareness increases.

In order to fully profit from the benefits of the Internet, new literacies and new social practices are required. Internet users need abilities to find and recognize relevant sources, evaluate them critically, synthesize information from multiple sources, and to communicate it (Leu, Kinzer, Coiro, & Cammack, 2004). In order to learn in different kinds of learning communities, people also need multicultural understanding, willingness to explore different perspectives, and abilities to engage in dialogic interaction.

In addition to the Internet, the other important factor, that is needed to advance the realisation of the aforementioned shifts, is education. Schools are responsible for educating literate citizens. Literacy practices that are more social, digitally constructed, problem-centred, and critical serve the achievement of this goal. Unfortunately, current research indicates that most educational Web-based practices are still cursory and fact-based (Kuiper, Volman, & Terwel, 2005). In future, literacy instructions should not only pay attention to proper

comprehension of texts but also encourage students to create knowledge and solve problems through engaging in reading multiple information sources.

As previous research has mainly focused on individual online reading, independent of social context, it is essential that now we begin to look collaborative online reading as a social practice, activity that advances learning**.** Deeper understanding of collaborative reading processes that aim at co-construction of knowledge provides possibilities to develop pedagogical practices. The present study explores upper secondary students' online reading both as an individual and social practice. It seeks to answer the question how students locate, evaluate, and synthesize information when they read on the Internet both individually or collaboratively. Furthermore, the study investigates students' meaning and knowledge construction patterns in a collaborative reading situation, where online information is searched for exploring different viewpoints of a controversial issue. As such, the present study may provide preliminary direction into methods, analyses, and results that can inform the study of more socially and digitally constructed reading practices.

# 2 AIMS OF THE STUDY

The aim of the present study was to examine the nature of online reading both in an individual and social reading situation. Furthermore, the study aimed at designing learning arrangements to promote collaborative online reading.

The aims of the study were the following:

1) to increase our knowledge of online reading as an individual (Sub-studies I and II) and social practice (Sub-studies III and IV),
2) to clarify how students co-construct meaning and knowledge when they read collaboratively online (Sub-study III),
3) to develop methods for analysing collaborative online reading (Sub-study III), and
4) to develop teaching methods to support students' collaborative online reading (Sub-study IV)

The present study clarified how upper-secondary school students read online when they use the Internet as a source for an essay either in an individual (Sub-studies I and II) or in a collaborative reading situation (Sub-studies III and IV). Sub-study I concentrated on investigating how students evaluate information when they read online. Sub-study II investigated how students locate, evaluate and process information, and how they monitor and regulate these processing practices. The study also aimed at explicating interrelations between these different processing practices. Furthermore, the second sub-study clarified associations between different processing practices and the quality of the students' essays.

Sub-study III illuminated student pairs' processing practices during collaborative online reading with the focus on students' co-construction of meaning and knowledge. In addition, Sub-study III searched for new methodological approaches for studying collaborative online reading. Finally, Sub-study IV clarified how construction of an argument graph promotes students' collaborative online reading.

# 3 THEORETICAL FRAMEWORKS

In this study, I draw upon three theoretical frameworks: constructivist, social constructivist, and online reading comprehension theory. Online reading as an individual practice (Sub-studies I and II) was approached through constructivist theory whereas exploring online reading as a social practice emphasized the social aspect of constructivist theory (Sub-studies III and IV). Online reading comprehension theory was applied throughout the study (Sub-studies I–IV) to inform my understanding of the elements of online reading specific to reading when using the Internet.

## 3.1 Constructivist and social constructivist theory

Although there is no single form of constructivism (Philips, 1995), underlying premise of learning as an active process is commonly shared among educational researchers (Mayer, 2004). Since the present study explored online reading as an individual and social practice, the most important distinction within different views of constructivism, is the distinction between individual and social views of constructivism. The individual view of constructivism emphasizes how an individual learner constructs knowledge by the aid of his or her cognitive apparatus (Philips, 1995). On the contrary, social constructivism accentuates the situated nature of learning within social and cultural settings (Smith, 1999; Vygotsky, 1986). Social constructivists see knowledge as a social product and knowledge construction as a shared rather than an individual experience (Prawat & Floden, 1994). In reading research, the individual view of constructivism approaches reading as an individual strategic process whereas the social constructivist view emphasizes reading as a social practice and co-construction of meaning (see Chapter 4).

The distinction between individual and social constructivism can also be considered through the perspective that a researcher adopts in a research situation (Smith, 1999). According to Smith (1999), an individual constructivist ob-

serves an individual learner and tries to make inferences what is happening in the learners' mind. In the present study, I used *think-aloud method* in order to gain access to on-line processing of an individual reader (Sub-studies I and II). Smith (1999) continues that the social constructivist view places a researcher within a social setting observing an individual as a social participant. The researcher concentrates on observing social interaction among the learners. This was the case in Sub-studies (III and IV) in which I used the *interaction method* for observing student pairs' online reading. In Sub-study III, I particularly concentrated on observing students' interaction patterns.

Doolittle and Hicks (2003) have presented six theoretical principles of constructivism that they base on philosophical tenets of constructivism. These principles appeared in the present study and affected the choices when teaching experiments were designed. According to the first principle, the construction of meaning and knowledge are individually and socially active processes (Doolittle & Hicks, 2003). Learners construct coherent and organized knowledge (Mayer, 2004) through individual processes, such as abstraction or reflection, or through social processes, such as negotiation (Doolittle & Hicks, 2003). In the present study, reading as both an individual and social practice, are grounded in this principle. Individually, skilled readers actively construct meaning through interacting and responding to the texts by applying various reading strategies, such as determining important ideas, inferencing, applying one's prior knowledge, and abstracting ideas (Coiro, Castek, & Guzniczak, 2011; Dole, Duffy, Roehler, & Pearson, 1991; Pressley & Afflerbach, 1995). A social reading situation brings along additional elements to their meaning construction as the readers can negotiate interpretations of the texts and build on each others' ideas. These features of the social reading situation are in accordance with the social constructivist theory which frames construction of meaning as a social activity in which the meaning construction evolves through negotiation (Palincsar, 1998; Prawat & Floden, 1994).

With the second principle, Doolittle and Hicks (2003) emphasize that construction of knowledge involves social mediation within cultural contexts. This means that the individual, the social, and the contextual factors are all indistinguishably linked. Accordingly, the most comprehensive review of research in reading comprehension (RAND Reading Study Group, 2002) emphasizes that reading is a process of constructing meaning through dynamic interaction among the readers, the text, and the activity in a socio-cultural context. Thus, although each individual constructs his or her own knowledge it is done in the contexts of activities carried out in conjunction with others (Wells, 2002).

The third principle states that knowledge construction is fostered by authentic and real-world environments. These environments are naturally-occuring and characterized by richness of culture and complexity of communication (Doolittle & Hicks, 2003). The Internet, the learning environment used in the present study, is an environment of this kind. The richness and complexity on the Internet emerge as the Internet includes a huge amount of information presented in multimodal forms. Some scholars argue (Kress, 2003; Säljö, 2010)

that the multimodality of information inevitably changes the meaning making practices when readers need to interpret texts in which written language, images, sounds, and videos are interacting.

The fourth principle presented by Dootlittle ja Hicks (2003) is that construction of knowledge takes place within the framework of the learner's prior knowledge and experience. Learners use their prior knowledge and interpretations of past experiences to make sense of what is new (Mayer, 2004; Wells, 2002). The importance of prior knowledge is widely acknowledged by reading researchers (Dole, Duffy, Roehler, & Pearson, 1991; Kintsch, 1988). Readers' prior knowledge facilitates and enhances text comprehension, especially, when they read expository texts for learning (Ozuru, Dempsey, & McNamara, 2009; Tarchi, 2010). In the present study, I took students' prior knowledge into account in two ways. First, the students were expected to have both experience and prior knowledge on the topics of the tasks. The topics were also supposed to have relevance to the students' lives which, in turn, promotes both active engagement with texts and students' discussions (Sub-studies III and IV). Second, in Sub-studies III and IV student pairs were asked to activate their prior knowledge by discussing the topic at hand with their partner before they started to read collaboratively online. This was thought to enhance students' awareness of each others' knowledge (Engelmann, Dehler, Bodemer, & Buder, 2009) and form a solid ground to their joint reading.

The fifth principle suggests that knowledge construction is integrated more deeply by engaging in multiple perspectives and representations of content, skills, and social realms (Doolittle & Hicks, 2003). Multiple modes of information and multiple controversial or completive perspectives provide students with opportunities for learning. In the present study (Sub-studies III and IV), students were asked to consider a controversial topic from various aspects by exploring different viewpoints on the Internet and discussing them. Furthermore, students were asked to visualize these different points of views with an argument graph tool. The representational tools, such as an argument graph, provide readers with means to represent their emerging knowledge (Suthers, 2001; 2003) in a collaborative reading situation.

The sixth and the last principle emphasizes that knowledge construction is fostered by students becoming self-regulated, self-mediated, and self-aware. These abilities are highly important in offline reading comprehension (Pressley & Afflerbach, 1995; Baker, 2008) and they may become even more pronounced when students read collaboratively in complex information environments, such as the Internet (Coiro & Dobler, 2007; Quintana, Zhang, & Krajcik, 2005) or in social reading situation. Sub-study II, in particular, concentrated on students' monitoring and regulating activities during online reading.

## 3.2 Online reading comprehension theory

Online reading comprehension theory is related to a broader theory concerning New Literacies (Leu, Kinzer, Coiro, & Cammack, 2004; Coiro, Knobel, Lankshear, & Leu, 2008). According to Coiro et al. (2008), new information and communication technologies require new literacies, i.e. skills, strategies, and social practices. New literacies change along with their defining technologies. Further, new literacies are multifaceted, benefiting from multiple points of view As social media enables new ways to communicate, new literacies are central to full participation in the global community.

Online reading comprehension theory (Leu et al., 2004) defines reading on the Internet as a process of problem-based inquiry involving additional skills, strategies, dispositions, and social practices that are important as people use the Internet to solve problems and answer questions. At least five processing practices occur during online reading comprehension: 1) reading to identify important questions, 2) reading to locate information, 3) reading to evaluate information critically, 4) reading to synthesize information, and 5) reading and writing to communicate information.

As online reading is characterized as a problem-based inquiry it is usually motivated by a *question* to answer or a problem to solve (Leu et al., 2004; Leu, Coiro, Castek, Hartman, Henry, & Reinking, 2008, p. 323). Defining one's information problem (see Brand-Gruwel, Wopereis, & Vermetten, 2005) works as a base for other processing practices of online reading.

In order to be able to solve information problems, people need abilities to *locate* information. Henry (2006) describes the ability to locate information on the Internet as a gatekeeper skill, because inability to locate information may mean that students do not find relevant information for their learning. In other words, abilities to locate relevant sources provide students with opportunities to concentrate on reading for understanding (Cho, 2011, pp. 66–67). Locating relevant information from the vast amount of information that the Internet provides requires skills to employ adequate search queries (Guinee, Eagleton, & Hall, 2003; Walraven, Brand-Gruwel, & Boshuizen, 2008) by translating information need into relevant search terms and combining these search terms to construct an appropriate query (Van Merriënboer & Kirschner, 2007, pp. 15–16). Students need also strategies, such as revising keywords, for recovering unsuccessful search attempts (Guinee, Eagleton, & Hall, 2003). Furthermore, locating relevant information requires skills to analyze search engine results (Henry, 2006) and to scan efficiently for relevant information within the Web sites (Cromley & Azevedo, 2009; Rouet, 2006). Findings from several studies indicate that some students across different age levels have difficulties in specifying appropriate search terms (Bilal & Kirby, 2002; Sormunen & Pennanen, 2004; Walraven, Brand-Gruwel, & Boshuizen, 2008) or they lack of abilities to plan and reflect their search activities (Fidel et al., 1999; Wallace, Kupperman, Krajcik, & Soloway, 2000).

In addition to the ability to locate relevant information, the ability to *evaluate information critically* is in a key position in successful online reading. Students, who are used to trust almost unquestionably the information presented in their textbooks, are challenged with the varying quality of information on the Internet (Bråten & Strømsø, 2006). When students read on the Internet they should ask questions, such as "Is this what I need?" and "Can I trust this?". This kind of questioning leads them to evaluate the relevance and credibility of information (Jonassen, Howland, Moore, & Marra, 2003; Judd, Farrow, & Tims, 2006). Relevance refers to how well information on a Web page meets the information needs of a reader (Maglaughlin & Sonnenwald, 2002; Saracevic, 1996) and credibility refers to trustworthiness (truthful, un-biased) and expertise (knowledgeable, competent) of the source (Fogg et al., 2001).

Evaluation can occur during online reading when readers evaluate either search results, a single Web page, or a collection of Web pages (Gerjets, Kammerer, & Werner, 2011). Evaluation of search results is predictive in nature (Rieh, 2000; 2002) as it is based on readers' expectations of a Web page and sparse information that link titles, short example texts, publishing type (blog, discussion forum, article) or URL-address provide (Cho, 2011; Gerjets, Kammerer, & Werner, 2011; MaKinster, Beghetto, & Plucker, 2002). As these predictive evaluations are done during reading search results they are closely related to processing practices of locating of information. After opening a Web page confirmatory evaluations can be done by judging the value of information within a Web page (Cho, 2011). At this point, a reader can evaluate claims and supporting evidence (Bos, 2000; Brem, Russell, & Weems, 2001), author, possible bias of information (Bos, 2000) and, in general, whether the information on the Web page satisfies one's information need. Finally, a reader can evaluate the collection of Web pages by comparing and contrasting information found from different sources (Gerjets, Kammerer, & Werner, 2011). Evaluating ideas originated from different sources is an important part of the information verification process (Eagleton & Dobler 2007, p. 200).

Critical evaluation of sources has been found to be related to successful learning from Internet-based inquiry (Wiley, Goldman, Graesser, Sanchez, Ash, & Hemmerich, 2009). Unfortunately, critical evaluation of information during online reading has found to be challenging for many students at different age levels (Connor-Greene & Greene, 2002; Grimes & Boening, 2001; Leu et al., 2008, Lorenzen, 2001; Walrawen, Brand-Gruwel, & Boshuizen, 2009).

Successful online reading also requires that readers *synthesize* information within and across different sources (Cho, 2011). Students need skills to construct a coherent representation by comparing and integrating information gathered from various sources (Le Bigot & Rouet, 2007; Strømsø, Bråten, & Samuelstuen, 2008; Wiley et al., 2009). Students have to consider how different parts of a single text or the content of different texts inform or contradict one another (Cho, 2011; Castek & Coiro, 2010). In addition, when reading on the Web students need flexibility to be able to shift between multiple modes of information (Coiro, 2003; Rouet, 2006) and between different text structures and

text genres (Eagleton & Dobler, 2007). Previous research suggests that reading across multiple sources may foster deeper understanding than reading information from a single source (Jacobson & Spiro, 1995; Wiley & Voss, 1999) as it requires that students make an effort to establish and explain connections within and across texts (Wolfe & Goldman, 2005). However, since Internet provides huge amounts of information with differing quality, synthesizing information from multiple sources may be challenging for many students (Rouet, 2006; Stahl, Hynd, Britton, McNish, & Bosquet, 1996). Some students might even prefer a strategy that aims at finding all needed information from a single Web page (Quintana, Zhang, & Krajcik, 2005; Wu & Tsai, 2005).

The last aforementioned practice of online reading comprehension is *communicating* information. Since the Internet offers a wide range of online tools to seek and share ideas, communicating is an indistinguishable part of online reading (Leu, McVerry, O´Byrne, Kiili, Zawilinski, & Everett-Cacopardo, 2011). When students communicate the ideas that they have read on the Internet by writing to each other, they may combine these ideas with their prior knowledge. It has been found that reading in combination with writing fosters deeper understanding of textual information when compared to situations where people only either read or write (Greene & Ackerman, 1995).

# 4 READING AS AN INDIVIDUAL AND SOCIAL PRACTICE

In this chapter, reading is considered from three different angels: 1) The model of constructively responsive reading is introduced. It approaches reading as an individual strategic process. 2) Reading as a social practice focus on the role of discussion and negotiation during collaborative reading. 3) Argumentative reading approach combines both cognitive and social perspectives.

## 4.1 Constructively responsive reading

Constructively responsive reading is an active and strategic process during which a reader deliberately and consciously applies reading strategies in order to construct meaning from the text (Afflerbach, Pearson, & Paris, 2008; Pressley & Afflerbach, 1995; Pressley & Gaskins, 2006). In their review of 38 studies involving protocol analysis, Pressley and Afflerbach (1995) found that reading strategies of accomplished readers clustered around three general types of strategies: identifying and learning text content, monitoring the act of reading, and evaluating different aspects of reading. All these general types of strategies can be applied before, during and after reading.

According to Pressley and Afflerbach (1995), readers seek overall meaning from the text by identifying important ideas from the text, looking for information relevant to their reading goals, making inferences and relating text content to one's prior knowledge. Throughout reading good readers monitor their understanding and progress toward their reading goal in such a way that they are aware of difficulties either in their understanding or temporary lacks of their concentration (Pressley & Afflerbach, 1995; Pressley & Gaskins, 2006). Awareness of difficulties in understanding or concentrating triggers a reader to regulate his or her cognitive processes (Efklides, 2006; Flavell, 1979).

The third aforementioned reading strategy was evaluating different aspects of reading. A reader can evaluate an author, a text itself, the purpose of

the text or whether the text is appropriate for the intended audience. Evaluation of an author can focus on the authors' credibility, rhetorical style, or argumentation; evaluation of a text can include vocabulary choices, currency, accuracy, and quality of writing (Pressley & Afflerbach, 1995).

To summarize, the model of constructively responsive reading emphasizes that construction of meaning is situated in relation to individual readers and their goals of reading (Afflerbach & Cho, 2010). This means that readers respond to texts differently depending on the purpose of their reading (Pressley & Afflerbach, 1995, Zhang & Duke, 2008). A skilled reader knows reading strategies and is able to select when and where to use them (Baker & Brown, 1984; Garner, 1987; Pressley & Gaskins, 2006).

All studies, except one, reviewed by Pressley and Afflerbach (1995) concentrated mostly on reading of a single, printed text. Because of the recent change in literacy environment, Afflerbach and Cho (2009) decided to review studies concerning multiple text reading (14 studies) and Internet or hypertext reading (32 studies) in order to describe the strategies that are required in new literacy contexts. They found that readers use similar strategies for seeking overall meaning, monitoring and evaluating different aspects of reading on the Internet than when reading a single, printed text. However, they also found strategies that are unique to hypertext and Internet reading. Afflerbach and Cho call these new ways of responding to texts as strategies for "realizing and constructing potential texts to read" (Afflerbach & Cho, 2009, 2010; Cho, 2011). With this cluster of strategies they refer to activities such as searching for relevant Web sites, predicting the utility of a link within Internet text, and choosing and sequencing the reading order. On the Internet, the texts are not given to the reader but he or she has to indentify the potential texts and one's reading path on the Web. It is very unlikely that two readers manage to choose the identical reading path. Due to the idiosyncrasy of reading paths, Coiro and Dobler (2007) have named Internet reading as a self-directed text construction.

According to Leu, Zawilinski, Castek, Banerjee, Housand, Liu and O´Neil (2007), reading online is not isomorphic with offline reading and additional reading strategies are needed. This was verified by Coiro and Dobler (2007) when they observed how skilled sixth-graders read on the Internet. They found that in addition to more conventional reading strategies, skilled readers used additional sources of prior knowledge, forward inferential reasoning, and self-regulation strategies unique to online reading. First, in order locate relevant information effectively on the Internet readers used their prior knowledge on search engines and informational Web-site structures. Second, they made predictive inferences that informed construction of their reading path. These aforementioned complexities of online reading also set new demands on monitoring and regulating one's reading processes. Monitoring and regulating are particularly important activities when dealing with multiple documents on the Internet (Stadtler & Bromme, 2007). Inadequate monitoring and regulation strategies may cause problems, such as poor time allocation between search

tasks and other online reading activities or getting distracted or lost during online reading (Quintana, Zhang, & Krajcik, 2005).

## 4.2 Collaborative reading

Compared to individual reading, collaborative reading has two distinctive features. Analogously with Suthers (2006, pp. 317–318), who has studied collaborative learning, these features are as follows: Collaboratively reading is a socially contextualized form of reading because it takes place with at least one other person. The second feature is text-based discussions through which meaning and knowledge are jointly constructed.

There are at least two forms of collaborative reading where discussion has a slightly different role. First, reading and discussion can be successive processes. This means that the readers first read the same text individually and make separate interpretations of the text, after which they discuss their interpretations. Thus, discussion is based on the representations and interpretations that individuals have already made by themselves of the text. Second, reading and discussion can be interwoven. In this case, readers attend to the same text simultaneously, which offers them opportunities to make joint interpretations of the text through discussing the text content together.

The former collaborative reading situation, in which discussions are preceded by silent reading, is based on representations and interpretations individuals have already made by themselves of the texts. Disagreement on the interpretations of the most essential ideas can stimulate productive, argumentative discussions. When interpretations of the texts are shaped through discussions that take place during reading, the readers can consider ideas, clarify misconceptions, and grasp subtleties implied in the text (Heisey & Kucan, 2010) immediately when they emerge.

Whether discussions take place during reading or are followed by silent reading, it is the talking that makes the collaborative reading situation particularly potential for learning (Teasley, 1995). Dillenbourg and Schneider (1995) have mentioned several learning mechanisms that can explain this. I have selected five mechanisms that I assume to be the most relevant for the present study. These are internalization, disagreement, alternative perspectives, explanations, and mutual regulation.

Learning usually occurs through *internalization.* Internalization, a concept presented by Vygotsky (1986), means that knowledge conveyed by interaction with a more able person can progressively be integrated into one's own knowledge structures. For example, in a collaborative reading situation a student can learn new productive reading strategies by observing how his or her partner applies certain strategies. The effectiveness of several collaborative instructional methods of reading, such as Collaborative Strategic Reading (Klinger & Vaughn, 1999), Collaborative Strategy Instruction (Andersson & Roit,

1993), Reciprocal Teaching (Palincsar & Brown, 1984) and Internet Reciprocal Teaching (Leu, Coiro, Castek, Hartman, Henry, & Reinking, 2008) rely on this learning mechanism. The aim of these methods is to teach students how to use effective reading strategies, such as anticipation or summarizing, through interaction with peers and a teacher.

The study conducted by Coiro, Castek, and Guzniczak (2011) illustrates nicely how students can internalize new ways of meaning making when they read together. Coiro and her colleagues compared the strategy use of two skilled adolescent readers who first read individually and then, collaboratively on the online environment. Different patterns of strategy use emerged among students when individual and paired reading were compared. The study showed that also skilled readers can develop their strategic repertoire through experiencing reading in a social situation.

When students attempt to reach mutual understanding about the content of the text, *disagreements* about interpretations may evoke argumentative discussions among them. Previous research has shown that engagement in argumentative discussions is particularly beneficial for learning (Marttunen & Laurinen, 2007; Mercer & Littleton, 2007). A collaborative reading situation offers also opportunities for students to discuss *alternative perspectives* (Reznitskaya, Anderson, Dong, Li, Kim, & Kim, 2008). Kucan and Beck (2003) found that students who engaged with a text in small-groups by discussing their emerging understanding and ideas during reading proposed considerably more alternatives than students who read individually.

In order to understand each other, students provide explanations to their partners by making their thinking explicit. This may have a positive effect on learning of both the explainer and the listener (Dillenbourg, 1999; Dillenbourg & Schneider, 1995). Chi, de Leeuw, Chiu, and LaVancher (1994) found that even explaining what one understands during an individual reading situation promoted deeper understanding of an expository text and learning.

Dillenbourg and Schneider (1995) point out that when students accomplish a joint task they have to justify their decisions by making their otherwise implicit strategic knowledge explicit. These discussions provide students with opportunities to *mutually regulate* their activities. Students can also share their metacognitive experiences that may trigger regulatory activities (Efklides, 2006; Flavell, 1979). For example, during mathematical problem solving student pairs may correct an erroneous strategy or to create a needed situational model (Iiskala, Vauras, Lehtinen, & Salonen, 2011). It has also been found that collaboration yields higher instances of planning, monitoring, and evaluating of search behavior during online reading compared to individual work (Lazonder, 2005).

Although collaborative reading offers opportunities for productive interaction, there are several factors, such as difficulties in group dynamics (Kreijns, Kirschner, & Jochems, 2003), inabilities or unwillingness to engage in counter-argumentative discussion (Salminen, Marttunen, & Laurinen, in press) and task features (Dillebourg & Schneider, 1995), that may hinder students' learning.

According to Chan, Burtis, Scardamalia, and Bereiter (1992) learning from texts goes beyond comprehension of presented information involving active construction of new knowledge. They found that constructive activity during reading had a significant direct effect on learning while prior knowledge indirectly affected learning through the mediation of constructive activity. Accordingly, Volet, Summers, and Thurman (2009) argue that when reading concentrates on gathering facts from the text it may not produce more than raw material from which knowledge may be constructed. Putting it another way, in order to construct new knowledge epistemic mode of engagement with texts is necessary as it encourages students to critical and constructive thinking (Wells, 1990). With epistemic mode of engagement with text, Wells (1990, p. 369) means that "meaning is treated as tentative, provisional, and open to alternative interpretations and revisions". Wells continues that it is unfortunate that a common mode of engagement with the texts in classrooms is informational. This means that focus is more on accuracy of comprehension and on retention of mere factual knowledge than on constructing new knowledge on the basis of students' readings.

Although the literacy practices that concentrate on informational mode of engagement with texts might still be prevailing in many classrooms, knowledge construction can be made intentional through instructional interventions that promote students to think about texts in such a way that they transform material in some manner (King, 1994). Examples of task that promote students' construction of knowledge when reading and thinking about texts together are asking students to solve problems, to construct explanations, or to decide a course of actions (Wells, 2007). Furthermore, knowledge construction can be supported with technology and multiple channels of communication (Verhoeven & Graesser, 2008) because students have to combine different representation modes of information.

## 4.3 Argumentative reading

Reading is a goal-directed activity and the purpose of reading affects the way in which a reader interacts with a text (McCrudden & Schraw, 2007). When readers are given different instructions for their reading they probably construct different mental representations of the same text. By given an argumentative task instructions, students are asked to approach a single text or multiple texts through argumentative lenses. The purpose of argumentative reading is to identify claims and supportive evidence and to evaluate warrants that link claims and evidence (Chambliss, 1995; Newell, Beach, Smith, & VanDerHeide, 2011). By doing this a reader can evaluate credibility of authors' argumentation, weigh different points of views, and reach a deeper understanding of controversial issues or ill-structured problems (Morocco, Aguilar, & Bershad, 2006; Schmoker, 2006, p. 66).

However, recent research has shown that both secondary school students and university students have difficulties in identifying and evaluating arguments (Bos, 2000; Brem, Russell, & Weems, 2001; Larson, Britt, & Larson, 2004; Marttunen, Laurinen, Litosseliti, & Lund, 2005). Larson et al. (2004) found that university students' ($n$ = 76) were able to identify correctly only 30% of the main argument elements from authentic argumentative texts. The errors that students made concerned incorrect identification of either a general statement or a question or counter-argument as a claim. One reason for these difficulties might be that students are not that used to genre-specific organizing structure of argumentative texts since it differs from the structures of more common narrative and expository texts (Britt & Larson, 2003).

Argumentative reading should not only been understood as a cognitive process but also as a social practice. According to Newell et al. (2011), the cognitive perspective on argumentative reading concentrates on evaluating students' abilities to identify and evaluate arguments; while the social perspective emphasize the situated nature of literacy practices. According to social perspective, students acquire context-specific argumentative literacy practices through engaging in dialogic interactions. Schwarz (2003) argues that engaging in collaborative reading of multiple texts with different perspectives should lead to knowledge construction and enhance learning. By definition of collaborative reading, students' engagement in interaction and negotiations for their understanding are crucial. This kind of productive interaction may be supported by argumentative task assignments (Wiley & Bailey, 2006).

Cognitive and social perspectives are alternative but also complementary (Newell et al., 2011). In this study (Sub-studies III and IV) both of these perspectives were present. From the cognitive point of view, students were asked to identify arguments both for and against the issue at hand. The social perspective actualized when students were asked to explore the issue collaboratively in order to write a joint argumentative essay. In addition to incorporating both the cognitive and social aspects of argumentative reading, argumentative reading and writing activities were also combined.

Both argumentative reading and writing can be supported by visualizing contradictory arguments and their relations. In the present study (Sub-study IV), students visualized argumentative relations with the help of an argument graph. The argument graph may help students to make their thinking visible on the basis of their prior knowledge, texts they are reading, and their discussions. Examples of the cognitive aids of argument graphs are related to monitoring progress in the task (Cox, 1999) and identifying the relations between arguments (Suthers, 2001). To name a few advantages of graphs at the social plane, argument graphs stimulate productive interaction (Suthers & Hundhausen, 2003) and make students to be aware of each other's emerging knowledge (Engelman et al., 2009).

# 5 RESEARCH QUESTIONS

The present study addressed the following main research questions. These questions are not literally identical with the questions in the articles but combined thematically into a coherent whole.

1) How did students engage in online reading processing practices when they search for source material for an essay on the Internet?
    a. How different online reading processing practices were interrelated? (Sub-study II)
    b. How did students evaluate the credibility and relevance of information on the Internet? (Sub-study I)
    c. How did student pairs engage in online reading processing practices when they read on the Internet in order to explore a controversial issue? (Sub-study III)
    d. How did student pairs co-construct meaning and knowledge when they read online in order to explore a controversial issue? (Sub-study III)
2) How did students, who varied in their online reading, perform on an essay writing task?
    a. How students' engagement in different online reading processing practices was associated with the quality of their essays? (Sub-study II)
    b. How did student pairs, who used different collaborative reading patterns to co-construct meaning and knowledge, perform on an essay writing task? (Sub-study III)
3) How did the construction of an argument graph promote students' collaborative online reading and source-based writing? (Sub-study IV)
    a. How did the student pairs in the argument graph and note-taking groups a) engage in online reading practices and b) what kinds of collaborative reading strategies did they share in order to explore a controversial issue?
    b. How did the student pairs in the argument graph and note-taking groups synthesize ideas in their essays?

# 6 METHODS

## 6.1 Teaching experiments and subjects

Two teaching experiments, both conducted in Finnish upper secondary schools, were arranged (Table 1). In the first experiment, data was collected for Sub-studies I and II. The second teaching experiment was arranged for collecting data for Sub-studies III and IV.

TABLE 1 Teaching experiments and the subjects of the study

| Teaching experiment | Subjects | Working mode |
|---|---|---|
| Teaching experiment I (Sub-studies I and II) | 25 upper secondary school students<br>n = 25 (Sub-study I)<br>n = 24 (Sub-study II) | Students worked individually |
| Teaching experiment II (Sub-studies III and IV) | 76 upper secondary school students<br>n = 38 (Sub-study III)<br>n = 76 (Sub-study IV) | Students worked in pairs |

The first teaching experiment aimed at clarifying online reading in an individual reading situation. It was conducted in the spring term 2006. The subjects were 25 students (14 females, 11 males), from 16 to 17 years of age, who attended the same school. These 25 students were the subjects of both Sub-studies I and II. One student was excluded of the analysis in the Sub-study II.

The second teaching experiment aimed at exploring online reading in a social reading situation. It was conducted in autumn term 2008. Students, 76 in total (aged from 16 to 18 years; 47 females, 29 males) participated in the study. Half of the students were the subjects of Sub-study III and all 76 students were the subjects of Sub-study IV.

## 6.2 Tasks and research design

Both of the teaching experiments were integrated into the courses on Finnish Language and Literature. The first experiment was integrated into the course where process-writing (Flower & Hayes, 1981) was taught and the second experiment was integrated into the course called "Text and Influence" (see Finnish National Board of Education, 2003, pp. 37–38). In both cases, the students who did not participate in the study were given a compensatory task that they did at home.

In the both teaching experiments, the students were asked to write an essay on a given topic. In the first experiment, the students were asked to write individually an essay on a topic "Sleeping as a human resource" (literally translated from Finnish). In the second experiment, the students' task was to write a joint argumentative essay on the issue "Should Internet censorship be tightened?" and consider the topic from different perspectives in their essays. These topics were chosen because it was thought that all students had at least some prior knowledge on them. Both topics had also relevance to the students' lives. Sleeping is an issue of daily life and the Internet censorship may affect students' own Internet use. Particularly, in argumentative tasks "debatability" of the topic has been found to have an important role in students' engagement in active, argumentative discussions (Salminen, Marttunen, & Laurinen, in press; Udell, 2007; Zohar & Nemet, 2002).

It has been found that if students are asked to express their opinion on a controversial issue prior to reading (Schwarz, 2003) or if they are given a certain perspective (against, neutral, for) in advance (Cerdán, Marín & Vidal-Abarca, 2011) students concentrate on reading only those sources or parts of the sources that support their own opinion or the perspective given to them. This kind of confirmation bias was probably avoided by asking students to explore multiple perspectives instead of asking them to take a stance.

In the first teaching experiment, the researcher met each student individually. The session lasted approximately 1 hour 45 minutes. In the beginning of the session each student filled in a short background questionnaire about their Internet use (for Sub-study I). Next, she or he searched for and read source material on the Internet for 40 minutes for their essay. Finally, 45 minutes were given to the students to write an essay.

In the second teaching experiment, the students worked in pairs. They were allowed to choose their partner freely so that they would feel comfortable in sharing their ideas together (see e.g. Dirks 1999; Kreijns et al., 2003). As a result of the self-selection process 20 girl-girl pairs, 11 boy-boy pairs, and 7 girl-boy pairs were formed. The pairs representing each of these gender combinations were randomly divided into two conditions: an argument graph condition and a note-taking condition. Students in the note-taking group were the subjects of Sub-study III and the students of both the note-taking and argument

graph groups were the subjects of the Sub-study IV. The study applied kvasi-experimental research design.

The basics of argumentation were first taught in the class. Next, the researcher met each student pair at a time. The study sessions lasted from 95 to 105 minutes. In the beginning of the session the students were introduced the task and the students in the argument graph group were trained to use the Web-based argument graph tool. After this, the student pairs worked in three phases. In the first phase (from 10 to 15 minutes), the pairs in the argument graph group were asked to discuss the topic and construct an argument graph, while the students in the note-taking group were asked to discuss the topic and take paper-and-pencil notes. In the second phase, the student pairs were asked to search for and read additional information on the Web for 30 minutes. The argument graph group was asked to modify their graph and the note-taking group was asked to continue their note taking. Finally, the students composed a joint essay (45 minutes). At the end of the session, the students filled in a short feedback questionnaire.

Throughout the task, the students worked face-to-face. The argument graph group worked with two computers. One computer was used for constructing the graph and for utilizing the graph in the writing phase, and the other computer was available for searching for information on the Web and for writing the essay. The note-taking group worked on a single computer. In order to prevent direct copying, the students were not allowed to use a word processor during the information searching phase.

## 6.3 Data collection and data sources

Two methods were applied: a think-aloud method (Sub-studies I and II) and an interaction method (Sub-studies III and IV). In the think-aloud method a subject reports his or her thinking while conducting a task (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995). This is regarded as an effective method for gaining an access to on-line processing (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995). In reading research the think-alound method has been shown to be a valid method to investigate how readers construct a situation model, i.e. how a reader uses his or her world knowledge to make inferences about agents, causality, and intentionality of the texts (Magliano, Millis, Ozuru, & McNamara, 2007). Because of these advantages of the think-aloud method, it has been widely used in traditional reading research (Pressley & Afflerbach, 1995) and recently also in new literacy research (Afflerbach & Cho, 2009; Coiro & Dobler, 2007).

An interaction method focuses on pairs, or groups of participants who are instructed to talk together as they perform a given task (Miyake, 1986). The interaction method provides an access to collaborative meaning and knowledge construction that takes place when pairs or groups are working together. Previously, the interaction method has been applied for studying human-computer interaction (Kahler, 2000; Nakakoji & Fischer, 1995; Van den Haak, de Jong, &

Schellens, 2004) and for exploring collaborative problem solving (Lund & Baker, 1999). Interaction method has hardly ever used in reading research. One exception of this notion is the study by Wiley and Bailey (2006). They recorded students' interaction and analyzed interaction protocols when they investigated student pairs' reading of pre-selected Web-documents. In the present study, think-aloud method was applied to explore online reading in an individual reading situation whereas interaction method was applied to explore reading in a situation where two students read together. Table 2 summaries how these two methods were applied in this study.

In think-aloud studies (Sub-studies I and II), the students were instructed to think aloud and report whatever they were thinking while searching for and reading information on the Internet. The researcher prompted students by asking questions, such as "what is in your mind?" or "what are you thinking?" if they remained silent for a longer period. The researcher did not model the thinking aloud, as the aim was to study students' spontaneous thoughts. When interaction approach was used for data collection, student pairs were asked to search for information for an essay together and collaborate throughout the task. Since the aim of the Sub-studies III and IV was to explore students' spontaneous collaboration during online reading, any prompts to break a silence were not given to them during the task.

TABLE 2 Summary of the use of the think-aloud and interaction method

| | **Think-aloud method** (Sub-studies I and II) | **Interaction method** (Sub-studies III and IV) |
|---|---|---|
| Subjects | n = 25 (Sub-study I)<br>n = 24 (Sub-study II) | n = 38 (Sub-study III)<br>n = 76 (Sub-study IV) |
| Research situation | Students worked individually. | Students worked in pairs. |
| Instructions | Students were asked to verbalize their thoughts when they searched for information on the Internet for their essay. | Students were asked to collaborate when searching for information on the Internet for their joint essay. |
| Prompts | Students were prompted if they remained silent a longer period. | Any prompts to break a silence were not given. |
| Role of the researcher | The researcher sat beside a student and asked prompt questions whenever needed. | The researcher sat in the other side of the room and was available for students if they had any questions or if any technical problems occurred. |
| Data collection | Students' "think-alouds" and Internet actions were recorded with a Screen Capture -program. | The students' discussions and Internet actions were recorded with a Screen Capture -program. |
| Data sources | Think-aloud protocols<br>Screen captures<br>Essays (Sub-study II)<br>Questionnaire about students' Internet use (Sub-study I) | Interaction protocols<br>Screen captures<br>Essays<br>Feedback questionnaire (Sub-study III) |

## 6.4 Data analyses

This study aimed at clarifying students' online reading either in an individual or collaborative reading situation. In the different Sub-studies I concentrated on different aspects of online reading and the aims of the sub-studies affected the methodological choices that were made. Table 3 summarises the data analyses of the present study.

In the analyses of all the sub-studies a quantitative-based qualitative approach (Chi, 1997) was applied. This approach combines qualitative and quanti-

tative analyses. Chi (1997) suggests that by integrating qualitative and quantitative analysis of verbal data the interpretations of the results are less subjective. In the present study, quantitative-based qualitative approach meant that the coding of verbal evidence was based on qualitative content analysis after which frequencies of the codes were analyzed quantitatively. The quantitative analysis of the data provided me an opportunity to explore different evaluation profiles among the students (Sub-study I) and different collaborative reading profiles among student pairs (Sub-study III) by a hierarchical cluster analysis. Furthermore, the quantitative analysis of data made it possible to investigate interrelations between different online reading practices and students' essays by means of a correlational analysis (Sub-study II). Finally, the quantitative analysis was applied in order to compare the groups that either constructed an argument graph or took notes during online reading (Sub-study IV).

In the analysis of verbal protocol data, different types of the unit of analysis were applied. In the analysis of the think-aloud protocols, the unit of analysis was an utterance. Utterances were used to identify students' reading strategies (Sub-studies I and II). In the analysis of the interaction protocols, three units of analysis were used: episodes (Sub-studies III and IV), collaborative reading patterns (Sub-study III) and utterances (Sub-studies III and IV). Episodes were used as the unit of analysis to describe the students' online reading processing practices. Collaborative reading patterns were used to clarify how the student pairs co-constructed meaning and knowledge, and utterances were used to identify the students' collaborative reading strategies.

The categories of the online reading episodes (Leu et al., 2004) and the categories of the collaborative reading patterns (Volet, Summers, & Thurman, 2009) were based on theory. The categories of both individual and collaborative reading strategies emerged as a result of theory (Pressley & Afflerbach, 1995) and data-driven examination using an inductive analytic analysis (Bogdan & Biklen, 2003).

In addition to the verbal protocols, students´ essays were analyzed in Sub-studies II and IV. In Sub-study II, two different analyses were conducted. First, the origin of each sentence of the students' essays was coded according to the coding scheme by Wiley and Voss (1999). This coding scheme was used to clarify how students used the Internet sources in their essays. Second, the breadth of the students' essays and the breadth and depth of students' causal thinking in their essay were clarified by analyzing the idea units of the essays (see Mayer, 1985).

In Sub-study IV, the essays were analyzed by exploring their content and the arguments presented for and against Internet censorship. In the content analysis of the essays, a sentence was used as a unit of analysis. The sentences were classified into the following data-driven categories: descriptive content, argumentative content, problems, problem solutions, and stance. In the argumentative analysis of the essays contrasting arguments were identified and the number of arguments for the Internet censorship and counter-arguments against it were counted.

TABLE 3 Summary of the data analyses

| | Sub-study I | Sub-study II | Sub-study III | Sub-study IV |
|---|---|---|---|---|
| Aim of the study | To clarify students' evaluation strategies when they read online | To explicate interrelations between different processing practices during online reading and associations of these processing practices with essay quality | To illuminate student pairs' online reading processing practices and their co-construction of meaning and knowledge during online reading | To clarify argument graph and note-taking groups' engagement in different online reading processing practices and their use of collaborative reading strategies |
| Data sources | Think-aloud protocols<br>Screen captures<br>Questionnaire about students' Internet use | Think-aloud protocols<br>Screen captures<br>Essays | Interaction protocols<br>Screen captures<br>Essays | Interaction protocols<br>Screen captures<br>Essays |
| Analysis method | Quantitative-based qualitative approach | Quantitative-based qualitative approach | Quantitative-based qualitative approach | Quantitative-based qualitative approach |
| Unit of analysis | Think-aloud protocols:<br>Utterances | Think-aloud protocols:<br>Utterances | Interaction protocols:<br>Online reading episodes<br>Collaborative reading patterns<br>Utterances | Interaction protocols:<br>Online reading episodes:<br>Utterances |
| Statistical methods | Hierarchical cluster analysis | Correlational analysis | Hierarchical cluster analysis | Mann-Whitney U-test |

# 7 SUMMARIES OF THE SUB-STUDIES

This study explores students' online reading practices in the individual (Sub-studies I and II) and social (Sub-studies III and IV) reading situation. This section will describe the main finding of the four sub-studies. In reporting the results I will use consistent terminology coherently across the studies which differ to some extent from the terms used in the original articles. This will make the comparison among the studies easier.

## 7.1 Sub-study I: Students evaluating Internet sources: From versatile evaluators to uncritical readers

The main aim of sub-study was to investigate how students evaluated information when they searched for source material on the Internet for an essay. This Sub-study also explored how students allocated their time between locating and content-processing practices during online reading. Upper-secondary school students ($n$ = 25) were asked to verbalize their thoughts during working on the Internet. Students had 40 minutes for their information search on the Internet and 45 minutes to write an essay on the topic. Their verbalizations related to information evaluation and their actions on the Internet were analyzed.

The students spent on average 61% of their time of the task on content-processing practices and 38% on locating practices[1]. The remaining 1% of time was not connected with either of these practices. There were considerable inter-individual differences how students allocated their time on locating and content processing. The five most effective Web-searchers spent more than 75% of their working time on reading Web sites and exploring contents concerning the topic of the essay. The four weakest students spent so much time on locating relevant information that only 30%-45% of the time was left for them to explore the Web sites.

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[1] In this study, evaluation, monitoring and regulating practices were included in either content processing or locating practices according to which practice was going on.

Of all types of locating practices observed, the greatest proportion of time was spent on browsing search results. On average, the students spent 17% of the total time on browsing search results. Formulating a query or using a URL address and skimming and rejecting opened Web pages accounted for additional 12% of their total working time. There was a substantial variation among the students in the time they spent on different locating practices. For example, the amount of time invested in browsing search results ranged from 5% to 46%. Considerable amount of time spent on browsing search results can be explained by ineffective queries that resulted in a list of irrelevant links or by students' inability to analyze the search results.

The study indicated that the students evaluated more frequently the relevance of information ($M$ = 16.9, $SD$ = 9.8) than the credibility of information ($M$ = 3.2, $SD$ = 3.8) when reading online. The variance in both relevance and credibility evaluation was substantial. The number of students' evaluative comments on relevance ranged from 6 to 43 and on credibility from 0 to 16. There were six students who did not evaluate the credibility at all.

With respect to relevance, the most frequently used strategies were predictive evaluation of relevance ($f$ = 130) and evaluation of topical relevance of Web page either on textual ($f$ = 116) or paragraph level ($f$ = 73). The most frequently used strategy when evaluating credibility was the assessment of the publisher, author or expert interviewed ($f$ = 27), accounting for third of all credibility evaluations. Almost half of the students used this strategy at least once.

Although the students did not evaluate the credibility of information very frequently, most of the students succeeded in locating and reading Web pages which were posted by a rather credible publisher or author. The most frequently selected sources of information were public associations, expert organizations or networks of experts, as well as Wikipedia. The reading of Web pages where the credibility of the publisher was in doubt tended to be done by only a few students.

In the cluster analysis five evaluation profiles emerged: 1) versatile evaluators; 2) relevance-oriented evaluators; 3) limited evaluators; 4) disoriented readers; and 5) uncritical readers. One student did not fit into any of the clusters. The *versatile evaluators* ($n$ = 3) applied various evaluation strategies including some cognitively demanding strategies, such as evaluation of argumentation and comparing two or more texts. The *relevance-oriented evaluators* ($n$ = 5) frequently applied strategies on evaluating relevance of information. Compared to versatile evaluators, relevance-oriented evaluators evaluated credibility less frequently and their repertoire of strategies was not that diverse. The *limited evaluators* ($n$ = 8) hardly evaluated credibility of information at all and they also evaluated relevance to a lesser degree than the versatile and relevance-oriented evaluators. The *disoriented readers* ($n$ = 5) had difficulties in locating relevant information on the Internet. As they spent quite a lot of time on locating information they had less time for reading Web pages (on average 39%) compared to the other groups of students (on average from 54% to 74%). The *uncritical readers* ($n$ = 3) differentiated significantly from the other groups in quality of Web

pages they selected to read. They spent more time (on average 44% of their total reading time) on reading Web pages where the credibility of the publisher was in doubt compared to the other groups of students (on average from 1% to 9%). One student, who did not fit into any of the profiles, frequently evaluated credibility of information by expressing 16 evaluative comments (the overall mean was 3.2). He evaluated especially the credibility of the author's argumentation (12 out of 16 comments). This student could be regarded as a reader with a critical disposition, which differentiated him from the other clusters.

## 7.2 Sub-study II: Skillful Internet reader is metacognitively competent

The purpose of Sub-study II was to clarify how upper-secondary school students locate, evaluate and process information, and monitor and regulate these processing practices when they use Internet as a source for an essay. The study also aimed at explicating interrelations between these processing practices. Furthermore, Sub-study II examined the associations between the use of different processing practices and the quality of the students' essays.

In Sub-study II, students ($n$ = 24) were asked to search for and read information for 40 minutes on the Internet in order to write an essay on a given topic. The time given for essay writing was 45 minutes. The students were asked to verbalize their thoughts during online reading. Their verbalizations and search actions on the Internet were recorded and analyzed.

During online reading, the students conducted on average 57 times a search action. The three most common actions, accounting for 97% of all the search actions, were browsing search results ($M$ = 27), selecting a link from the search results ($M$ = 20), and formulating a search query ($M$ = 9). The differences in the number of conducted search actions among the students were striking. One student needed only 21 search actions to access relevant material, whereas the most active searcher conducted as many as 185 search actions during online reading. The results suggest that some students had notable difficulties in locating information efficiently on the Internet.

In order to better understand what caused troubles for some students to locate information, I conducted some further analyses that yielded results not reported in the original article. First, I analyzed students' search queries and second, I examined the interrelations between formulating queries, browsing search results and selecting a link from the search results. Of all formulated search queries, the queries including one term were the most common, accounting for 41% of the queries. Almost a third (30%) of the search queries consisted of two terms and 17% of the queries included more than two terms. In the rest of the queries, students searched for information with a name of a person or an institute or they utilized a search engine to locate a certain Web site, such as Wikipedia. Some of the queries that did not include the main concept or its

synonym turned out to be problematic. Some students also used very vague terms (e.g. health) in their unsuccessful search queries. The students who had most difficulties in formulating search queries used the title of the task in their search queries which limited the number of relevant Web pages available to them. It was also typical for some of these students that they were not able to change their search queries appropriately. They either repeated the same query several times or reformulated it only a little. The number of formulated queries were positively associated with the number of browsing search results ($r$ = .85; $p$ <0.001) and selecting a link from the search results ($r$ = .73; $p$ <0.001). Browsing search results was also positively associated with selecting a link from the search results ($r$ = .95; $p$ <0.001). This indicates that different kinds of problems in locating information cumulate to some students.

The analysis of the think-aloud protocols showed that content-processing strategies accounted for 37%, metacognitive strategies 36%, and information evaluation strategies 27% of all the strategies. There were considerable inter-individual differences among the students in their use of these strategies. When processing content, the students mainly concentrated on gathering information on the Web pages and cognitively more demanding elaborative content-processing strategies were rather seldom applied. In information evaluation, the students concentrated mostly on evaluating relevance of the Web pages whereas evaluation of credibility was far less common.

In this study, metacognitive strategies were divided into micro-level and macro-level strategies. When student use metacognitive strategies at the micro-level they make decisions of immediate actions with a short duration. For example, they monitor their own orientation in a reactive way ("Where am I"; "I was here already"). Macro-level metacognitive strategies are forward-looking, proactive activities that include, for example, planning and evaluating. This study suggests that the way in which students use metacogntive strategies at micro- and macro level has a significant role in successful online reading. The number of micro-level metacognitive strategies was positively associated ($r$ = .73; $p$ < 0.01) and the number of macro-level metacognitive strategies was negatively associated ($r$ = -.37; $p$ = ns.) with the number of conducted search actions. This means that students, who carried out numerous search actions, focused mainly on micro-level metacognitive activities. It seems that some students did not posses advanced proactive, evaluative, and adjustive strategies that would have helped them to plan their searching and to recover from unsuccessful search attempts. Because some students invested much effort and time on locating information they had less time to concentrate on content processing. Namely, it was found that the number of search actions was negatively associated with the number of content-processing strategies and particularly, with gathering information from Web pages ($r$ = -.42; $p$ < 0.01).

Furhermore, macro-level metacognitive strategies were positively associated with elaborative content-processing strategies ($r$ = .54; $p$ < 0.01). This indicates that strategic reading involves high-level metacognitive activity as the students who elaborated what they read put also effort on planning, evaluating

and regulating their activities. Third, macro-level metacognitive strategies were also positively associated with evaluation of relevance ($r$ = .51; $p$ < 0.05). This result can be explained by the fact that when students plan their activities and define their information need they form a clear relevance criterion which works as the basis for evaluation of information.

Finally, this study indicated that strategic reading worked as the basis for the quality of writing. The number of elaborative content-processing strategies was positively associated with the contentual breadth ($r$ = .41; $p$ < 0.05) and breadth of causal thinking of the students' essays ($r$ = .54; $p$ < 0.01).

To conclude, this study suggests that skillful Internet reader is metacognitively competent. It seems that skillful readers plan, evaluate, and regulate their search activities. They are able to locate relevant information quite effectively which makes it possible for them to concentrate on reading for learning. Metacognitively competent readers elaborate what they read and this is reflected as better quality of their writing.

## 7.3 Sub-study III: Working on understanding during collaborative online reading

The purpose of Sub-study III was to illuminate student pairs' online reading processing practices and their co-construction of meaning and knowledge when they read on the Internet in order to explore a controversial issue. The study also aimed at clarifying how students, who use different collaborative reading patterns to co-construct meaning and knowledge, perform on an essay writing task.

In Sub-study III, 19 student pairs were asked to write a joint argumentative essay on the topic "Should Internet censorship be tightened" and consider the topic from different perspectives. First, the pairs discussed the topic freely for 10 to 15 minutes in order to activate their prior knowledge. Next, they were asked to search for and read collaboratively additional information on the Internet for 30 minutes. Finally, the student pairs had 45 minutes to compose their joint essays. Student pairs' discussions during online reading and their search actions on the Internet were recorded and analyzed in order to examine students' engagement in different online reading practices, their collaborative reading patterns, and their reading strategy use.

From all online reading processing practices, the greatest proportion of time (on average 65%) was spent on content processing. On an average, the student pairs spent rather a lot of time (23%) also on locating information. Far less time was spent on monitoring and regulating activities (7%) and evaluation of information (5%). The amount of off-task discussion was low, on average only 0.3%, indicating that the student pairs concentrated well on the task. There were considerable differences between the pairs how much time they spent on locating information. One student pair spent only 4% of time on locating infor-

mation whereas another pair spent as much as 52% of their time on searching for relevant information. These results indicate that some student pairs had problems with locating information. Time spent on locating was negatively associated with time spent on content processing ($r$ = -.894; $p$ < 0.01). This means that student pairs who spent more time on locating information had less relative time for content processing. These results stress the important role of the ability to locate information during online reading (Bilal, 2000; Kuiper & Volman, 2008).

In order to clarify how students evaluated information I conducted some further analysis the results of which are not reported in the original article. I classified each of the evaluation episodes into one of the following three categories: 1) evaluation of credibility, 2) evaluation of relevance, and 3) evaluation of both credibility and relevance. The results showed that the student pairs evaluated relevance more frequently than credibility of information. From all evaluation episodes, 64% were related to evaluation of relevance and 32% to evaluation of credibility. A small proportion of episodes (4%) included evaluation of both credibility and relevance.

The student pairs spent, on average, 46% of their content-processing time on collaborative reading patterns, 45% of their time on silent reading, and 9% of their time individually oriented reading patterns. From collaborative reading patterns, more time was spent on co-construction of meaning or knowledge (28%) than on co-acquisition or clarification of information (18%). Patterns of pair co-construction of meaning or knowledge were three times as long as patterns of individual construction of meaning or knowledge, and contained more than three times as many reading strategies than patterns of individual construction of meaning or knowledge. This indicates the richness of content processing during the patterns of co-construction of meaning and knowledge. During these collaborative reading patterns student pairs engaged in deep-level processing and built their ideas on their partner's thoughts.

The two most common collaborative reading strategies were gathering information, and putting forward, developing, or evaluating arguments. Gathering information accounted for 37% and putting forward, developing or evaluating arguments 16% of all the reading strategies. More than half (512 strategies out of 944) of the strategies were shared during the patterns of co-construction of meaning or knowledge. When students co-constructed meaning or knowledge the mostly used strategy was putting forward, developing or evaluating arguments. This strategy was a bit more frequently used during the patterns of co-construction of meaning and knowledge than gathering information (1.8 vs. 1.3 utterances indicating the strategy use).

The examination of the reading strategy use among the student pairs showed that there were considerable differences how students applied the strategies. On an average, the student pairs shared almost 50 strategies during their content processing and the standard deviation among the pairs were 30.5. This indicates that some of the students are both capable and willing to share

their processing and thoughts with their partner whereas some of the pairs are not.

In Sub-study III, hierarchical cluster analysis was conducted in order to identify students' collaborative reading profiles. In the cluster analysis the following five collaborative reading profiles emerged: 1) Co-constructors; 2) Collaborators; 3) Blenders; 4) Individually Oriented Readers, and 5) Silent Readers. *Co-Constructors* (2 pairs) spent most of their time on collaborative content processing and especially on co-construction of meaning or knowledge (83% of content-processing time). They shared, on average, 110 reading strategies and their use of the strategies was versatile. The *Collaborators* (2 pairs) engaged in collaborative content processing too but compared to the Co-constructors their processing was more equally distributed between the co-construction of meaning or knowledge (41% of content-processing time) and co-acquisition or clarification of information (46%). On average, the Collaborators shared 59 reading strategies during their content processing. The *Blenders* (6 pairs) mixed collaborative (55%) and individually oriented (45%) content processing during which they shared on average 60 reading strategies. The *Individually Oriented Readers* (4 pairs) spent more time on individually oriented content processing than on collaborative content processing. They shared, on average, 41 reading strategies during their content processing. The *Silent readers* (5 pairs) spent 81% of their content processing time on silent reading and therefore they shared only, on average, 17 reading strategies during their content processing.

The differences found among the student pairs are striking. Some pairs spent a substantial amount of time on working together to construct meaning or knowledge whereas some students had a stronger preference for working alone. When the Co-constructors spent 83% of their content-processing time on co-construction of meaning or knowledge, the Individually Oriented Readers and the Silent Readers spent, on average, only 7-8% of their time on co-construction of meaning or knowledge. The results suggest that all students are not able to take a full advantage of the collaborative situation.

This study showed that the mean scores of the students' joint essays, given by teachers, mapped closely to the student pairs' reading profiles and the relative proportion of time that student pairs spent on co-construction of meaning or knowledge during their content processing. Both student pairs with the profile Co-constructors received the highest possible mark (6 = Outstanding) on their essays. Two pairs with the profile Collaborators received the next highest mark (5 = Excellent). The average mark of the Blenders was 4.83, the Individually Oriented Readers 4.75, and the mark of the Silent Readers was 4.20 on average. This study suggests that the student pairs were able to utilize their engagement in collaborative and deep level of content processing in their essay writing.

## 7.4 Sub-study IV: Argument graph as a tool for promoting collaborative online reading

The purpose of Sub-Study IV was to clarify how the construction of an argument graph promotes students' collaborative online reading. The study compared student pairs in the argument graph group and note-taking group in their engagement in different online reading practices and their use of collaborative reading strategies when they synthesize information from online sources. It also examined how student pairs in the argument graph group and note-taking group synthesized ideas in their joint essays.

The subjects of the study were 76 upper secondary students. The students were asked to write an essay on the issue *Should Internet censorship be tightened?* and consider arguments both for and against censorship of the Internet. The student pairs (n = 38) worked in three phases. In the first phase (10 to 15 minutes), the pairs in the argument graph group were asked to discuss the topic and construct an argument graph, while the students in the note-taking group were asked to discuss the topic and take paper and pencil notes. In the second phase, the student pairs were asked to search for and read additional information on the Web for 30 minutes. The argument graph group was asked to modify their graph and the note-taking group was asked to take notes. Finally, the students composed a joint essay (45 minutes). Student pairs' discussions during online reading and their search actions on the Internet were recorded and analyzed in order to clarify their engagement in online reading processing practices and their use of different collaborative reading strategies. Students' joint essays were analyzed for their content and arguments.

Both the argument graph and note-taking groups spent most of their working time on reading to synthesize information (71% vs. 66%) and on locating information (16% vs. 23%). It is remarkable that the student pairs who constructed argument graphs during online reading spent, on average, less time on locating information than the student pairs who took notes ($U = 248$; $p < 0.05$). The average number of locating episodes was lower among the student pairs in the argument graph group ($M = 6.95$) than in the note-taking group ($M = 9.47$) ($U = 262.5$; $p < 0.05$). It seems that the argument graph group less often went back and forth between locating information and reading Web-pages than the note-taking group.

On average, the total number of used reading strategies was about the same in the argument graph and note-taking groups. Both the argument graph and the note-taking groups used collaborative reading strategies on average almost 50 times. However, the variation was wider in the note-taking group ($SD = 30.46$) than in the argument graph group ($SD = 21.38$). It seems that the use of an argument graph lowers the differences between the student pairs in the argument graph group. As the most active collaborative readers in the argument graph and note-taking groups did not differ from each other, the con-

struction of an argument graph might have helped usually not so active collaborators to share their thinking with their partner.

Among all collaborative reading strategies, gathering information was the most frequently used strategy in both groups. In the use of the reading strategies, the argument graph group differed considerably ($U = 16.5$; $p < 0.001$) from the note-taking group in the number of times they considered relations between concepts or arguments (9.2 vs. 1.3). As putting forward, developing or evaluating arguments was also quite a common strategy in the both groups, the mere argumentative task assignment was probably successful in directing students' collaborative reading towards argumentative discussion.

The essays of the argument graph group were more argumentative in content than those of the note-taking group (64% vs. 44 % of all content; $U = 76$; $p < 0.01$). Instead, the essays of the note-taking group contained more descriptive content than those of the argument graph group (23% vs.16%; $U = 248$; $p < 0.05$). The note-taking group also presented more problems (19% vs. 12%) and solutions to problems (12% vs. 7%) related to Internet censorship than the argument graph group. However, these differences were not statistically significant.

Since the argument graph groups' essays contained more argumentative content, it is obvious that the graph group also presented on average more (18.3 vs. 11.7) arguments than the note taking group ($U = 98.50$; $p < 0.05$). These arguments were either for or against Internet censorship. The average number of arguments for censorship was higher in the essays of the graph group (11.2 vs. 6.4) than in the essays of the note-taking group ($U = 74.50$; $p < 0.01$). The groups did not differ in the number of arguments against censorship. The pairs in the argument graph group presented on average more arguments for than against (11.2 vs. 7.1) Internet censorship ($Z = 2.86$; $p < 0.01$). On the contrary, the number of arguments for and against (6.4 vs. 5.3) Internet censorship was quite similar in the essays of the note-taking group ($Z = 0.94$; $p$ = ns.).

To conclude, the construction of an argument graph may help students' collaborative online reading that aims at source-based writing in three ways. The argument graph may help students to focus on reading to synthesize while they spent less time on locating information. It also may help students to explicate their synthesizing processes because the graph enables them to make the connections between arguments visible. Finally, the graph probably directs students' attention to argumentative content when they read. The students may attend to identifying arguments in texts and elaborate them jointly.

# 8 DISCUSSION OF MAIN FINDINGS

## 8.1 Processing practices during individual and collaborative online reading

### 8.1.1 Locating information

The present study indicated that the ability to locate information is important both during individual and collaborative online reading. It was found that the number of search actions was negatively associated with the number of content-processing strategies, in particular with gathering important ideas from the texts in an individual reading situation (Sub-study II). Furthermore, time spent on locating information was negatively associated with time spent on content processing in a collaborative reading situation (Sub-study III). Thus, the students who spent more time with locating information had less relative time for content processing, i.e. less time for reading for learning.

Although it has been previously found that students who read together online are more effective in locating information than students who work individually (Lazonder, 2005), the present study indicated that both individual and collaborative readers may have considerable difficulties in locating information. The variance in time spent on locating information was substantial among individuals (Sub-study I) and paired readers (Sub-study III). These results support the idea that being able to locate appropriate information efficiently may be a gatekeeping online reading practice (Henry, 2006) both in individual and collaborative reading.

The problems that the students faced during locating information were mainly related to the following four areas: 1) formulating adequate search queries; 2) understanding how search engines work; 3) analyzing search results and 4) regulating search activities (Sub-study II). According to Guinee, Eagleton, and Hall (2003), the search queries that combine two terms are usually the most effective. In the present study of individual online reading (Sub-study II), only a bit less than a third of the formulated queries consisted of two terms. However,

also two term queries may sometimes be problematic. This was the case when queries did not include the main concept of the explored issue. Some students also used very vague terms or the literal title of the task in their search queries suggesting that they had lack of knowledge on how search engines work.

Although a majority of the students were able to locate relevant information quite effectively, it seems that all students need some guidance for developing their searches. Students need to be taught more systematic planning of their queries, for example, by guiding them to consider the main concepts that are related to the phenomena that they explore. Even though students would not possess that much of prior knowledge on the issue they could take advantage of issue related concepts that they have found from the Web pages they have just read. Students could then utilize these issue related concepts for formulating more precise queries. For example, in some Web pages read by the students sleeping was told to be related to learning achievements. Students could have utilized this information for formulating a query "sleeping + learning". However, this kind of strategic activity was hardly non-existent. Practicing systematic use of conceptual knowledge in specifying search queries would prepare students for their university studies where inquiry and researched-based practices are pronounced.

In addition to problems in formulating search queries, some students had difficulties also in analyzing search results. They spent a lot of time on browsing search results; one student used as much as 46% of her time on this activity. Numerous selections of the links from the search results indicate that some students probably rely on "click and look" strategy (Leu et al., 2007) instead of reading and analyzing the search results. Finally, it seems that some students have also difficulties in recovering from unsuccessful search attempts. The importance of monitoring and regulating one's activities for locating relevant information will be discussed in more detail in chapter 8.1.4.

### 8.1.2 Evaluating information

Nowadays, students frequently rely on Internet sources in their school work. Since the Internet contains information with differing quality, it is exceedingly important that students evaluate what is worth reading and critically ponder what they read. The present study found that students more frequently evaluated the relevance than the credibility of information. This was the case in both the individual and collaborative reading situation. It seemed that in the collaborative reading situation the relative proportion of credibility evaluations was a bit higher than in the individual reading situation. However, this result has to be approached very cautiously because the different units of analysis were used in the sub-studies of individual and collaborative reading.

In spite of the higher proportion of credibility evaluations in the collaborative reading situation (36% vs. 16%), the proportion of those students who did not evaluate credibility of information at all was higher among collaborative readers (42%) than among individual readers (24%). These results indicate that

reading in collaboration does not intrinsically provoke an evaluative reading mode.

Reason for some students' or student pairs' lack of evaluative comments might be that without prompting they do not verbalize their evaluations if they do not face information with questionable credibility. In this case, it is more efficient to simply continue reading. The most worrying is the situation of those uncritical readers who tend to engage in reading questionable sources without any concerns about the credibility of the sources.

According to Brem, Russel, and Weems (2001) critical evaluation of information can be described as a situated activity. They found that students epistemological stance and their methods for assessing support and reasonableness varied with the type of the Web site. In the present study, two research tasks required a little bit different strategy use. The first search task basically asked the students to find arguments for why sleeping is important to humans. The efficient strategy was to search for Web sites that rely on research-based information or reliable sources and avoid informal Web sites, such as discussion forums, private blogs, or pages with incomplete author information. In the second search task, the students were asked to explore Internet censorship from different perspectives. In order to find different views to the topic, the students profited from visiting also informal discussion forums and Web sites produced by ideological communities. When students refer to standpoints found from possibly biased Web sites, they should pay attention to the quality of argumentation of the source and also indicate the nature of the source in their essays. To conclude, the two search task used in the present study brought out the situational nature of evaluation and the need for flexibility in the use of evaluation strategies.

### 8.1.3 Content processing

The present study explored how students engaged in content processing when they read online either individually or collaboratively. The results suggest that collaborative reading of online information about a controversial issue, within an argumentative discussion framework, may promote content processing that goes beyond simple gathering of facts. It was found that individual readers concentrated on gathering facts (80% of all reading strategies) whereas the collaborative reading within argumentative framework offered the student additional opportunities for deeper exploration of ideas and perspectives. In the collaborative reading situation the proportion of gathering facts of all the reading strategies was 37% and the rest of the strategies indicated deeper consideration of the issue at hand. The study suggests that collaborative, argumentative reading situation may support both meaning and knowledge construction. Since these two compared studies varied the interpretations concerning the benefits of collaborative reading within an argumentative reading context should be approached cautiously.

As noted, the two combined elements, the collaborative reading situation and the argumentative framework, seemed to promote students' content pro-

cessing. On the basis of the present study we do not know the relative contributions of these two elements on depth of the students' content processing but some presumptions on how these elements might work can be suggested by comparing the two different tasks and situations. In the individual reading situation, the students were asked to explain why sleeping is important to humans whereas in the collaborative reading situation the students were asked to explore different perspectives concerning the question whether the Internet censorship should be tightened. The task assignment in the individual reading situation probably directed the students to gather sets of facts that supported the idea of the importance of sleeping. In the collaborative reading situation, the argumentative task assignment required the students not only to gather arguments for and counter-arguments against the issue in question but it also called them to evaluate arguments, ponder relations and consequences of different views, and to propose alternatives. These kinds of deeper considerations were seldom included in the Web sources found by the students. So, the students were required to create a conversation by synthesizing information from different sources and discussing the different views. In line with these presumptions, Greene and Ackerman (1995) suggest that readers and writers extend their effort beyond reciting information only when they are challenged to do so.

In addition to argumentative framework, this study suggests that the collaborative reading situation compared to the individual reading situation brings along additional opportunities to engage in deep content processing. Students can negotiate their understanding and put forward and develop arguments in order to convince their partner of their point of view. Students can build on each other's ideas by means of which they can expand their thinking. Further, a partner may help a student to complete an emerging idea. For example, one student vaguely remembered a former incident that started the public conversation about the harmfulness of the Internet in Finland. After telling this, the students constructed this relevant example bit by bit together and wrote about the issues related to this example in their essay. In addition, students can propose alternatives and weight their appropriateness. Also asking questions, such as "why do you think so" may maintain the high quality of interaction (King, 2007; Mercer & Littleton, 2007; Volet, Summers, & Thurman, 2009). It was found that the student pairs with active engagement in co-construction of meaning and knowledge proposed more questions than individually oriented readers.

Despite of the possible advantages of collaborative reading, it may also conceal risks. Some students may enthusiastically build on each others' ideas so that the discussion sidetracks from the main issue or students may rely too much on their prior knowledge at the cost of exploration of source materials. In addition, engagement of overextended inferences that is cued by surface features of a text can be seen as low level of constructive activity (Chan, Burtis, Scardamalia, & Bereiter, 1992). Further, disputational talk (Mercer, 1996) or unequal contributions to meaning and knowledge construction may also be obstacles for productive collaboration.

There is a paucity of research on how students read together when they attend a same text simultaneously. Therefore, the interesting question is how collaboration practically takes place during reading. Encoding a text at the textbase level is an individual process and collaboration comes into play when students discuss their emerging understanding and share different reading strategies to construct a situational model from the text. Further, when students ponder ideas presented in the text also new ideas outside of the text can emerge in their mind so that students can discuss and develop them further. The data from the present study showed incidents of dialogical meaning making described by Stahl (2005, p. 82) in a following way: "Groups can construct knowledge that no one individual could have constructed alone by a synergistic effect that merges ideas from different individual perspectives".

This study suggested that the students preferred and combined distinctive collaborative reading patterns in different ways during their online reading. There were striking differences among the student pairs. The students differed in whether the emphasis of their content processing was on individual or collaborative content processing, how deeply their engaged in content processing, and how much time they spent on reading silently. When some pairs applied various reading strategies in an active, reciprocal way in order to construct meaning and knowledge, other pairs preferred to read silently sharing a thought with their partner only every now and then. This indicates that although a collaborative reading situation offers opportunities to co-construct meaning and knowledge, simply participating in a collaborative reading situation does not ensure that all students are able or willing to collaborate in a productive way. As a matter of fact, 9 out of 19 student pairs spent less than half of their content-processing time on collaborative content processing. This may be explained by the predominance of individually oriented study methods in mainstream classroom settings; joint activities among students are still relatively rare (Mercer & Howe, 2012). In line with this, many students mentioned after the research session that reading in collaboration was a new experience to them. This suggests that students would need both guidance and opportunities to practice collaborative reading in order to fully benefit from it.

This study also showed that the depth of content processing during online reading was related to the quality of the students' essays in both the individual and collaborative reading situation. In the individual reading situation, the number of elaborative content-processing strategies was positively associated with the contentual breadth and breadth of causal thinking of the students' essays. In the collaborative reading situation, the student pairs who spent the greatest proportion of time on co-constructing meaning or knowledge received the highest scores on their essays whereas the student pairs who spent the least amount of time received the lowest scores; and the other pairs fell on a continuum between these two points depending upon the proportion of time they spent on co-constructing meaning or knowledge. These results support the idea of intertwined nature of reading and writing practices (Greene & Ackerman, 1995).

Further, it is reasonable to think that students also benefitted from collaboration in their source-based writing. The active engagement in co-construction of meaning and knowledge during exploring online sources for an essay resulted essays with better quality. At the general level, the quality of students' essays, as reported by the students' teachers, was better than the quality of the essays the students normally write individually in the class.

### 8.1.4 Monitoring and regulating activities

The Internet is a complex reading environment in which readers have to orchestrate several, often parallel online reading processes. This sets additional demands on readers to monitor and regulate their activities compared to traditional reading (Coiro & Dobler, 2007). The main purpose of monitoring and regulating activities is to allocate time among different online reading practices. In the present study, the students' monitoring and regulating activities were observed from both students' verbalizations and actions they did during online reading.

On the Internet readers have to monitor and regulate their locating, evaluating, and content-processing practices at different levels. At the macro-level students monitor and regulate their activities in a forward-looking, proactive fashion whereas at the micro-level students monitor and regulate their immediate actions the duration of which is short. When readers plan, monitor, and regulate their information search at the macro-level they systematically develop their search queries by deciding what concepts are essential in terms of their reading purpose. They also evaluate how successful their search terms are and regulate their activities accordingly. Without systematic planning, monitoring and regulating of their search activities students may get lost and fumble on the Web. This causes that their monitoring and regulating activities move to the micro-level. For example, students may repeat unsuccessful queries without revising them or just click whatever links available or keep track of their orientation in a reactive way.

Evaluation of information at the macro-level include establishment of evaluation criteria on the basis of the purpose of the reading task. This makes it possible for students to predict the potential usefulness of the Web pages when their read search results. They can also decide whether the Web page is worth reading by skimming the page with a relevance and credibility criteria in mind. Skillful students are able to coordinate their evaluation activities among search results, single Web pages, and a collection of Web-pages as well as regulate the depth of their evaluations. If the focus of students' monitoring and regulating activities is at the micro-level, students select links without predictive evaluation or they start to read a page without skimming it first. These students usually read the text sentence by sentence and do not leave irrelevant or unreliable pages until they have read them rather a long time.

Monitoring and regulation of content processing at the macro-level ensure that students use appropriate reading strategies. Students adjust their strategy use according to their information need and evaluate their progress on the task.

They put effort on elaborating and synthesizing information from multiple sources. They watch over that they keep valuable information available by keeping multiple tabs open so that they can compare and contrast ideas later with information found from other sources. If the focus of monitoring and regulating is at the micro-level students concentrate on copying directly some ideas from one source at the time. They do not keep "found things found". When they realize that the page they visited earlier included valuable information, they have to invest effort in order to find the page again. In the present data an example of that is a girl who realized that she has lost the useful page where after she pressed a back button 36 times in order to re-find the page.

During individual reading a student can monitor and regulate his or her own activities, whereas collaborative reading enables mutual monitoring and regulation of one's own, other's, or joint activities. The results concerning mutual monitoring and regulation, reported elsewhere (Kiili, Laurinen, & Marttunen, 2011), showed that students pondered task demands, planned their working, and judged their joint progress together. The advantage of collaborative reading is apparent also when students express that they have difficulties in their understanding and they need help from their partners. The partner can explain the difficult aspects of the text. If she or he is unable to help the students can try to resolve the problem together. For example, they can use a search engine to find a definition for the difficult concept. Further, it was also found that students really monitored each others' understanding and in a few cases they even detected their partners' misunderstanding and tried to correct it.

## 8.2 Promoting collaborative online reading

The present study indicated that an argument graph is a useful tool for promoting students' collaborative online reading, particularly when teachers want students to pay attention to argumentative content in their reading and source-based writing. Interestingly, the study showed that the pairs, who constructed an argument graph during online reading, spent less time on locating information than the pairs who took notes. This means that the students in the argument graph group had more time to content processing which best supports developing an understanding for an issue. It is unclear, what the reasons for the difference were. It might be that the argument graph helped the students to focus on the issue at hand as they added actively arguments and viewpoints into the argument graph and also pondered the relations between the arguments. This may have required more time than note taking. When the design of the study was planned, it was thought that students would take advantage of arguments that they add into their graph in the prior knowledge activation phase for planning their information search and for formulating the search queries. This was not the case in the present study. It seems that students need guidance in how they can utilize their prior knowledge, even when it is made explicit, in their search for relevant information.

The study found evidence, consistent with previous research (e.g. Van Amelsvoort, 2006) that the argument graph helps students to make relations between arguments more explicit. It was found that the argument graph group considered considerably more concepts or relations between concepts or arguments than the note-taking group during online reading. This can also been seen as an indication that argument graph may help students to explicate their synthesizing process during online reading. Further, visualizing connections between arguments may help students to construct joint understanding on an issue. The argument graph group included more argumentative content and more arguments in their essays (both for the issue and in overall amount) than the note-taking group. Thus, the construction of an argument graph may direct students' attention to argumentative content in the texts and they may also elaborate arguments jointly.

Synthesizing information during online reading and composing a discourse synthesis by selecting, organizing, and connecting content (Spivey & King, 1989) of different online sources is a cognitively demanding task. Stahl, Hynd, Britton, McNish, and Bosquet (1996) have stated that at least high school students may not be able to profit from multiple texts with conflicting opinions without specific instructions. The argument graph, especially if combined with a proper guidance, may be a promising tool to promote students' information synthesis.

# 9 GENERAL DISCUSSION

## 9.1 Evaluation of the study

The present study enhanced our understanding of online reading as both an individual and social practice. Although in the sub-studies of individual and collaborative reading different tasks and partly different analyses were used, the present study offered possibilities to make some comparisons between individual and collaborative online reading. However, it should be borne in mind that these interpretations are only indicative. In particular, the present study shed light on possible advantages that collaborative reading may offer to students. Although the sub-studies of both individual and collaborative reading involved only a rather small number of students, the studies provide consistent evidence of both the nature of online reading and problems that students may face when reading on the Web. The present study also succeeded in finding a promising learning method to promote collaborative online reading that aims at argumentative source-based writing.

The present study provided valuable directions into methods and analyses for studying socially and digitally constructed reading. Think-aloud approach was used to gain access to thinking processes of individual online readers whereas interaction approach was applied to collect verbal protocol data in a social reading situation. The interaction approach offers certain methodological advantages. It appears to provide access to students' reading processes in a way that is less intrusive and more consistent with natural interaction patterns. One concern of using a think aloud method (Sub-studies I and II) is the artificial nature of the research situation, since readers are asked to think aloud in a situation in which they would normally be silent (Miyake, 1986). This intrudes on processing and might also encourage some students to process material more actively (Pressley & Afflerbach, 1995). Collecting data while students collaborate and discuss their ideas with their partners provide an access to reading strategies in a more ecologically valid manner.

In the analysis of students' interaction protocols, three units of analyses; episodes, collaborative reading patterns, and utterances; were used (Sub-study III) in order to capture the complexities of online reading. This provided some advantages but there were also limitations. The episodes were used to capture the overall picture of processing practices that took place during collaborative online reading. Thus, the episodic analysis only focused on the larger scale practices as each episode was categorized according to the dominant processing practice. Therefore, the episodic analysis may conceal some processing practices that were interwoven throughout several of the larger, more visible practices. Monitoring and regulating activities, in particular, appeared within episodes of other dominant practices.

The episodic analysis is applicable as an initial approach in order to localize discussion segments of particular interest. In the present study (Sub-study III and IV), content-processing episodes were analyzed in more detail in order to clarify how students co-constructed meaning or knowledge (Sub-study III) and synthesized information (Sub-study IV) during online reading. One shortcoming of this is that content-processing practices were isolated from other practices and the interactive patterns among the practices were lost. However, collaborative online reading involves such complexities that if we want to achieve deeper understanding of a certain online reading practice, we might be forced to take sometimes also a narrower perspective in our studies.

Students' content processing was investigated by analyzing students' utterances and collaborative reading patterns (Sub-study III). Collaborative reading patterns were used to clarify how student pairs co-constructed meaning or knowledge while utterances were used to identify collaborative reading strategies. The examination of individual reading processes has mainly concentrated on identifying students' reading strategies at the utterance level. This was also the case in Sub-studies I and II. However, the coding of the interaction protocols at the utterance level does not reveal the dynamics of students' discourse (Van Boxtel, Van der Linden, & Kanselaar, 2000). Therefore, I used a more holistic analysis of collaborative reading patterns. The advantage of this analysis was that it combined the coding of collaborative reading strategies with the observations concerning the reciprocal nature of students' use of strategies. The analysis of collaborative reading patterns produced valuable information about students' interaction that aims at co-constructing meaning and knowledge during collaborative online reading.

The sub-study IV focused on clarifying whether an argument graph tool can promote students' collaborative online reading that aims at argumentative source-based writing. From all online reading practices this study focused especially on reading to synthesize information. The study found that construction of an argument graph helped students to pay attention to argumentative content when they read online and engaged in source-based writing. The argument graph also stimulated the students to synthesize information by considering argumentative relations between ideas during online reading. As it was not considered how students utilized different Web sources during online reading,

the study approached synthesizing information in a quite shallow way. Another limitation of the study was that it only examined how students synthesized supportive arguments and counter-arguments in their joint essays without exploring the quality of students' arguments. In addition, the study was limited to clarifying how the construction of argument graphs affected students' collaborative reading strategies and the content of their essays. Many interesting questions remained unanswered. Further studies can clarify how students' knowledge evolves when they modify their graphs over the course of the assignment and how students utilize their graphs in their essays. Despite of these limitations, the study provided some initial ideas about reading to synthesize information that hopefully inspires future research to deepen the understanding of this online reading practice that is may be one of the most complex phenomena to study.

One limitation of this study is that when studying collaborative online reading non-verbal observational data, such as gestures or pointing at the screen, was not collected. Non-verbal communication probably facilitates students' meaning making processes. Further, not all meaning making builds exclusively on verbal communication (Vass, Littleton, Miell, & Jones, 2008). As this study was limited to the students' discussions and movements on the screen, the whole richness of students' interaction was not captured.

This study integrated both qualitative and quantitative methods by applying quantitative-based qualitative approach (see Chi, 1997). Although quantifying students' online reading processes from verbal protocol data may conceal some of the richness of the data, quantifying made it possible to compare individual and collaborative reading. It also enabled the use of statistical methods.

One weakness of this study is that terminology employed in the different sub-studies varied slightly. This can be partly explained by a quite long research period from 2007 to 2012. Some of the variation of the terminology reflects the increase of my theoretical understanding. However, some of the variation is due to the deliberate choices. Although the online reading comprehension theory informed Sub-study III, I decided to use the term content processing instead of the term synthesis. There were two reasons for this decision. First, the analysis conducted in the Study III did not explicitly reveal how students integrated multiple Web sources during reading. The focus was more on how students co-constructed meaning and knowledge by utilizing both online sources and each others' emerging knowledge as resources. Second, the analyses done in Sub-study III were based on the framework that I modified from the theoretical model of socially-regulated learning (Volet, Summers, & Thurman, 2009). The two dimensions of analysis framework, depth of content processing and collaborativeness of content processing, affected my choices of the terms used. In spite of choosing to use the term content processing, there was an underlying premise that during content processing students synthesize information from multiple sources.

Alike earlier studies of collaborative learning (see Mäkitalo, 2006), this study (Sub-studies III and IV) may be limited by an underlying premise that

engagement in deep level interaction always inevitably advances learning. Future research need to pay more careful attention to the relevancy of students' discussions from the point of view of the task. The analysis should pay more attention to how students utilize different sources and how they synthesize ideas from various texts, their prior knowledge, and their joint emerging ideas.

To conclude, despite of the limitations of the present study, it extends our understanding of online reading both as an individual and social practice. It provides a useful starting point for exploration of more socially and digitally constructed reading. The study directs the attention to reading as a collaborative effort to construct meaning and knowledge in digital learning environments. It also suggested some promising methodological approaches for exploring collaborative reading. However, new research methods need to be developed in order to understand the full diversity of online reading practices and their relative contributions to the quality of source-based writing.

## 9.2 Evaluation of ethical issues

The study was conducted according to the ethical guidelines of educational research (National Advisory Board on Research Ethics, 2009; Nolen & Putten, 2007). The data collection was conducted by the ethical principles of *autonomy and self-determination*. In the present study, each student could refuse from participation in this study or the use of data concerning him or her personally.

Participation in the study was based on voluntariness and the subjects were properly informed about what they were supposed to do during the study. The study was integrated to curriculum so that tasks related to the study were obligatory, as school tasks are. The students were free to choose between two alternatives: they could do the tasks that included in the present study or do similar tasks at home. If a student under-aged, the informed consent was obtained from his or her parent or a legally authorized representative. The consent form included information about the aim of the study, nature and use of the collected data and voluntariness of the participation. The researchers' contact information was provided in the case that the parents would have needed some further information about the study.

Students' *privacy and confidentiality* issues were taken into account in the following way. The subjects' anonymity was guaranteed. All the research data is stored in a secured server and only a research and two research assistants have had an access to data. Additionally, all the data files are named by a code that cannot be traced to the any single student. When authentic examples from the data were reported, pseudonyms were used.

*Avoiding damage* for participants is one ethical principle. As the task assignments in the present study were based on curriculum, the time student invested for participation was not spent in vain. The data is stored appropriately so that it cannot be used for to harm any of the participants.

The ethical principle of *beneficence,* i.e. the aim to produce some benefit rather than simply carry out a study for its own sake, was also taken into account (Murphy & Dingwall, 2001, p. 337). The tasks that the students conducted during the teaching experiment were in line with the learning aims of the curriculum. Both teaching experiments were integrated as part of the courses of Finnish language and literature. The teaching experiments were planned together with the students' teachers. In addition, the students benefitted from taking part in the study as they were given some feedback about their working as a group. They were told what kinds of issues they could pay attention to in future in order to become better Internet readers.

Finally, the data was analyzed systematically and conducted analyses and results were reported with accuracy. The sources of the finance are reported in the study reports.

## 9.3 Future research and pedagogical implications

Although adolescents, often referred to as digital natives (Prensky, 2001) or the net generation (Jones & Czerniewicz, 2010), may be skilled with using the Internet for social networking and for entertaining purposes, they may not be proficient enough with online information use that requires higher order thinking skills (Leu et al., 2009). The present study supported this idea. Therefore, teachers should not rely on presumption that all students are skilled when it comes to the Internet. Teachers need to orchestrate literacy learning activities that challenge students to accomplish complex searches, critically evaluate different kinds of sources, and to use and synthesize information from multiple sources. Teachers can also take advantage of knowledge of those students who possess new literacies so that these students can share their expertise with others (Leu et al., 2004).

This study found some initial evidence that collaborative reading within argumentative discussion framework may provide students with opportunities to deeper engagement with text compared to individual reading concerning uncontroversial issues. Since the comparisons of the two different kinds of reading situation only gave some initial ideas of possible benefits of collaborative reading as such there is a need for further research that compares individual and collaborative reading within a similar task assignment.

Nowadays and especially in future, workplace literacy demands abilities to engage in collaborative literacy practices that aim at joint problem solving (Smith, Miculecky, Kibby, Dreher, & Dole, 2000). Therefore, educational activities should be designed so that they also necessitate joint and deep information processing. The tasks should not allow students to accomplish them merely by reciting information or by working individually. In particular, solving problems, constructing an explanation, or deciding a course of action might be such tasks that call for deep processing of information and co-construction of knowledge (Wells, 2007). It is also important to notice that in classroom lessons that aim at

co-construction of meaning and knowledge students need adequate amount of time to accomplish their joint tasks. Idea generation and meaning negotiations take more time than tasks that require mere telling others what one has read. Although I did not analyze students' implicit perceptions of a good essay, my impression is that some students seemed to value the amount of information in the cost of deeper consideration of information. Thus, it seems that the task assignments and evaluation criteria should direct students' attention to the quality of their thinking as opposed to the number of gathered ideas.

The present study showed that not all students are capable or willing to actively collaborate during online reading. It is obvious that these students need guidance in how to engage in productive interaction. Mercer and Littleton (2007) have obtained encouraging results in their long-term intervention studies in which pupils were taught to use explorative talk both in classrooms and in group-work. Classroom practices that combine individual and collaborative reading might also be a good way to accustom students to collaborative reading. Some students might feel more comfortable to piece together an initial understanding of the texts before engaging in collaborative reading. For example, students could first be asked to find two reliable sources on a given problematic topic on their own. Then student pairs could be asked discuss together what they have found and locate and read together additional information if needed. Finally, students could collaboratively make a synthesis of the information found and suggest solutions to the problem.

As noted, literacy practices that are socially and digitally constructed demand careful planning if they are to be effective. Even more important is that teachers learn to see the value of collaborative online reading as both an activity that encourages students to synthesize information from multiple sources and to create knowledge together as well as an activity that has a great potential to develop students' individual, digital reading abilities. As far as reading is solely seen as an individual activity that concentrates on comprehension of traditional texts, there is a risk that school does not prepare students for literacy and life of the 21st century.

The present study explored collaborative reading among self-selected pairs organized around an argumentative task assignment. It also investigated whether collaborative reading could be supported by an argument graph tool. The study showed that collaborative reading within argumentative discussion framework may provide additional opportunities for learning through productive interaction. It also suggested that with the use of an argument graph tool, students' attention during online reading can be directed to argumentative content and relations between arguments and ideas. Further research is needed to explore students' interaction during collaborative reading within different contexts and with a larger and wider range of students. Research community needs to clarify how different components involved in collaborative reading situations accomplish students' productive interaction that supports their understanding of texts and meaning and knowledge construction. Figure 1 suggests directions for future research on paired reading: How different tasks, characters of readers,

tools, texts, and the interplay between them affect students' interaction that is situated within socio- cultural contexts. One important area that calls for clarification is how pairs with different reading skills engage in collaborative reading and whether one student with sophisticated reading strategies can promote reading processes of a less skilled reader. An interesting question to study would also be how different levels of prior knowledge affect students' interaction.

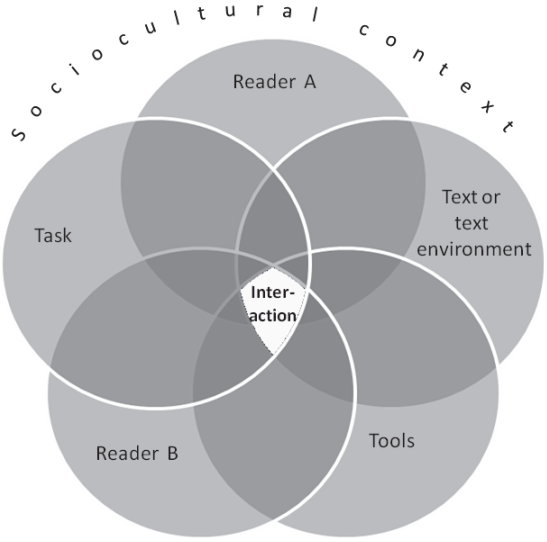


FIGURE 1 Framework for future research on paired reading

Further knowledge of the effects of different tools and task features on students' interaction is important for designing pedagogical activities. How students interact when they engage in summarizing information, solving problems, or in evaluating information. Further, tools that promote students engagement in different online reading processing practices need to be developed. It seems that especially tools that support critical evaluation of information are needed. Additionally, metacognitive tools that help students to plan and regulate their information search would be beneficial for students. Finally, what needs clarification is collaborative reading of different texts within varying textual environments as well as how sociocultural context shapes reading and interaction.

# YHTEENVETO

## Tutkimuksen tavoitteet

Tämän tutkimuksen tavoitteena oli selvittää, miten lukiolaiset, joko yksin tai yhdessä, hakevat tietoa, arvioivat informaatiota ja työstävät lukemaansa silloin, kun he käyttävät internettiä kirjoitelmansa tiedonlähteenä. Tutkimuksessa tarkasteltiin myös sitä, miten opiskelijat luovat merkityksiä ja tietoa yhdessä, kun he lukevat internetissä tekstejä kiistanalaisesta aiheesta. Lisäksi selvitettiin, miten argumentointikaavion laatiminen lukemisen aikana tukee opiskelijoiden yhteisöllistä internetlukemista ja lähteisiin perustuvaa kirjoittamista.

## Tutkimuksen toteutus

Tutkimuksessa järjestettiin kaksi opetuskokeilua. Ensimmäiseen opetuskokeiluun osallistui 25 ja toiseen 76 lukiolaista. Opetuskokeilut toteutettiin osana äidinkielen opetusta. Molemmissa opetuskokeiluissa opiskelijoita pyydettiin etsimään lähdemateriaalia internetistä kirjoitelmaa varten. Ensimmäisessä opetuskokeilussa kirjoitelman aiheena oli ”Uni ihmisen voimavarana”. Opiskelijat saivat tehdä muistiinpanoja tiedonhaun aikana (40 min), jonka jälkeen heillä oli 45 minuuttia aikaa laatia kirjoitelmansa.

Toisessa opetuskokeilussa opiskelijat työskentelivät pareittain ja he laativat yhteisen kirjoitelman aiheesta ”Pitäisikö internetsensuuria tiukentaa?” Opiskelijoita pyydettiin tarkastelemaan aihetta eri näkökulmista. Opetuskokeilussa opiskelijat jaettiin kahteen ryhmään: argumentointikaavioryhmään ja muistiinpanoryhmään. Opiskelijat työskentelivät kolmessa vaiheessa. Ensiksi (10–15min) kaavioryhmään kuuluneet opiskelijaparit keskustelivat internetsensuurin tiukentamisesta ja laativat argumentointikaavion keskustelujensa pohjalta. Muistiinpanoryhmään kuuluneet opiskelijaparit puolestaan keskustelivat aiheesta tehden muistiinpanoja paperille. Tämän jälkeen opiskelijaparit etsivät aiheesta lisätietoa internetistä puolen tunnin ajan. Argumentointikaavioryhmä täydensi löytämänsä informaation avulla laatimaansa kaaviota ja muistiinpanoryhmä muistiinpanojaan. Lopuksi opiskelijat laativat yhteisen kirjoitelman joko argumentointikaaviotaan tai muistiinpanojaan hyödyntäen. Opiskelijoilla oli 45 minuuttia aikaa kirjoitelmansa laatimiseen.

Opiskelijoiden internetlukemista tutkittiin ääneenajattelu- ja vuorovaikutusmenetelmällä. Ääneenajattelumenetelmässä opiskelijoita pyydettiin kertomaan ääneen siitä, mitä he ajattelevat etsiessään ja lukiessaan informaatiota internetissä. Mikäli opiskelija oli pidemmän aikaa kertomatta ajattelustaan, häntä muistutettiin ääneenajattelemisesta. Vuorovaikutusmenetelmässä opiskelijapa-

reja puolestaan pyydettiin suorittamaan annettu tehtävä yhdessä keskustellen. Joko opiskelijoiden ääneenajattelut tai opiskelijaparien käymät keskustelut sekä heidän internetissä tekemänsä toiminnot tallennettiin videonkaappausohjelmalla.

Tutkimuksen aineisto koostuu ääneenajattelu – ja vuorovaikutusprotokollista, opiskelijoiden internetissä tekemien toimintojen tallenteista sekä opiskelijoiden laatimista kirjoitelmista. Aineiston analyysi perustui kvalitatiivisten luokittelujen kvantifiointiin, mikä mahdollisti erilaisten tilastollisten menetelmien käytön aineiston käsittelyssä. Ääneenajatteluprotokollista tunnistettiin ja luokiteltiin sellaiset ilmaukset, jotka osoittivat opiskelijan prosessoivan sisältöjä, arvioivan informaatiota tai tarkkailevan ja säätelevän omia toimintojaan. Tallenteista puolestaan tunnistettiin ja luokiteltiin opiskelijoiden tekemät tiedonhakutoiminnot.

Vuorovaikutusprotokollat analysoitiin kolmella tasolla. Ensinnä opiskelijoiden lukemisen aikana käydyt keskustelut jaettiin tiedonhaun, informaation arvioinnin, sisällön prosessoinnin ja toiminnan tarkkailun ja säätelyn episodeihin. Sisällön prosessoinnin episodit jaettiin edelleen katkelmiin sen perusteella, millaista yhteisöllistä lukemista ne sisälsivät. Katkelmat luokiteltiin hyödyntämällä nelikenttää, joka muodostui kahdesta ulottuvuudesta: yhteisöllinen vs. yksilöllinen ja syvällinen vs. pinnallinen informaation prosessointi. Hiljaa lukeminen luokiteltiin erikseen. Sisällön prosessoinnin episodeista paikallistettiin ja luokiteltiin myös sellaiset ilmaisut, jotka osoittivat jonkin lukemisstrategian käyttöä.

Opiskelijoiden yksilöllisesti laatimista kirjoitelmista selvitettiin kirjoitelmien sisällöllinen laajuus ja sekä kirjoitelmien sisältämän kausaalisen ajattelun laajuus ja syvyys. Opiskelijaparien yhteisiä kirjoitelmia tarkasteltiin luokittelemalla niiden sisällöt argumentatiiviseen ja kuvailevaan sisältöön, internetsensuurin ongelmia tarkastelevaan ja ongelmanratkaisuja esittelevään sisältöön sekä sisältöön, jossa opiskelijat ilmaisevat oman kantansa internetsensuuriin. Lisäksi tarkasteltiin, kuinka paljon opiskelijaparien kirjoitelmat sisälsivät argumentteja internetsensuurin puolesta ja sitä vastaan. Myös opiskelijoiden opettajat arvioivat yhteiset kirjoitelmat.

## Tulokset ja johtopäätökset

Tämä tutkimus osoitti, että heikot tiedonhaun strategiat voivat olla yksi pullonkaula internetlukemisessa. Tutkimuksessa havaittiin, että joillakin opiskelijoilla, oli sitten kyse yksilöllisestä tai yhteisöllisestä lukemistilanteesta, oli vaikeuksia löytää relevanttia informaatiota. Tällöin jopa puolet tehtävään käytettävästä ajasta kului relevantin informaation etsimiseen, jolloin opiskelijoille jäi vähemmän aikaa itse tutkittavan ilmiön tarkasteluun. Tiedonhaun ongelmat näyttivät liittyvän hakukyselyiden muotoilemiseen, hakukoneiden toiminnan ymmärtämiseen, hakutulosten analysointiin sekä tiedonhaun suunnitteluun ja sen säätelyyn. Ongelmat näyttivät kasautuvan tietyille opiskelijoille.

Internetissä kuka tahansa voi julkaista mitä tahansa. Tämän vuoksi informaation kriittinen arviointi on erityisen tärkeää. Tämä tutkimus osoitti, että opiskelijat arvioivat useammin informaation relevanssia kuin sen luotettavuutta niin yksilöllisessä kuin yhteisöllisessäkin lukemistilanteessa. Opiskelijat erosivat huomattavasti siinä, kuinka aktiivisesti he arvioivat informaatiota ja kuinka monipuolisia arviointistrategioita he käyttivät. Yksilöllisessä lukemistilanteessa havaitut arviointiprofiilit kuvaavat näitä opiskelijoiden välisiä eroja. Arviointiprofiilit olivat seuraavat: 1) informaatiota monipuolisesti arvioivat lukijat, 2) relevanssin arviointiin keskittyvät lukijat, 3) suppeasti informaatiota arvioivat lukijat, 4) disorientoituneet lukijat sekä 5) kritiikittömästi informaatioon suhtautuvat lukijat. Huolimatta siitä, että opiskelijat arvioivat melko vähän löytämänsä informaation luotettavuutta, vain pieni joukko opiskelijoista näytti lukevan sellaisia internetsivuja, joiden julkaisijan luotettavuus oli kyseenalainen.

Tämä tutkimus osoitti, että yhteisöllinen lukeminen, jonka tavoitteena on tarkastella kiistanalaista asiaa eri näkökulmista, tukee syvällistä sisällön prosessointia. Yksilöllisessä lukemistilanteessa opiskelijat keskittyivät lähinnä informaation poimimiseen internetsivuilta. Kaikista sisällön prosessoinnin strategioista 80 % oli informaation poimintaa. Sitä vastoin yhteisöllisessä, argumentatiivista lukemista vaativassa tilanteessa vastaava osuus oli 37 %. Muut opiskelijoiden käyttämät strategiat osoittivat informaation syvällisempää käsittelyä. Vaikka yhteisöllinen, argumentatiivinen lukemistilanne näyttäisikin tukevan opiskelijoiden merkitysten ja tiedon rakentamista, eivät kaikki opiskelijat osanneet hyödyntää yhteisöllisen työskentelyn mahdollisuuksia. Opiskelijoiden yhteisöllisen lukemisen tavat vaihtelivat melkoisesti. Kun jotkut opiskelijaparit rakensivat tietoa aktiivisesti yhdessä, toiset parit suosivat yksilöllisempää lukemistapaa, jopa hiljaa lukemista.

Tämä tutkimus tuki ajatusta lukemisesta ja kirjoittamisesta toisiinsa limittyneinä tekstitaitoina. Se, kuinka syvällisesti opiskelijat työstivät lukemaansa, oli yhteydessä opiskelijoiden kirjoitelmien laatuun niin yksin kuin yhdessä työskenneltäessä. Yksilöllisessä lukemistilanteessa elaboroiva tekstin prosessointi oli yhteydessä opiskelijoiden kirjoitelmien laajuuteen ja kausaalisuuteen. Yhteisöllisessä lukemistilanteessa ne opiskelijaparit, jotka käyttivät eniten aikaa yhteiseen merkitysten ja tiedon rakentamiseen, saivat kirjoitelmistaan parhaat arvosanat. Sitä vastoin opiskelijaparit, jotka käyttivät vähiten aikaa yhteiseen merkitysten ja tiedon rakentamiseen ja jotka suosivat yksilöllisempää lukemistapaa, saivat keskimäärin heikoimmat arvosanat. Ainakin tämän tutkimuksen perusteella näyttää siltä, että opiskelijat pystyivät hyödyntämään internetlukemisen aikaista syvällistä sisällön prosessointiaan kirjoitelmien laatimisessa.

Hyvien lukijoiden on havaittu tarkkailevan ja säätelevän lukemisprosessejaan, oli sitten kyse perinteisten, lineaaristen tekstien tai ei-lineaaristen internettekstien lukemisesta (Baker, 2008; Coiro & Dobler, 2007). Tämä tutkimus tukee aiempia havaintoja. Taitavat opiskelijat suunnittelivat, arvioivat ja sopeuttivat toimintaansa tehtävän vaatimuksiin. Heidän lukemisensa internetissä oli ennakoivaa ja toimintaa suuntaavaa. Heikoimmin tehtävässä menestyneiden internetlukijoiden metakognitiivista toimintaa voi puolestaan luonnehtia reaktiivi-

seksi välittömien toimintojen tarkkailuksi ja säätelyksi. Nämä lukijat saattoivat esimerkiksi toistaa tehottomia hakukyselyitä ja valita linkkejä hakutuloksista ilman sen suurempaa harkintaa. Sitä vastoin taitavat lukijat arvioivat hakukyselyjen toimivuutta ja säätelivät toimintaansa sen mukaisesti. He myös pyrkivät valitsemaan hakutuloksista sellaisia linkkejä, jotka he arvioivat hyödyllisiksi. Erot metakognitiivisessa toiminnassa tulivat esille myös sisältöjen prosessoinnissa. Kun taitavat lukijat käyttivät lukemisen strategioita tarkoituksenmukaisesti sekä informaation poimimiseen, lähteiden vertailuun että informaation syvällisempään työstämiseenkin, niin heikoimmat lukijat keskittyivät pääasiassa informaation kopiointiin yhdeltä sivulta kerrallaan. Taitavat lukijat pitivät myös jo löytämänsä hyödylliset sivut helposti uudelleen saatavilla, kun taas heikoimmat lukijat joutuivat etsimään ne uudestaan.

Tämä tutkimus osoitti, että argumentointikaavion laatiminen voi tukea opiskelijoiden yhteisöllistä internetlukemista ja lähteisiin perustuvaa kirjoittamista ainakin kolmella tavalla. Ensinnä opiskelijaparit, jotka laativat argumentointikaavion lukemisen aikana käyttivät vähemmän aikaa tiedonhakuun kuin opiskelijaparit, jotka tekivät lukemisen aikana muistiinpanoja. Kun tiedonhakuun käytetään vähemmän aikaa, jää opiskelijoille enemmän mahdollisuuksia keskittyä itse opiskeltavaan sisältöön. Toiseksi opiskelijaparit, jotka laativat argumentointikaavion, pohtivat enemmän käsitteiden ja argumenttien välisiä suhteita kuin muistiinpanoja laatineet opiskelijaparit. Argumentointikaavion avulla opiskelijat voivatkin tehdä näkyväksi sen, miten he syntetisoivat lähteistä löytyneitä ja lähteiden virittämiä ajatuksia toisiinsa. Kolmanneksi tutkimuksessa havaittiin, että argumentointikaavion laatineiden opiskelijaparien kirjoitelmat sisälsivät enemmän sekä argumentatiivista sisältöä että yksittäisiä argumentteja kuin muistiinpanoja laatineiden opiskelijoiden kirjoitelmat.

Nykynuoria on kutsuttu diginatiiveiksi (Prensky, 2001) tai nettisukupolveksi (Jones & Czerniewicz, 2010) ja useimmat heistä ovatkin taitavia käyttämään internetiä sosiaaliseen verkostoitumiseen ja viihdetarkoituksiin. Tämä tutkimus osoittaa sen, että kaikki nuoret eivät kuitenkaan ole riittävän taitavia silloin, kun on kyse informaation hyötykäytöstä, joka vaatii korkeamman tason ajattelutaitoja. Tämän tutkimuksen perusteella näyttää siltä, että opiskelijat tarvitsisivat ohjausta tehokkaiden hakukyselyjen muotoiluun ja informaation kriittiseen arviointiin. Hakukyselyjen muotoilua voitaisiin harjoitella esimerkiksi pohtimalla, miten tutkittavaa ilmiötä voitaisiin käsitteellistää. Informaation kriittistä arviointia voitaisiin puolestaan harjoitella kiinnittämällä huomiota tekstien julkaisijaan, keskustelemalla julkaisijan tarkoitusperistä sekä tarkastelemalla eri intressiryhmien näkemyksiä. Olisi myös tärkeää oppia arvioimaan sitä, miten kirjoittajat perustelevat omia kantojaan. Opiskelijoiden syvällistä informaation prosessointia voidaan tukea sellaisin tehtävänannoin, jotka vaativat yhteisöllistä merkitysten ja tiedon rakentamista. Koska kaikki opiskelijat eivät osaa hyödyntää yhteisöllisen internetlukemisen tarjoamia mahdollisuuksia, pitäisi kehittää sellaisia digitaalisia työkaluja ja tehtävänantoja, joiden käyttö vaatii lukemisen aikaisia merkitysneuvotteluita.

## REFERENCES


Afflerbach, P., & Cho, B.-Y. (2009). Identifying and describing constructively responsive comprehension strategies in new and traditional forms of reading. In S. E. Israel & G. G. Duffy (Eds.), *Handbook of research on reading comprehension* (pp. 69–90). London: Routledge.

Afflerbach, P., & Cho, B.-Y. (2010). Determining and describing reading strategies: Internet and traditional forms of reading. In H. S. Waters & W. Schneider (Eds.), *Metacognition, strategy use, and instruction* (pp. 201–225). New York, NY: Guilford Press.

Afflerbach, P., Pearson, D., & Paris, S. (2008). Clarifying differences between reading skills and reading strategies. *Reading Teacher, 61*(5), 364–373.

Anderson, V., & Roit, M. (1993). Planning and implementing collaborative strategy instruction for delayed readers in grades 6–10. *Elementary School Journal, 94*(2), 121–137.

Baker, L. (2008). Metacognition in comprehension instruction: What we've learned since NRP. In C. C. Block & S. R. Paris (Eds)., *Comprehension instruction: Research-based best practices* (pp. 65–79). New York, NY: Guilford Press.

Baker, L., & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson, R. Barr, M. L. Kamil, & P. Mosenthal (Eds.), *Handbook of reading research* (pp. 353–394). New York, NY: Longman.

Bilal, D. (2000). Children's use of the yahooligans! Web search engine: I. Cognitive, physical, and affective behaviors on fact-based search tasks. *Journal of the American Society of Information Science, 51*(7), 646–665.

Bilal, D., & Kirby, J. (2002). Differences and similarities in information seeking: Children and adults as Web users. *Information Processing & Management, 38* (5), 649–670.

Bogdan, R. C., & Biklen, S. K. (2003). *Qualitative research for education: An introduction to theories and methods* (4th ed.) Boston, MA: Allyn & Bacon.

Bos, N. (2000). High school students' critical evaluation of scientific resources on the World Wide Web. *Journal of Science Edcation and Technology, 9*(2), 161–173.

Brand-Gruwel, S., Wopereis, I., & Vermetten, Y. (2005). Information problem solving by experts and novices: Analysis of a complex cognitive skill. *Computers in Human Behavior, 21*(3), 487–508.

Brem, S. K., Russell, J., & Weems, L. (2001). Science on the Web: Student evaluations of scientific arguments. *Discourse Processes, 32*(2&3), 191–213.

Britt, M. A., & Larson, A. A. (2003). Constructing representations of arguments. *Journal of Memory and Language, 48*(4), 794–810.

Bråten, I., & Strømsø, H. I. (2006). Epistemological beliefs, interest, and gender as predictors of Internet-based learning activities. *Computers in Human Behavior, 22*(6), 1027–1042.

Castek, J., & Coiro, J. (2010). Measuring online reading comprehension in open networked spaces: Challenges, concerns, and choices. Poster presented at

Annual Meeting of American Educational Research Association, Denver, April 30 – May 4, 2010.

Cerdán, R., Marín, M. C., & Vidal-Abarca, E. (2011). Perspective and source effects when high-school students read multiple contradictory documents. Paper presented at the 13th Biennial Conference Earli 2011, Exeter, UK, August 30 – September 3, 2011.

Chambliss, M. J. (1995). Text cues and strategies successful readers use to construct the gist of lengthy written arguments. *Reading Research Quarterly*, *30*(4), 778–807.

Chan, C. K. K., Burtis, P. J., Scardamalia, M., & Bereiter, C. (1992). Constructive activity in learning from texts. *American Educational Research Journal, 29*(1), 97–118.

Chi, M. T. H. (1997). Quantifying qualitative analyses of verbal data: A practical guide. *Journal on the Learning Sciences, 6*(3), 271–315.

Chi, M. T. H., de Leeuw, N., Chiu, M., & LaVancher, C. (1994). Eliciting self-explanations improves understanding. *Cognitive Science, 18*(3), 439–477.

Cho, B-Y. (2011). Adolescents constructively responsive reading strategy use in a critical internet reading task. Doctoral dissertation, University of Maryland. Retrieved from http://drum.lib.umd.edu/bitstream/1903/11879/1/Cho_umd_0117E_ 12423.pdf

Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher, 56*(5), 458–464.

Coiro, J., Castek, J., & Guzniczak, L. (2011). Uncovering online reading comprehension processes: Two adolescents reading independently and collaboratively on the Internet. *60th Yearbook of the Literacy Research Association,* 354–369.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly, 42*(2), 214–257.

Coiro, J., Knobel, M., Lankshear, C., & Leu, D. J. (2008). Central issues in New Literacies and New Literacies research. In J. Coiro, M. Knobel, C. Lankshear, & D. J. Leu (Eds.), *Handbook of Research on New Literacies* (pp. 1–21). Mahwah, NJ: Erlbaum.

Connor-Greene, P. A., & Greene, D. J. (2002). Science or snake oil? Teaching critical evaluation of "research" reports on the Internet. *Teaching of Psychology, 29*(4), 321–324.

Cox, R. (1999). Representation construction, externalized cognition and individual differences. *Learning and Instruction, 9*(4), 343–363.

Cromley, J. G., & Azevedo, R. (2009). Locating Information within Extended Hypermedia. *Educational Technology Research and Development, 57*(3), 287–313.

Dillenbourg P. (1999). What do you mean by collaborative learning? In P. Dillenbourg (Ed.), *Collaborative-learning: Cognitive and Computational Approaches* (pp. 1–19). Oxford: Elsevier.

Dillenbourg, P., & Schneider, D. (1995). Collaborative Learning and the Internet. ICCAI 95, 1995. Retrieved from http://tecfa.unige.ch/tecfa/research/ CMC/ colla/iccai95_1.html.

Dirks, K. T. (1999). The effects of interpersonal trust on work group performance. *The Journal of Applied Psychology, 84*(3), 445–455.

Dole, J. A., Duffy, G. G., Roehler, L. E., & Pearson, P. D. (1991). Moving from the old to the new: Research on reading comprehension instruction. *Review of Educational Research, 61(*2), 239–264.

Doolittle, P., & Hicks, D. (2003). Constructivism as a theoretical foundation for the use of technology in social studies. *Theory and Research in Social Education, 31*(1), 72–104.

Eagleton, M. B., & Dobler, E. (2007). *Reading the Web: Strategies for Internet inquiry.* New York, NY: The Guilford Press.

Efklides, A. (2006). Metacognition and affect: What can metacognitive experiences tell us about the learning process? *Educational Research Review, 1*(1), 3–14.

Engelmann, T., Dehler, J., Bodemer, D., & Buder, J. (2009). Knowledge awareness in CSCL: A psychological perspective. *Computers in Human Behavior, 25*(4), 949–960.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data*. Cambridge, MA: MIT Press.

Fidel, R., Davies, R. K., Douglas, M. H., Holder, J. K., Hopkins, C. J., Kushner, E. J., Miyagishima, B. K., & Toney, C. D. (1999). A visit to the information mall: Web searching behavior of high school students. *Journal of the American Society for Information Science and Technology*, *50*(1), 24–37.

Finnish National Board of Education. (2003). National core curriculum for upper secondary schools 2003. Retrieved from http://www.oph.fi /download/ 47678_core_curricula_upper_secondary _education.pdf

Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American psychologist, 34*(10), 906–911.

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365–387.

Fogg, B. J., Marshall, J., Laraki, O., Osipovich, A., Varma, C., Fang, N., Paul, J., Rangnekar, A., Shon, J., Swani, P., & Treinen, M. (2001). What makes websites credible? A report on a large quantitative study. *Proceedings of the SIGCHI on Human Factors in Computing Systems*. Seattle, WA: The Association of Computing Machinery.

Garner, R. (1987). *Metacognition and reading comprehension*. Norwood, NJ: Ablex Publishing Corporation.

Gerjets, P., Kammerer, Y., & Werner, B. (2011). Measuring spontaneous and instructed evaluation process during Web search: Integrating concurrent thinking-aloud protocols and eye-tracking data. *Learning and Instruction, 21*(2), 220–231.

Greene, S., & Ackerman, J. M. (1995). Expanding the constructivist metaphor: A rhetorical perspective on literacy research and practice. *Review of Educational Research, 65*(4), 383–420.

Grimes, D. J., & Boening, C. H. (2001). Worries with the Web: A look at student use of Web resources. *College & Research Libraries, 62*(1), 11–23.

Guinee, K., Eagleton, M. B., & Hall, T. E. (2003). Adolescents' Internet search strategies: Drawing upon familiar cognitive paradigms when accessing electronic information sources. *Journal of Educational Computing Research, 29*(3), 363–374.

Heisey, N., & Kucan, L. (2010). Introducing science concepts to primary students through read-alouds: Interactions and multiple texts make the difference. *The Reading Teacher, 63*(8), 666–676.

Henry, L. A. (2006). SEARCHing for an answer: The critical role of new literacies while reading on the Internet. *The Reading Teacher, 59*(7), 614–627.

Iiskala, T., Vauras, M., Lehtinen, E., & Salonen, P. (2011). Socially shared metacognition of dyads of pupils in collaborative mathematical problem-solving processes. *Learning and Instruction, 21*(3), 379–393.

Jacobson, M. J., & Spiro, R. J. (1995). Hypertext learning environments, cognitive flexibility, and the transfer of complex knowledge: An empirical investigation. *Journal of Educational Computing Research, 12*(4), 301–333.

Jonassen, D. H., Howland, J., Moore, J., & Marra, M. (2003). *Learning to solve problems with technology: A constructivist approach* (2nd ed.). NJ: Merill Prentice Hall.

Jones, C., & Czerniewicz, L. (2010). Describing or debunking? The net generation and digital natives. *Journal of Computer Assisted Learning, 26*(5), 317–320.

Judd, V. C., Farrow, L. I., & Tims, B. J. (2006). Evaluating public web site information: A process and an instrument. *Reference Service Review, 34*(1), 12–32.

Kahler, H. (2000). Methods and tools: Constructive interaction and collaborative work: Introducing a method for testing collaborative systems. *ACM Interactions, 7*(3), 27–34

Kiili, C., Laurinen, L., & Marttunen, M. (2011). Metacognitive experiences during collaborative online reading. In V. Kaartinen, C. Kiili, & M. Mäkinen (Eds.), *Proceedings of 2nd Baltic Sea Reading Conference − 15th Nordic Reading Conference* (pp. 52–62). Online publication available at http://www.parnet.fi/~finra/proceedings_of_second-baltic_sea_ reading _conference. Turku: FinRA Ry.

King, A. (1994). Guiding knowledge construction in the classroom: Effects of teaching children how to question and how to explain. *American Educational Research Journal*, *31*(2), 338–368.

King, A. (2007). Beyond literal comprehension: A strategy to promote deep understanding of text. In D. S. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions and technologies* (pp. 267–290). New York, NY: Lawrence Erlbaum.

Kintsch, W. (1988). The role of knowledge in discourse processing: A construction-integration model. *Psychological Review, 95*(2), 163–182.

Klingner, J. K., & Vaughn, S. (1999). Promoting reading comprehension, content learning, and English acquisition through Collaborative Strategic Reading (CSR). *Reading Teacher, 52*(7), 738–747.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behaviour*, *19*(3), 335–353.

Kress. G. (2003). *Literacy in the new media age.* London: Routledge.

Kucan, L., & Beck, I. L. (2003). Inviting students to talk about expository texts: A comparison of two discourse environments and their effects on comprehension. *Literacy Research and Instruction, 42*(3), 1–31.

Kuiper, E., & Volman, M. (2008). The Web as a source of information for students in K-12 education. In J. Coiro, M. Knobel, C. Lankshear & D. Leu. (Eds.), *Handbook of Research on New Literacies* (pp. 241–266). Mahwah, NJ: Lawrence Erlbaum.

Kuiper, E., Volman, M., & Terwel, J. (2005). The Web as an information resource in K–12 education: Strategies for supporting students in searching and processing information. *Review of Educational Research, 75*(3), 285–328.

Larson, M., Britt, M. A., & Larson, A. A. (2004). Disfluencies in comprehending argumentative texts. *Reading Psychology, 25*(3), 205–224.

Lazonder, A. W. (2005). Do two heads search better than one? Effects of student collaboration on Web search behaviour and search outcomes. *British Journal of Educational Technology, 36*(3), 465–475.

Le Bigot, L., & Rouet, J. F. (2007). The impact of presentation format, task assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research, 39*(4), 445–470.

Leu, D. J., Coiro, J., Castek, J., Hartman, D. K., Henry, L. A., & Reinking, D. (2008). Research on instruction and assessment in the new literacies of online reading comprehension. In C. C. Block & S. R. Parris (Eds.), *Comprehension instruction:Research-based best practices* (pp. 321–346). New York, NY: Guilford.

Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from Internet and other information and communication technologies. In R. B. Ruddell & N. Unrau (Eds.), *Theoretical models and process of reading* (5th ed., pp. 1570–1613). Newark, DE: International Reading Association.

Leu, D. J., McVerry, J. G., O´Byrne, I., Kiili, C., Zawilinski, L., Everett-Cacopardo, H., Kennedy, C., & Forzani, E. (2011). The New Literacies of online reading comprehension: Expanding the literacy and learning curriculum. *Journal of Adolescent & Adult Literacy, 55*(1), 5–14.

Leu, D. J., O'Byrne, W. I., Zawilinski, L., McVerry, J. G., & Everett-Cacopardo, H. (2009). Expanding the New Literacies conversation. *Educational Researcher, 38*(4), 264–269.

Leu, D. J., Zawilinski, L., Castek, J., Banerjee, M., Housand, B., Liu, Y., & O'Neil, M. (2007). What is new about the new literacies of online reading comprehension? In L. Rush, J. Eakle, & A. Berger (Eds.), *Secondary school literacy: What research reveals for classroom practices* (pp. 37–68). Urbana, IL: National Council of Teachers of English.

Lorenzen, M. (2001). The land of confusion? High school students and their use of the World Wide Web for research. *Research Strategies, 18*(2), 151–163.

Lund, K., & Baker, M. J. (1999). Teachers' collaborative interpretations of students' computer-mediated collaborative problem solving interactions. In S. P. Lajoie & M. Vivet (Eds.), *Proceedings of the International Conference on Artificial Intelligence and Education, Le Mans, July 1999. Artificial Intelligence in Education* (pp. 147–154) Amsterdam: IOS Press.

Maglaughlin, K. L., & Sonnenwald, D. H. (2002). User perspectives on relevance criteria: A comparison among relevant, partially relevant, and non-relevant judgements. *Journal of the American Society for Information Science and Technology, 53*(3), 327–342.

Magliano, J. P., Millis, K., Ozuru, Y., & McNamara, D. S. (2007), A multidimensional framework to evaluate reading assessment tools. In D. S. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions and technologies* (pp. 107–136). New York, NY: Lawrence Erlbaum.

MaKinster, J. G., Beghetto, R. A., & Plucker, J. A. (2002). Why can't I find Newton's third law? Case studies of students' use of the Web as a science resource. *Journal of Science Education and Technology, 11*(2), 155–172.

Marttunen, M., & Laurinen, L. (2007). Collaborative learning through chat discussions and argument diagrams in secondary school. *Journal of Research on Technology in Education, 40*(1), 109–126.

Marttunen, M., Laurinen, L., Litosseliti, L., & Lund, K. (2005). Argumentation skills as prerequisites for collaborative learning among Finnish, French and English secondary school students. *Educational Research and Evaluation, 11*(4), 365–384.

Mayer, R. E. (1985). Structural analysis of science prose: Can we increase problem-solving performance? In B. K. Britton & J. B. Black (Eds.), *Understanding expository text: A theoretical and practical handbook for analyzing explanatory text* (pp. 65–86). Hillsdale, NJ.: Lawrence Erlbaum.

Mayer, R. E. (2004). Should there be a three-strikes rule against pure discovery learning? *American Psychologist, 59*(1), 14–19.

McCrudden, M. T., & Schraw, G. (2007). Relevance and goal-focusing in text processing. *Educational Psychology Review, 19*(2), 113–139.

Mercer, N. (1996). The quality of talk in children's collaborative activity in the classroom. *Learning and Instruction, 6*(4), 359–377.

Mercer, N., & Howe, C. (2012). Explaining the dialogic process of teaching and learning: The value and potential of sociocultural theory. *Learning, Culture and Social Interaction.* doi:10.1016/j.lcsi.2012.03.001.

Mercer, N., & Littleton, K. (2007). *Dialogue and the development of children's thinking: A sociocultural approach*. London: Routledge.

Miyake, N. (1986). Constructive interaction and the iterative process of understanding. *Cognitive Science, 10*(2), 151–177.

Morocco, C. C., Aguilar, C. M., & Bershad, C. J. (2006). *Supported literacy for adolescents: Transforming teaching and content learning for the 21st century*. San Francisco, CA: Jossey-Bass.

Murphy, E., & Dingwall, R. (2001). The ethics of ethnography. In P. Atkinson, A. Coffey, S. Delamont, J. Lofland, & L. Lofland (Eds.), *Handbook of ethnography* (pp. 339–351). London: Sage.

Mäkitalo, K. (2006). *Interaction in online learning environments: How to support collaborative activities in higher education settings.* University of Jyväskylä. Institute of Educational Research. Research Reports 18.

Nakakoji, K., & Fischer, G. (1995). Intertwining knowledge delivery and elicitation: A process model for human-computer collaboration in design. *Knowledge-Based Systems Journal, 8*(2–3), 94–104.

National Advisory Board on Research Ethics. (2009). *Ethical principles of research in the humanities and social and behavioural sciences and proposals for ethical review.* Retrieved from http://www.tenk.fi/eettinen_ennakkoarviointi/ethicalprinciples.pdf

Newell, G. E., Beach, R., Smith, J., & VanDerHeide, J. (2011). Teaching and learning argumentative reading and writing: A review of research. *Reading Research Quarterly, 46*(3), 273–304.

Nolen, A. L., & Putten, J. V. (2007). Action research in education: Addressing gaps in ethical principles and practices. *Educational Researcher, 36*(7), 401–407.

Ozuru, Y., Dempsey, K., & McNamara, D. (2009). Prior knowledge, reading skill, and text cohesion in the comprehension of science texts. *Learning and Instruction, 19*(3), 228–242.

Palincsar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology, 49*(1), 345–375.

Palincsar, A. S., & Brown, A. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*(2), 117–175.

Philips, D. C. (1995). The good, the bad, and the ugly: The many faces of cosntructivism. *Educational Researcher, 24*(7), 5–12.

Prawat, R. S., & Floden, R. E. (1994). Philosophical perspectives on constructivist views of learning. *Educational Psychology, 29*(1), 37–48.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon*, *9*(5), 1–6.

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ.: Lawrence Erlbaum.

Pressley, M., & Gaskins, I. W. (2006). Metacognitively competent reading comprehension is constructively responsive reading: How can such reading be developed in students? *Metacognition and Learning, 1*(1), 99–113.

Quintana, C., Zhang, M., & Krajcik, J. (2005). A framework for supporting metacognitive aspects of online inquiry through software-based scaffolding. *Educational Psychologist, 40*(4), 235–244.

RAND Reading Study Group. (2002). *Reading for understanding: Towards an R&D program in reading comprehension.* Retrieved from http://www. iapsych. com/articles/rand2002.pdf.

Reznitskaya, A., Anderson, R. C., Dong, T., Li, Y., Kim, I-L., & Kim, S-Y. (2008). Learning to think well: Application of argument schema theory to literacy instruction. In C. C. Block & S. R. Parris (Eds.), *Comprehension instruction: Research-based best practices* (pp. 654–668). New York, NY: Guilford Press.

Rieh, S. Y. (2000). *Information quality and cognitive authority in the World Wide Web*. Doctoral dissertation. Rutgers University. Retrieved from http:// www.si.umich. edu/rieh/ research_diss.html

Rieh, S. Y. (2002). Judgment of information quality and cognitive authority in the Web. *Journal of the American Society for Information Science and Technology, 53*(2), 145–161.

Rouet, J. F. (2006). *The skills of document use: From text comprehension to Web-based learning*. Mahwah, NJ: Lawrence Erlbaum.

Salminen, T., Marttunen, M., & Laurinen, L. (in press). Argumentation in secondary school students' structured and unstructured chat discussions. *Journal of Educational Computing Research, 47*(2).

Saracevic, T. (1996). Relevance considered. In P. Ingwersen & N. Ole Pors (Eds.), *Proceedings of the Second Conference on Conceptions of Library and Information Science CoLIS2* (pp. 201–218). Copenhagen, Denmark: Royal School for Librarianship.

Schmoker, M. J. (2006). *Results now: How we can achieve unprecedented improvements in teaching and learning*. Alexandria, VA: Association for Supervision and Curriculum Development.

Schwarz, B. (2003). Collective reading of multiple texts in argumentative activities. *International Journal of Educational Research, 39*(1–2), 133–151.

Smith, E. (1999). Social constructivism, individual constructivim and the role of computers in mathematics education. *Journal of Mathematical Behavior, 17*(4), 411–425.

Smith, M. C., Mikulecky, L., Kibby, M. W., Dreher, M. J., & Dole, J. A. (2000). What will be the demands of literacy in the workplace in the next millennium? *Reading Research Quarterly, 3*(3), 378–383.

Sormunen, E., & Pennanen, S. (2004). The challenge of automated tutoring in Web-based learning environments for information retrieval instruction. *Information research, 9*(2). Retrieved from http://informationr.net/ir/9-2/paper169.html

Spivey, N. N., & King, J. R. (1989). Readers as writers composing from sources. *Reading Research Quarterly, 24*(1), 254–277.

Stadtler, M., & Bromme, R. (2007). Dealing with multiple documents on the WWW: The role of metacognition in the formation of documents models.

*International Journal of Computer-Supported Collaborative Learning, 2*(2–3), 191–210.

Stahl, S. A., Hynd, C. R., Britton, B. K., McNish, M. M., & Bosquet, D. (1996). What happens when students read multiple source documents in history? *Reading Research Quarterly, 31*(4), 430–456.

Stahl, G. (2005). Group cognition in computer-assisted collaborative learning. *Journal of Computer Assisted Learning, 21*(2), 79–90

Strømsø, H. I., Bråten, I., & Samuelstuen, M. S. (2008). Dimensions of topic-specific epistemological beliefs as predictors of multiple text understanding. *Learning and Instruction, 18*(6), 513–527.

Suthers, D. D. (2001). Towards a systematic study of representational guidance for collaborative learning discourse. *Journal of Universal Computer Science, 7*(3), 254–277.

Suthers, D. D. (2003). Representational guidance for collaborative inquiry. In J. E. B. Andriessen, M. Baker, & D. D. Suthers (Eds.), *Arguing to learn. Confronting cognitions in computer-supported collaborative learning environments* (pp. 27–46). Dordrecht: Kluwer.

Suthers, D. D. (2006). Technology affordances for intersubjective meaning making: A research agenda for CSCL. *International Journal of Computer-Supported Collaborative Learning, 1*(3), 315–337.

Suthers, D. D., & Hundhausen, C. D. (2003). An experimental study of the effects of representational guidance on collaborative learning processes. *The Journal of the Learning Sciences, 12*(2), 183–218.

Säljö, R. (2010). Digital tools and challenges to institutional traditions of learning: Technologies, social memory and the performative nature of learning. *Journal of Computer Assisted Learning, 26*(1), 53–64.

Tarchi, C. (2010). Reading comprehension of informative texts in secondary school: A focus on direct and indirect effects of reader's prior knowledge. *Learning and Individual Differences, 20*(5), 415–420.

Teasley, S. D. (1995). The role of talk in children's peer collaborations. *Developmental Psychology, 31*(2), 207–220.

Udell, W. (2007). Enhancing adolescent girls' argument skills in reasoning about personal and non-personal decisions. *Cognitive Development*, *22*(3), 341–352.

Van Amelsvoort, M. (2006). *A space for debate. How diagrams support collaborative argumentation-based learning*. Doctoral dissertation. ICO, Dutch Interuniversity Center for Educational Research. PrintPartners Ipskamp, Enschede.

Van Boxtel, C., Van der Linden, & Kanselaar, G. (2000). Collaborative learning tasks and the elaboration of conceptual knowledge. *Learning and Instruction, 10*(4), 311–330.

Van den Haak, M. J., de Jong, M. D. T, & Schellens, P. J. (2004). Employing think-aloud protocols and constructive interaction to test the usability of online library catalogues: A methodological comparison. *Interacting with Computers, 16*(6), 1153–1170.

Van Merriënboer, J. J. G., & Kirschner, P. A. (2007). *Ten steps to complex learning: A systematic approach to four-component instructional design*. Mahwah, NJ: Lawrence Erlbaum.

Vass, E., Littleton, K., Miell, D., & Jones, A. (2008). The discourse of collaborative creative writing: Peer collaboration as a context for mutual inspiration. *Thinking Skills and Creativity*, *3*(3), 192–202.

Verhoeven, L., & Graesser, A. (2008). Cognitive and linguistic factors in interactive knowledge construction. *Discourse Processes, 45*(4), 289–297.

Volet, S., Summers, M., & Thurman, J. (2009). High-level co-regulation in collaborative learning: How does it emerge and how it is sustained? *Learning and Instruction, 19*(2), 128–143.

Vygotsky, L. S. (1986). *Thought and language*. Cambridge, MA: MIT Press.

Wallace, R. M., Kupperman, J., Krajcik, J., & Soloway, E. (2000). Science on the Web: Students on-line in a sixth-grade classroom. *Journal of Learning Sciences, 9*(1), 75–104.

Walraven, A., Brand-Gruwel, S., & Boshuizen, H. P. A. (2008). Information-problem solving: A review of problems students encounter and instructional solutions. *Computers in Human Behavior, 24*(3), 623–648.

Wells, G. (1990). Talk about texts: Where literacy is learned and taught. *Curriculum Inquiry, 20*(4), 369–405.

Wells, G. (2002). Learning and teaching for understanding: The key role of collaborative knowledge building. In J. Brophy (Ed.), *Social constructivist teaching: Affordances and constraints* (pp. 1–41). Oxford, England: Elsevier.

Wells, G. (2007). Semiotic mediation, dialogue and the construction of knowledge. *Human Development, 50*(5), 244–274.

Wilenius, M. (2011). Näköaloja kasvatuksen tulevaisuuteen. [Prospects of future education]. Keynote speech at the Annual Meeting of Finnish Educational Research Association, November 2, 2011, Joensuu, Finland.

Wiley, J., & Bailey, J. (2006). Effects of collaboration and argumentation on learning from Web pages. In A. M. O'Donnell, C. E. Hmelo-Silver, & G. Erkens (Eds.), *Collaborative learning, reasoning, and technology. Rutgers invitational symposium on education series* (pp. 297–321). Mahwah, NJ: Lawrence Erlbaum.

Wiley, J., & Voss, J. F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology, 91*(2), 301–311.

Wiley, J., Goldman, S. R., Graesser, A. C., Sanchez, C. A., Ash, I. K., & Hemmerich, J. A. (2009). Source evaluation, comprehension, and learning in Internet science inquiry tasks. *American Educational Research Journal, 46*(4), 1060–1106.

Wolfe, M. B. W., & Goldman, S. R. (2005). Relations between adolescents' text processing and reasoning. *Cognition and Instruction, 23*(4), 467–502.

Wu, Y-T., & Tsai, C-C. (2005). Information commitments: Evaluative standards and information searching strategies in web-based learning environments. *Journal of Computer Assisted Learning, 21*(5), 374–385.

Zhang, S., & Duke, N. K. (2008). Strategies for Internet reading with different reading purposes: A descriptive study of twelve good Internet readers. *Journal of Literacy Research, 40*(1), 128–162.

Zohar, A., & Nemet, F. (2002). Fostering students' knowledge and argumentation skills through dilemmas in human genetics. *Journal of Research in Science Teaching*, *39*(1), 35–62.

# ORIGINAL PAPERS

# I

## STUDENTS EVALUATING INTERNET SOURCES: FROM VERSATILE EVALUATORS TO UNCRITICAL READERS

by

Carita Kiili, Leena Laurinen, & Miika Marttunen, 2008

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# II

# SKILLFUL INTERNET READER IS METACOGNITIVELY COMPETENT

by

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## Issues and Challenges

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# Chapter XLI
# Skillful Internet Reader is Metacognitively Competent

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## ABSTRACT

*The purpose of this study was to investigate the interrelations between information searching, text-processing, information evaluation, and metacognition when upper-secondary school students are using Internet as a source for an essay. Students (n = 24) were asked to search for source material from the Internet in order to write an essay on a given topic. They were asked to verbalize their thoughts while they were gathering their source material. Their verbalizations and actions were recorded and analyzed. The results indicated that students who had difficulties in locating relevant information had to monitor their orientation and keep track of what to do next. Skillful students, in contrast, were able to plan and evaluate their performance, and adjust their activities to the task demands. These students were then able to focus more on elaborative text-processing. Thus, the present study supports the view that constructively responsive reading demands a metacognitively competent reader.*

## INTRODUCTION

Using the Internet both as an information source and as a learning resource sets cognitive demands for searching, information processing, evaluation, and regulation. Mostly these complex processes have been researched in separate studies. However, Brand-Gruwel, Wopereis, and Vermetten (2005) have suggested a model to combine these processes. The information problem solving

process, as their model is called, consists of five main skills and their regulation. In the model the main skills are: 1) defining the information problem, 2) searching for information, 3) scanning information, 4) processing information, and 5) organizing and presenting information. These main skills further divide into several sub-skills. A closer look at these sub-skills reveal that judging information is an iterative process that is related to the information searching, scanning, and processing phases of the information problem solving task. Because of this complexity, Internet readers need, alongside traditional reading strategies, additional prior knowledge on website structures and search engines (Coiro & Dobler, 2007). They also need forward inferential reasoning strategies (Coiro & Dobler, 2007) and critical thinking skills (Gilster, 1997).

In this chapter we use concept of Internet reading as we are interested in how internet users apply traditional reading strategies. Do to the fact that Internet differs from traditional information sources, these reading strategies are complemented with information search processes as well as information evaluation and metacognitive processes specific to Internet reading.

Information on the Internet is often presented as hypertext. Hypertexts are typically non-linear, interactive texts that may include multiple media forms (Coiro, 2003). Readers of hypertexts decide what information to access and in what order. Thus, the reader is responsible for choosing and organizing arguments, whereas in traditional, linear texts these activities are done by the author (Carter, 2003). This is an interesting notion in view of the difficulty that university students have in identifying arguments (Larson, Britt, & Larson, 2004), even when reading printed, linear texts. The reader's responsibility for making decisions about what to read and in what order increases cognitive load; this in turn impairs reading performance (DeStefano & LeFevre, 2007). Eveland and Dunwoody (2000) found, consistently, that majority of processing done by Internet users focused on maintaining orientation both to the structure and to the content of the website. This dual effort reduces information processing devoted to meaningful learning.

In most cases, Internet readers are required to integrate information from multiple sources to meet their information needs. According to Britt and Sommer (2004), it is more demanding to form between-text links than within-text links, because of the lack of explicit clues for facilitating integration. On the other hand, when readers seek to acquire a coherent representation by integrating information from multiple sources, they process information more actively (ibid). In the study conducted by Wiley and Voss (1999) university students read the same material either from multiple sources (web documents) or as a single text from a textbook. The students were asked to write an argumentative, narrative, or exploratory essay, or a summary. The students who read the material from multiple sources and wrote an argumentative essay composed the most integrative essays with the most causal connections.

In studies concerned with the reading strategies used on the Internet, participants have either searched for information in accordance with their own interests (Eveland & Dunwoody, 2000; Hill & Hannafin, 1997) or they have searched for answers to narrow questions (Coiro & Dobler, 2007; Konishi, 2003). The aim of the present study was to obtain information about reading on the Internet while students searched for and read information for a broader, authentic learning task, that is, when they used the Internet as a source for an essay. The primary focus of this chapter is on the interrelations between information searching, text-processing, information evaluation, and metacognition and how these processes are mirrored in essay writing.

## Information Searching

Internet readers need both prior knowledge of the topic related to the search task and experience of

the use of the Internet to be able to locate relevant information (Hölscher & Strube, 2000; Jenkins, Corritore, & Wiedenbeck, 2003). In most cases, however, mere recall of relevant prior knowledge and technical Internet skills are not enough. An Internet reader must also be able to transform his or her prior knowledge in order to formulate relevant search terms. Van Merriënboer and Kirschner (2007, pp. 15–16) have presented a hierarchy of the search skills needed to obtain relevant research literature. In the hierarchy formulating a search query refers to the skills of translating the research question into relevant search terms and combining these search terms to construct an appropriate query. Lower-order skills, such as using Boolean operators, are prerequisites for performing higher-order skills. In their review Walraven, Brand-Gruwel, and Boshuizen (2008) noted that all age groups have difficulties in specifying appropriate search terms. Even university students have problems with these higher-order skills, as has been demonstrated by Sormunen and Pennanen (2004). They found that that the most common errors in the search queries of university students were, in fact, concept-level errors.

## Cognitive and Metacognitive Processes in Reading

According to Pressley and Gaskins (2006, pp. 100, 102), constructively responsive reading is an active and strategic process. A constructively responsive reader knows reading strategies (what), is able to apply them adequately (when and where), possesses extensive knowledge, and is often highly motivated. Pressley and Gaskins (2006) argue that although constructively responsive reading is commonly associated with how experts read, students can be taught to be constructively responsive as well. They stress that constructively responsive reading demands a metacognitively competent reader. However, they do not explicitly separate cognitive from metacognitive strategies. Conversely, Weinstein, and Mayer (1986) distinguish between cognitive and metacognitive strategies in text processing. Cognitive strategies refer to learners' cognitive processing during the process of encoding. Theories of reading comprehension emphasize that readers have to integrate text ideas and their prior knowledge to achieve the highest level of comprehension (e.g Kintsch, 1998). Metacognitive strategies refer to learners' knowledge of their own cognitive processing and their ability to control these processes (Weinstein & Mayer, 1986). Brown, Armbruster, and Baker (1986) argue that successful readers monitor their learning by planning strategies, adjusting their effort, and evaluating their success.

Although reading strategies have been classified in numerous ways (Coiro & Dobler, 2007; Coté & Goldman, 1999; Pressley & Afflerbach, 1995) researchers agree that the versatile and active use of reading strategies results in better text comprehension. Nevertheless, Afflerbach, Pearson, and Paris (2008) emphasize that reading strategies are not always successful and do not necessarily lead to better text comprehension. One reason for this is the context-dependent nature of strategic activities (Garner, 1990).

## Information Evaluation

When reading on the Internet critical thinking skills are essential, as the Internet contains much partial and sometimes even misleading information (Gilster 1997, p. 87). However, previous research has indicated that even university students have deficiencies in evaluating Internet sources (Metzger, Flanagin, & Zwarun, 2003; Grimes & Boening, 2001). Furthermore, previous studies (Coiro & Dobler, 2007; MaKinster, Beghetto, & Plucker, 2002) have indicated that predictive evaluation of information has an important role in the skillful use of Internet sources. In the present study information evaluation is considered from two perspectives: how students evaluate credibility of information and relevance of information. Credibility refers to whether a student is paying

attention to distinguishing reliable from unreliable information. Relevance, in turn, refers to whether a student is paying attention to distinguishing essential from non-essential information.

### Re-Accessing Information

Experienced Internet users utilize the tools provided by web browsers for the purpose of making useful information easily re-accessible (Aula, Jhaveri, & Käki, 2005; Bruce, Jones, & Dumais, 2004). Aula et al. (2005) discovered that experienced Internet users utilized search engines, URL addresses, and bookmarks to re-access information. They found that the use of search engines is often problematic, as it might be impossible to remember the exact query with which the information was originally found. Further, Aula et al. (2005) noted that experienced users had often multiple tabs or multiple browser windows open while searching for information.

Skillful Internet readers can take advantage of re-access strategies in different ways. Re-access strategies can help Internet readers to handle multiple documents and facilitate comparison and evaluation of information presented in different sources. Moreover, re-access strategies can help readers to maintain their orientation and not lose useful information once it has been found.

### Research Questions

The research questions addressed by the study were as follows:

1. What kinds of search actions and what kinds of text-processing, information evaluation, and metacognitive strategies do students use when searching the Internet for source material for an essay?
2. To what extent do students copy or transform the texts they read in writing their essays?
3. Are the search actions and text-processing, information evaluation, and metacognitive strategies used by students associated with the quality of their essays?

## METHODS

### Participants

Students, 25 in total (14 female and 11 male) from an upper secondary school in Finland volunteered for participation in this study. The participants were either 16 or 17 years of age. One student was excluded from the analysis because her essay wondered outside the topic.

### Task

The study was integrated into process-writing practice (Flower & Hayes, 1981) in the mother tongue (Finnish) class. The students were asked to look for source material on the Internet for 40 minutes in order to write an essay on the following topic: *Sleeping as a human resource*. The students were asked to verbalize their thoughts as they gathered their source material. They then had 45 minutes to write a first draft of their essay, writing their final essay at a later date.

The students were informed that they were free to use all the features of the browser. In each browser the starting page was empty and the students had to decide how to start the search task. The students were allowed to make notes during the search, but not print pages.

### Data Collection

The study was conducted in the spring term of 2006. The researcher met each student individually. The entire research session lasted approximately 1 hour 45 minutes. The session started with a brief questionnaire. The students were asked for background information (age, sex) and information about their use of the Internet (number of hours weekly; familiarity with search

engines). After the students had completed the questionnaire the researcher introduced the task. The instructions were also given to the students in writing. After reading the instructions, the students were asked to confirm whether they had understood the task. They were allowed to ask questions about the process.

The students were instructed to think aloud and report whatever they thought while searching for and reading information on the Internet. They were informed that prompt questions (what is in your mind?; what are you thinking?) would be asked if they remained silent for a longer period. The researcher did not model thinking aloud, as the aim was to study students' spontaneous thoughts. If students asked questions about what was meant by thinking aloud, they were answered. Students asked questions such as "Do I say that now I'm thinking that I'm going to use Google to find information" or "Do you mean speaking to myself?"

Web actions as well as students' think-alouds were recorded using Easy Video Capture software. Each session was replayed, transcribed, analyzed, and coded.

## Data Analysis

### Students' Search Actions

Search actions were divided into seven categories: 1) formulating a query 2) using a URL address 3) browsing search results 4) selecting a link from the search results 5) using links 6) changing a search engine 7) changing the search language.

### Think-Aloud Protocols and Students' Notes

In the analysis of think-aloud protocols, strategies were divided into three main categories: text-processing, information evaluation strategies, and metacognitive strategies. External reading strategies (writing notes) were also taken into account. The main categories and their sub-categories are presented in Table 1. The text-processing strategies were divided in two sub-categories: locating or gathering important information and elaborative text-processing strategies. Furthermore, the information evaluation strategies were divided into evaluation of credibility and evaluation of relevance.

As shown in Table 1, metacognitive strategies consist of micro-level and macro-level strategies. Monitoring one's own activities by saying what one is doing or going to do are characteristic of micro-level metacognitive strategies. On the contrary, when readers use macro-level metacognitive strategies they use forward-looking activities, evaluate their performance, and adjust their activities to the task demands. Re-access strategies were included in metacognitive strategies, because the purpose of such re-access strategies is to control the search and reading process. Re-access strategies at the micro-level are only reactive, such as using the search engine to relocate information, whereas re-access strategies at the macro-level are proactive, such as having multiple tabs or browser windows open. Some authentic examples from the data obtained on each subcategory are presented in Table 2. The reliability of the analysis of the students' think-aloud protocols was examined by having two researchers to classify 17% (4 of 24) of the think-aloud protocols: the level of agreement found was 86%.

### Essays

We formed six variables to evaluate the quality of the essays. The *origin of each sentence* (variable 1) was analyzed to find out how the students applied the Internet sources in their essays. The *number of idea units* (variable 2) was measured to evaluate the breadth of the essays and *number of explanative idea units* (variable 3) was measured to evaluate the breadth of the students' causal thinking in their essays. *Explanative idea units were classified into three hierarchical levels* (variables 4–6) to assess the depth of causal thinking.

*Table 1. Sub-categories of text-processing, information evaluation, and metacognitive*

| **Text-processing strategies** | |
|---|---|
| Locating or gathering important information | *Elaborative text-processing strategies*:<br>Integrating own prior knowledge or own experiences<br>Integrating or comparing two or more text<br>Inferencing<br>Recapitulating information<br>Considering or categorizing concepts, finding out meaning of unfamiliar concepts |
| **Information evaluation strategies** | |
| *Evaluation of credibility:*<br>Evaluation of publisher or authority<br>Evaluation of writer's argumentation<br>Evaluation of style or content of the text<br>Paying attention to publisher without evaluative comment<br>Evaluation of credibility without justification<br>Evaluation of up-to-dateness<br>Predictive evaluation of credibility<br>Verification of information<br>Evaluation of sources given in the text | *Evaluation of relevance:*<br>Predictive evaluation of relevance<br>Evaluation of topicality at the textual, or paragraph level<br>Evaluation of style or content of the text<br>Evaluation of novelty<br>Evaluation of usability or mode of information<br>Evaluation of relevance by comparing two or more texts<br>Evaluation of generalization<br>Evaluating text as relevant by frequency of information |
| **Metacognitive strategies** | |
| *Micro-level metacognitive strategies:*<br>Repeating the title of the task<br>Steering: what to do next<br>Monitoring orientation: where am I now?<br>Reactive re-access strategies<br>Monitoring understanding or activities<br>Asking time: how much time do I have left | *Macro-level metacognitive strategies*:<br>Defining information need<br>Planning<br>Proactive re-access strategies<br>Evaluating own performance or activities<br>Monitoring time by adjusting ones' activities to remaining time |

## Origin of the Sentences in the Essays (Variable 1)

We compared the sentences in the students' essays to the texts they had read. The students' notes as well as the think-aloud protocols were used to help to locate the original source of the sentences. The origin of each sentence was coded as *borrowed*, *transformed* or *added* according to the coding scheme by Wiley and Voss (1999). The borrowed sentences were either copied or paraphrased from the original source. The transformed sentences were either combinations of information presented in the original text together with student's prior knowledge or sentences constructed using different sources. Also the recapitulations made by

*Table 2. Examples of text-processing, information evaluation, and metacognitive strategies*

| Category | Example |
|---|---|
| *Text processing strategies* | |
| Locating or gathering important information in the text | This seems important, this circadian rhythm. |
| Elaborative strategies | It occurred to me that, very young babies develop best when they are sleeping (integrating own prior knowledge). |
| | I should find something about deep sleep, *because you should reach the deep sleep phase to be able to recharge yourself* (causal inferencing). |
| *Information evaluation strategies* | |
| Evaluation of credibility | Here is at least somebody who is a knowledgeable person, docent of psychology, it is at least mentioned here, I don't know if he has been interviewed or what (evaluation of authority). |
| Evaluation of relevance | Sleeping disorders [the title of the text] are not so important in this essay, so I don't need any of the information given here (evaluating topicality at the textual level). |
| *Metacognitive strategies* | |
| Macro-level metacognitive strategies | I'd prefer to search for information about the causes, why it is worth sleeping (defining information need). |
| | I am wondering, do I have enough material. However, I already know something about this topic, but then I am wondering whether, that in the essay there should be also references to these web materials. But I think I have enough (evaluating own performance). |
| Micro-level metacognitive strategies | Wait a minute - is this the same page (monitoring orientation). |
| | I am just thinking that I don't understand this sentence at all (monitoring own understanding). |

students were coded into this category. Added sentences consisted of novel information not presented in the source texts.

## Breadth and Causality of the Essays (Variables 2–6)

In the analysis each sentence was divided into idea units. An idea unit corresponds typically to a single verb clause that expresses an action, event or state (Mayer, 1985). Each idea unit was coded as either an explanative or a descriptive one. The total number of explanative and descriptive idea units was counted to indicate the *contentual breadth* of the essay. The number of explanative idea units shows the *breadth of causal thinking* in the essay. Furthermore, explanative idea units were classified into *three hierarchical levels* to assess the depth of causal thinking. The following excerpt from a student's essay shows how the five explanative idea units are divided into the three hierarchical levels.

Sleeping is essential for physical and mental health (Level I). During sleeping the brain organizes the events of the day and things that have been learned (Level II). Thus, a sufficient amount of sleep is essential, especially for students (Level III).

The reliability of the analysis of the essays was examined by having two researchers classify 17% (4 of 24) of the essays: 96% agreement was found in number of explanative idea units. When the explanative idea units were classified into the three hierarchical levels, the percentage of agreement was 92.

## RESULTS

### Search Actions

Table 3 presents the search actions carried out by the students. The most common action, accounting for 46% ($M = 26.5$) of all the search actions, was browsing the search results. The students selected a link from the search results on average 20 times and they formulated on average of 9.4 queries.

As Table 3 shows, there were considerable inter-individual differences in the use of the different search actions. One student needed only 21 search actions to access relevant material, whereas the most active searcher conducted as many as 185 search actions during allotted time. One reason for these inter-individual differences was the content of the queries formulated by the students. For example, in their queries some students used search terms (for example the title of the task, i.e. sleeping as a human resource), which limited the number of relevant web pages available to them. It was also typical of these students that they were not able to change their queries appropriately. They either repeated the same query several times or reformulated it only a little. Some students who were more successful in formulating their queries also used the title of the task in their query. Unlike the less successful students, they evaluated the effectiveness of the query (*This was not a good choice to make*) and instantly changed their search terms.

### Text-Processing, Information Evaluation, and Metacognitive Strategies

Table 4 presents the strategies used by students as determined by the analysis of their think-aloud protocols and notes. Text-processing strategies were the most common, accounting for 36.8% of the total. In text-processing the students concentrated mainly on locating or gathering important information from the texts ($M = 22.2$), while cognitively more demanding elaborative text-processing strategies were seldom used ($M = 5.5$). Metacognitive strategies were almost as common as text-processing strategies, and accounted for 35.9% of all strategies. Micro-level metacognitive strategies ($M = 16.3$) were more common than macro-level metacognitive strategies ($M = 10.8$). Information evaluation strategies accounted for 27.3% of the total. The students concentrated mostly on relevance evaluation ($M = 17.3$), that is, they decided what kind of texts or part of texts were worth closer attention. In this study 27% of all the evaluative strategies used were predictive in nature. As Table 4 shows, considerable inter-individual differences were found in the use of text-processing, metacognitive, and information evaluation strategies.

*Table 3. Descriptive statistics on search actions*

| *Search action* | *f* | *%* | *M* | *SD* | *Min–Max* |
|---|---|---|---|---|---|
| Browsing search results | 637 | 46% | 26.5 | 15.4 | 10–86 |
| Selecting a link from the search results | 481 | 35% | 20.0 | 12.5 | 7–70 |
| Formulating a query | 226 | 16% | 9.4 | 6.6 | 2–27 |
| Using a URL address | 10 | 1% | 0.4 | 0.9 | 0–4 |
| Changing a search engine | 10 | 1% | 0.4 | 0.8 | 0–2 |
| Using links | 9 | 1% | 0.4 | 0.8 | 0–3 |
| Changing search language | 3 | 0% | 0.1 | 0.3 | 0–1 |
| Total | 1376 | 100% | 57.3 | 33.3 | |

*Table 4. Descriptive statistics on text-processing, metacognitive, and information evaluation strategies*

| | *f* | *%* | *M* | *SD* | *Min–Max* |
|---|---|---|---|---|---|
| *Text-processing strategies* | | | | | |
| Locating important information in the text | 533 | 29.4 | 22.2 | 8.4 | 5–37 |
| Elaborative text-processing strategies | 133 | 7.3 | 5.5 | 4.2 | 1–17 |
| Total | 666 | 36.8 | 27.8 | 9.8 | 6–50 |
| *Metacognitive strategies* | | | | | |
| Micro-level metacognitive strategies | 391 | 21.6 | 16.3 | 11.3 | 3–51 |
| Macro-level metacognitive strategies | 260 | 14.3 | 10.8 | 6.2 | 2–23 |
| Total | 651 | 35.9 | 27.1 | 12.2 | 6–57 |
| *Information evaluation strategies* | | | | | |
| Evaluation of relevance | 414 | 22.8 | 17.3 | 9.9 | 6–43 |
| Evaluation of credibility | 81 | 4.5 | 3.4 | 3.8 | 0–16 |
| Total | 495 | 27.3 | 20.6 | 11.3 | 7–45 |

## Intercorrelations between Search Actions, Text-Processing Strategies, Information Evaluation Strategies, and Metacognitive Strategies

The number of conducted search actions was positively associated with the number of micro-level metacognitive strategies ($r = .73$; $p < 0.01$) and negatively associated with the number of macro-level metacognitive strategies ($r = -.37$). Thus, students who conducted several search actions at the cost of other activities monitored and regulated their activities mainly at the micro-level. Additionally, they were not able to concentrate on text-processing to the same extent as students who were able to find relevant information more effectively. The number of search actions conducted was negatively associated with the number of text-processing strategies, especially with locating important information in the texts ($r = -.42$; $p < 0.05$).

Additionally, elaborative text-processing strategies were associated with macro-level metacognitive strategies ($r = 54$; $p < 0.01$), indicating that strategic reading involves a high level of metacognitive activity, particularly at the macro-level. This means that students who elaborated what they were reading also put effort into planning, evaluating their performance, and regulating their activities to fit the task demands. Furthermore, the number of macro-level metacognitive strategies was positively associated with the evaluation of relevance ($r = .51$; $p < 0.05$).

## Students' Essays

The students' essays contained on average 25 sentences (ranged 12–41) consisting of 276 words (ranged 153–429). Most of the sentences (56.5%) were borrowed, 29.9% were transformed and 13.6% were added. Here too, the inter-individual differences were considerable. For example, the range of transformed sentences was 4–53% in students' essays.

The essays contained an average of 47 idea units, 26.7 of which were explanative in nature (see Table 5). Table 5 also presents the distribution of explanative sentences at the three levels of causality, indicating the depth of the students' causal thinking. Most of the sentences were coded at level two of the hierarchy.

*Table 5. Mean number of all idea units and explanative idea units in the students' essays*

| | *f* | *M* | *SD* | *Min–Max* |
|---|---|---|---|---|
| Idea units (total) | 1127 | 47.0 | 12.7 | 28–78 |
| Explanative idea units | 639 | 26.7 | 7.7 | 12–40 |
| Explanative idea units at level I | 81 | 3.4 | 2.9 | 0–11 |
| Explanative idea units at level II | 402 | 16.8 | 6.6 | 7–28 |
| Explanative idea units at level III | 156 | 6.5 | 4.8 | 0–17 |

### Correlations of Search Actions, Text-Processing Strategies, Information Evaluation Strategies, Metacognitive Strategies with Essay Quality

Elaborative text-processing strategies were positively associated with the contentual breadth of the essays ($r = .41$; $p < 0.05$) and the breadth of causal thinking in the essays ($r = .54$; $p < 0.01$). Furthermore, elaborative text-processing strategies were associated with causal depth in the essays: the correlation between elaborative text-processing strategies and the number of explanative idea units at level two was .53 ($p < 0.01$). The number of conducted search actions was consistently negatively associated with all the variables related to the breadth and causality of the essays. However, the correlation was statistically significant only in one variable. The correlation between search actions and explanative idea units at level three was -.44 ($p < 0.05$).

No relation was found between the text-processing, information evaluation, and metacognitive strategies students used and how they used source material in their essays, that is, whether they borrowed or transformed their sources or whether they added material into their essays on the basis of their prior knowledge.

## DISCUSSION

Reading on the Internet is a complex process in which searching, text-processing, information evaluation, and metacognitive strategies are interwoven. The results of this study indicated, consistently those of previous studies (Walraven et al., 2008), that some students had difficulties in formulating their search queries; this, in turn, had an overall negative effect on the reading process. Students who had difficulties in locating relevant information concentrated more on monitoring and regulating their own activities at the micro-level than at the macro-level. This can be considered from two angles. On the one hand, these students carried out so many short-term activities that they had to monitor their orientation (e.g., *I have already seen this page*) and keep track of what to do next. These intensive monitoring and tracking processes took up their cognitive capacity. On the other hand, these students were less able to operate at the macro-level and thus, evaluate and adjust their search strategies to the task demands. It can be concluded from these observations that ineffective search strategies can have a profound effect on the selection of reading material and thus, a detrimental influence on the quality of learning.

In interpreting the results of this study, it is worth considering Garner's (1990) idea regarding the context-dependent nature of strategic activity. For example, some of the search strategies applied in a strategic way by a few students did not lead to positive results in this task but might have been successful in some other task.

The results demonstrated, in accordance with previous studies by Metzger et al. (2003) and Grimes and Boening (2001), that most students only seldom evaluated the credibility of the infor-

mation they found. Nevertheless, they evaluated the relevance of information quite actively, and this was associated with macro-level metacognitive strategies. This association suggests that students who define their information need or plan their activities have rather clear relevance criteria in their minds that, in turn, make the evaluation of relevance easy. The results of this study are also in line with previous findings (Coiro & Dobler, 2007; MaKinster et al., 2002) that predictive evaluation of relevance plays an important role when using the Internet as a source of information.

This study supports the view that constructively responsive reading demands a metacognitively competent reader (Pressley & Gaskins, 2006). The students who elaborated what they read also used macro-level metacognitive strategies, i.e., they put effort into planning, evaluating their performance, and adjusting their activities to the task demands. Because these students were able to apply metacognitive strategies at the macro-level, their cognitive capacity was taken up to a lesser degree by micro-level monitoring and regulation. Consequently, they were also able to concentrate on elaborative text-processing.

Teachers might assume that teenagers are skilled in the use of the Internet and take ready advantage of the technical tools offered by browsers. However, this study shows that only a small number of students utilized the possibility to have multiple tabs open in order to re-access of information. The students who used this feature were able to control their search and reading processes more effectively. Some of them also utilized multiple tabs as a tool for critical reading, so that they were able to compare different sources with ease.

Moreover, this study indicated that strategic reading functioned as the basis for the quality of writing. More precisely, the use of elaborative text-processing strategies showed a positive correlation with the breadth and causality of the students' essays. However, the use of text-processing strategies was not related to the way the students utilized source material in their essays, i.e. whether they borrowed or transformed sources or whether they added contents into their essays by applying their prior knowledge.

The think-aloud method is regarded as an effective method for gaining access to on-line processing (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995). Taking into consideration the distinction between declarative knowledge (i.e., what strategies are), procedural knowledge (i.e., how to use a strategy), and conditional strategy knowledge (i.e., when to use a strategy) (Paris, Lipson, & Wixson, 1983), the advantage of the think-aloud method becomes apparent. Namely, although students might be able to describe appropriate strategies if asked by means of think-aloud method it can also be established whether they are able to make proper use of those strategies.

When evaluating the results of this study it has to be taken into account that on the Internet a researcher can not direct readers' thinking aloud by marking text passages to show where the reader should stop to think aloud. Olsson, Duffy, and Mack (1984) argue that unmarked passages are likely to elicit only a few comments, thereby limiting the informativeness of think-alouds. When Coiro and Dobler (2007) studied Internet reading they used specific questions during the think-aloud with the aim of bringing out some of the highly automatic processing being done by the participants. In the present study this kind of rapid, automatic processing was probably not revealed. However, giving instructions of this kind during the think-aloud might direct students' thinking and lead them to pay attention to issues that they would normally ignore.

In this study the students were allowed to make notes but not to print or copy-paste documents. This decision was made as our aim was specifically to study reading on the Internet, and not merely information search, where the students would have read the material later on after copying or printing potentially interesting texts. Thus, this study might not describe how students usually

handle assignments of this type, as indicated by the following student comment: *This is funny, one could just print these pages and look at them then later on*. If the students had been allowed to copy or print the original texts it might have affected their essays, for example by increasing the number of borrowed sentences.

In today's information society the use of the Internet as a source of information is a basic skill which students continuously need in their studies and will need later in working life. However, use of the Internet as an information source is a demanding and complex process that has to be practiced. Brand-Gruwel et al. (2005) suggest that instruction should concentrate on training important sub-skills that students have not yet mastered. The findings of the present study suggest that at the upper-secondary school level, at least following four important skills should be practiced. In addition to the formulation of adequate search queries and evaluation of information credibility, students need to be scaffolded to be able to pay attention to macro-level metacognitive activities, such as planning and evaluating their own performance and elaborative text-processing.

Previous research indicates that different methods of instruction might be useful for teaching different sub-skills. One computer-supported method that can be applied to assist students' Internet reading processes is to give prompts that help students to pay attention to specific sub-skills. Stadtler and Bromme (2007) found that monitoring prompts, received during Internet reading, helped university students to acquire more facts about the topic of interest. Additionally, evaluative prompts helped students to judge information. Stadtler and Bromme argue that prompting could be especially useful when learners are capable of executing strategies but only seldom spontaneously apply them. For example, in the present study a few students were careful to evaluate the credibility of Wikipedia, possibly because it has been discussed in public, while the same students did not evaluate other web sources, even when no information on the authors was available. If these students had been given evaluative prompts, they would have probably been able to evaluate the other sources as well. According to Britt and Aglinskas (2002), even a rather simple intervention may improve students' abilities to attend to the source information quality. However, the study by Dornish and Sperling (2006) indicates that prompting might not always be as useful when trying to promote elaborative text-processing strategies.

Another method that can guide students' Internet reading is to issue argumentative task instructions. Wiley and Bailey (2006) found that when learning collaboratively from web pages, argumentative tasks may enhance co-construction of understanding. Surprisingly, in their study, an argumentative task did not promote evaluation of information. Furthermore, when reading on the Internet, collaboration in general may support metacognitive processing, such as task definition and planning activities (Wiley & Bailey, 2006). Students might also share good practices and learn more effectively to use the possibilities provided by browsers and search engines. Lazonder (2005) discovered that students working in pairs utilized richer repertoire of search strategies and located relevant information more efficiently than student working alone. Additionally, pairs monitored and evaluated their search behavior more actively.

To sum up, it seems that evaluation of information might best be promoted by prompting whereas elaborative text-processing may be enhanced with tasks that require deeper processing as opposed to merely gathering information. However, more research is needed to find suitable methods for teaching sub-skills that are essential when using the Internet as a resource for learning.

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## REFERENCES

Afflerbach, P., Pearson, P. D., & Paris, S. G. (2008). Clarifying differences between reading skills and reading strategies. *The Reading Teacher, 61*(5), 364–373.

Aula, A., Jhaveri, N., & Käki, M. (2005). Information search and re-access strategies of experienced web users. In *Proceedings of WWW 2005*, May 10–14, (pp. 583–592). Chiba, Japan.

Brand-Gruwel, S., Wopereis, I., & Vermetten, Y. (2005). Information problem solving by experts and novices: Analysis of a complex cognitive skill. *Computers in Human Behavior, 21*(3), 487–508.

Britt, M. A., & Aglinskas, C. (2002). Improving students' ability to identify and use source information. *Cognition and Instruction, 20*(4), 485–522.

Britt, M. A., & Sommer, J. (2004). Facilitating textual integration with macro-structure focusing tasks. *Reading Psychology*, *25*(4), 313–339.

Brown, A. L., Armbruster, B. B., & Baker, L. (1986). The role of metacognition in reading and studying. In J. Orasanu (Ed.), *Reading comprehension: From research to practice reading* (pp. 49–75). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bruce, H., Jones, W., & Dumais, S. (2004). "Information behaviour that keeps found things found." *Information Research*, *10*(1). Retrieved December 1, 2007from http://InformationR.net/ir/101/paper207. html

Carter, L. (2003). Argument in hypertext: Writing strategies and the problem of order in a non-sequential world. *Computers and Composition, 20*(1), 3–22.

Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher, 56*(5), 458–464.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly, 42*(2), 214–257.

Coté, N., & Goldman, S. R. (1999). Building representations of informational text: Evidence from children's' think-aloud protocols. In H. Van Oostendorp & S. R Goldman (Eds.), *The construction of mental representations during reading* (pp. 169–193). Mahwah, N.J.: Lawrence Erlbaum Associates.

DeStefano, D., & LeFevre, J-A. (2007). Cognitive load in hypertext reading: A review. *Computers in Human Behavior, 23*(3), 1616–1641.

Dornish, M. M., & Sperling, R. A. (2006). Facilitating learning from technology-enhanced text: Effects of prompted elaborative interrogation. *The Journal of Educational Research, 99*(3), 156–165.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data*. Cambridge, MA: MIT Press.

Eveland, W. P., & Dunwoody, S. (2000). Examining Information processing on the World Wide Web using think aloud protocols. *Mediapsychology, 2*(3), 219–244.

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365–387.

Garner, R. (1990). When children and adults do not use learning strategies: Toward a theory of settings. *Review of Educational Research, 60*(4), 517–529.

Gilster, P. (1997). *Digital literacy*. New York: Wiley Computer Pub.

Grimes, D. J., & Boening, C. H. (2001). Worries with the Web: A look at student use of Web resources. *College & Research Libraries, 62*(1), 11–23.

Hill, J., & Hannafin, M. J. (1997). Cognitive strategies and learning from the World Wide Web. *Educational Technology Research & Development*, *45(*4), 37–64.

Hölscher, C., & Strube, G. (2000). Web search behavior of Internet experts and newbies. *Computer Networks, 33*(1–6), 337–346.

Jenkins, C., Corritore, C. L., & Wiedenbeck, S. (2003). Patterns of information seeking on the web: A qualitative study of domain expertise and web expertise. *IT & Society, 1*(3), 64–89.

Kintsch, W. (1998). *Comprehension: A paradigm for cognition*. New York: Cambridge University Press.

Konishi, M. (2003). Strategies for reading hypertext by Japanese ESL learners. *The Reading Matrix, 3*(3), 97–119.

Larson, M., Britt, M. A., & Larson A. A. (2004). Disfluencies in comprehending argumentative texts. *Reading Psychology, 25*(3), 205–224.

Lazonder, A. W. (2005). Do two heads search better than one? Effects of student collaboration on web search behaviour and search outcomes. *British Journal of Educational Technology, 36*(3), 465–475.

MaKinster, J. G., Beghetto, R. A., & Plucker, J. A. (2002). Why can't I find Newton's third law? Case studies of students' use of the Web as a science resource. *Journal of Science Education and Technology, 11*(2), 155–172.

Mayer, R. E. (1985). Structural analysis of science prose: Can we increase problem-solving performance? In B. K. Britton & J. B. Black (Eds.), *Understanding expository text: A theoretical and practical handbook for analyzing explanatory text* (pp. 65–86). Hillsdale, NJ: Lawrence Erlbaum Associates.

Metzger, M. J., Flanagin, A. J., & Zwarun, L. (2003). College student web use, perceptions of information credibility, and verification behavior. *Computers & Education, 41*(3), 271–290.

Olsson, G. M., Duffy, S. A., & Mack, R. L. (1984). Thinking-out loud as a method for studying real-time comprehension processes. In D. E. Kieras & M. A. Just (Eds.), *New methods in reading comprehension research* (pp. 245–286). Hillsdale, NJ: Lawrence Erlbaum Associates.

Paris, S. G., Lipson, M. Y., & Wixson, K. K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology, 8*(3), 293–316.

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Pressley, M., & Gaskins, I. W. (2006). Metacognitively competent reading comprehension is constructively responsive reading: How can such reading be developed in students? *Metacognition and Learning, 1*(1), 99–113.

Sormunen, E., & Pennanen, S. (2004). The challenge of automated tutoring in Web-based learning environments for information retrieval instruction. *Information research, 9*(2). Retrieved from October 11, 2007 from http://informationr.net/ir/9-2/paper169.html

Stadtler, M., & Bromme, R. (2007). Dealing with multiple documents on the WWW: The role of metacognition in the formation of documents models. *International Journal of Computer-Supported Collaborative Learning, 2*(2–3), 191–210.

Walraven, A., Brand-Gruwel, S., & Boshuizen, H. P. A. (2008). Information-problem solving: A review of problems students encounter and instructional solutions. *Computers in Human Behavior, 24*(3), 623–648.

van Merrienboer, J. J. G., & Kirschner, P. A. (2007). *Ten steps to complex learning: A systematic approach to four-component instructional design*. Mahwah, NJ: Lawrence Erlbaum Associates.

Weinstein, C. E., & Mayer, R. E. (1986). The teaching of learning strategies. In M. C. Wittrock (Ed.). *Handbook of research on teaching* (pp. 325–327). New York: Macmillan.

Wiley, J., & Bailey, J. (2006). Effects of collaboration and argumentation on learning from Web pages. In A. M. O'Donnell, C. E. Hmelo-Silver, & G. Erkens (Eds.), *Collaborative learning, reasoning, and technology.* Rutgers invitational symposium on education series (pp. 297–321). Mahwah, NJ: Lawrence Erlbaum Associates.

Wiley, J., & Voss, J. F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology, 91*(2), 301–311.

## KEY TERMS AND DEFINITIONS

**Consrtuctively Responsive Reading:** Is an active process by which adequate reading strategies are applied in a metacognitively competent way.

**Credibility Evaluation:** Means distinguishing reliable from unreliable information.

**Elaborative Text-Processing Includes:** Cognitive activities by which the reader expands information presented in the text with his or her prior knowledge or integrates information from different sources.

**Information Search Strategies:** Comprise means of locating relevant information on the Internet.

**Internet Reading:** Comprises searching, processing, and evaluating of information, and regulating these processes when using Internet as an information source.

**Metacognitive Strategies:** Consist of planning, monitoring, evaluating, and adjusting one's cognitive processes.

**Relevance Evaluation:** Means distinguishing essential from non-essential information.

**Re-Access Strategies:** Keep found things easily accessible.

# III

## WORKING ON UNDERSTANDING DURING COLLABORATIVE ONLINE READING

by

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# Working on understanding during collaborative online reading

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**Abstract.** This study examines how students in Finland (16–18 years of age) constructed meaning and knowledge in a collaborative online reading situation. Student pairs ($n$ = 19) were asked to write a joint essay on a controversial issue. First, the pairs discussed the topic freely in order to activate their prior knowledge. Next, they gathered source material on the Internet. Finally, they composed a joint essay. The data were collected using an interaction approach to verbal protocol data, along with video screen captures. In the analysis, three units were employed: episodes ($n$ = 562), for describing online reading practices; utterances ($n$ = 944), for identifying collaborative reading strategies; and collaborative reading patterns ($n$ = 435) for clarifying how the student pairs constructed meaning and knowledge. Collaborative reading patterns were categorized according to a four-part model. A hierarchical cluster analysis was conducted to identify students' collaborative reading profiles. Five collaborative reading profiles emerged: co-constructers (2 pairs); collaborators (2 pairs); blenders (6 pairs); individually-oriented readers (4 pairs); and silent readers (5 pairs). Overall, it appeared that some students were capable of working as pairs whereas others had a stronger preference for working alone. Collaborative profiles might offer teachers both an evaluative and an instructional tool to support collaborative interaction in their classrooms.

**Keywords:** online reading, new literacies, digital literacy, collaborative reading, verbal protocols, secondary school

This study explored how students engage in collaborative online reading as they constructed meaning and knowledge in a collaborative online reading situation. The issue is important because many settings, including the workplace, increasingly require online reading and collaborative problem solving (PIAAC Expert Group on Problem Solving in Technology-Rich Environments, 2009; Smith, Mikulecky, Kibby, Dreher, & Dole, 2000; Theisens, Roberts, & Istance, 2010). In these settings, the reading of online information and knowledge creation often becomes a social, rather than an individual, practice (Engeström & Sannino, 2010; Leu, Kinzer, Coiro, Castek, & Henry, in press; Paavola, Lipponen, & Hakkarainen, 2004). Given these issues, it is likely that schools will be increasingly encouraged to develop more collaborative and online literacy practices with students. We see the beginnings of this movement in the development of national curricula or standards containing these elements (Common Core State Standards Initiative, 2010; Australia Curriculum, Assessment and Reporting Authority, n.d.).

While extensive research exists about reading as an individual practice, there is little research about reading as a collaborative social practice, especially in relation to the co-construction of meaning and knowledge. The present study is an initial investigation into students' meaning and knowledge construction practices during a collaborative reading situation, where online information is used to explore different viewpoints of an important problem. As such, it may provide preliminary direction into methods, analyses, and results that can inform the study of more socially and digitally constructed reading practices**.** Understanding the nature of these practices may provide important direction to developing a generation prepared for literacy and life in the 21st century.

## Theoretical Frameworks

Understanding how meaning and knowledge construction take place during reading may be one of the most complex tasks in literacy research. As Huey (1908) wrote, over a hundred years ago, "To completely analyze what we do when we read would almost be the acme of the psychologist's achievements, for it would be to describe very many of the most intricate workings of the human mind" (p. 6). Huey, however, described reading as an individual practice. Even more complex, perhaps, is the socially constructed nature of reading when two individuals read and develop ideas together from online information, engaged in collaborative meaning and knowledge construction as they solve a challenging problem.

These complexities suggest that multiple theoretical frameworks may be useful to direct research in this area (Labbo & Reinking, 1999). A unidimensional theoretical framework may be inadequate for the complexities that exist at the interstices of the collaborative construction of knowledge and online reading. As Prawat and Floden (1994) note "Rather than strive for theoretical purity, it may make more sense to reach across theoretical boundaries, selecting those aspects of each world view that seem most appropriate for the task at hand" (p. 38). Consistent with these ideas, we draw upon two theoretical frameworks that appear to provide the most productive lenses for this investigation: social constructivist theory and the new literacies of online reading comprehension.

## Social Constructivist Theory

We use social constructivist theory (Palincsar, 1998; Vygotsky, 1986) to inform our insights of the dynamics that take place during collaborative online reading and discussion. We also use this perspective to inform insights into the co-construction of knowledge that takes place during these interactions**.** Social constructivist theory argues that knowledge is co-constructed within a social activity and evolves through negotiation (Palincsar, 1998; Prawat & Floden, 1994). Students acquire knowledge when they work on their understanding and relate new ideas and ways of thinking to their existing view of the world (Barnes, 2008; Kukla, 2000).

According to Barnes (2008), one of the best ways to work on one's understanding is through discussion, since it enables students to try out their ideas and explore contradictory views. Collaborative activities, such as joint information problem solving and argumentative discussion, provide mechanisms for enhancing higher-order thinking and thus produce learning (Dillenbourg, 1999; Palincsar, 1998). This may be especially true when students read online about a controversial issue since many different points of view may be encountered. Engagement in collaborative argumentation enables students to learn together by examining different points of view and the arguments for and against each position (Marttunen & Laurinen, 2007).

In this study, social constructivist theory informed our understanding of how student pairs explored a controversial issue by reading online and simultaneously engaging in argumentative discussions in order to jointly construct a multifaceted picture about a complex phenomenon.

## Online Reading Comprehension Theory

To inform our understanding of online reading elements we use online reading comprehension theory (Leu, Kinzer, Coiro, & Cammack, 2004; Leu, Kinzer, Coiro, Castek, & Henry, in press). Online reading comprehension theory is one aspect of a broader New Literacies theory (Coiro, Knobel, Lankshear, & Leu, 2008) used to inform our understanding of the new literacies required by new informational and communication technologies that continuously emerge in an online world. Online reading comprehension theory defines reading on the Internet as a process of problem-based inquiry involving the additional skills, strategies, dispositions, and social practices that are important as we use the Internet to solve problems and answer questions. At least five processing practices occur during online reading comprehension: a) reading to identify important questions, b) reading to locate information, c) reading to evaluate information critically, d) reading to synthesize information, and e) reading and writing to communicate information (Leu, Kinzer, Coiro, & Cammack, 2004; Leu, Kinzer, Coiro, Castek, & Henry, in press). This lens was useful to inform our understanding of the collaborative reading of online information that took place in our study.

## Collaborative Reading

Consistent with the social constructivist theory with which we framed this study, we use the term collaborative reading to capture two essential elements. First, analogous with collaborative learning (Suthers, 2006), collaborative reading is a socially contextualized form of reading; reading takes place with at least one other person. Second, consistent with research on the beneficial effects of discussion it includes a process in which meaning and knowledge are jointly constructed through text-based discussion (cf. Suthers, 2006).

There are at least two forms of collaborative reading where discussion has a slightly different role. First, reading and discussion can be successive processes. This means that the readers first read the same text separately and make separate interpretations of the text, after which readers discuss their interpretations. Thus, discussion is based on the representations and interpretations that individuals have already made by themselves of the text. Second, reading and discussion can be interwoven. In this case, readers attend to the same text simultaneously, which offers them opportunities to make joint interpretations of the text by discussing. In this study, we explored the latter form of collaborative reading.

Various forms of collaborative reading have often been included in discussion-based teaching methods. It has been shown that teaching methods in which students discuss their ideas and make their reasoning explicit have a positive effect not only on the quality of group discussion but also on students' individual cognitive development (Applebee, Langer, Nystrand, & Gamoran, 2003; Mercer & Littleton, 2007). This research has found that discussions which include interpretations (Teasley, 1995), higher-order questions (King, 2007), and explorations and argumentation (Mercer & Littleton, 2007; Mercer, 1996) are particularly beneficial for learning.

Discussion is a flexible meaning-making tool (Barnes, 2008) with which readers can easily test their interpretations of texts and the ideas built on those interpretations. Hence, students could be expected to construct not only an understanding of text content but also an understanding of the process of constructing meaning from text (Kucan & Beck, 1997). Additionally, discussions provide students with opportunities to develop a more critical stance toward the information they read since alternative perspectives are shared and explored (Reznitskaya et al., 2008).

## Collaborative Reading as Co-Construction of Meaning and Knowledge

The most comprehensive review of research in reading comprehension (RAND Reading Study Group, 2002) concluded that skillful readers actively engage in deep-level processing (Kintsch & Kintsch, 2005; Pearson, 2001), which includes complex relationships between the reader, the text, and the task in a socio-cultural context. This process is highly active and is driven by an effort to construct meaning. We build on this work but, because of our interest in collaborative reading and the social constructivist framing of our work, we focus on the social context and the task element within the RAND Reading Study Group model.

In this study, collaborative reading was explored as the construction of meaning and the construction of knowledge. Reading as the *construction of meaning* is defined as a closely text-related activity, the purpose of which is to achieve a deep understanding of the text. During the construction of meaning, readers go beyond the literal comprehension of a text by connecting the text with their prior knowledge (King, 2007; Pearson, 2001; RAND Reading Study Group, 2002). For example, a student who reads that censorship is common in totalitarian countries may construct meaning by

considering totalitarian countries with which they are familiar, such as China and North Korea, in order to better capture the ideas in the text.

Reading as the *construction of knowledge* is defined as a loosely text-related activity where the purpose is to solve problems, construct explanations, or explore different views by utilizing the ideas presented in the text (Van Aalst, 2009). During the construction of knowledge, a text acts as the stimulant for extending one's thinking. For example, after exploring different arguments for and against internet censorship readers may begin to consider an idea new to them—how to protect children from harmful material without violating freedom of speech concerns, restructuring their knowledge in important ways.

Although the distinction between the construction of meaning and the construction of knowledge can be made in theory, in practice these processes are typically recursive and reciprocal so that it becomes difficult to neatly differentiate them. At times, the construction of meaning may serve as the basis for knowledge construction and, at other times, knowledge construction may serve as the basis for meaning construction. The intertwined nature of meaning construction and knowledge construction is especially evident during collaborative reading.

As we study reading as a socially-constructed activity, we explore collaborative reading as an activity with the potential for the co-construction of both meaning and knowledge. How might this take place? First, students who read together can co-construct meaning by carefully considering ideas presented in the text, by clarifying misconceptions, and by grasping subtleties implied in the text (Heisey & Kucan, 2010). Second, students can co-construct knowledge when they extend, deepen, or transform meanings of the text by building on each other's ideas (Van Drie, Van Boxtel, Jaspers, & Kanselaar, 2005). For example, engagement in collaborative argumentation may deepen and expand students' knowledge as they examine issues from different perspectives (Andriessen, Baker, & Suthers, 2003; Jadallah et al., 2009).

Issues of meaning construction and knowledge construction may be a particular concern during online reading. Volet, Summers, and Thurman (2009) argue that when reading concentrates on gathering facts from the text it may not produce more than raw material from which knowledge may be constructed. Unfortunately, recent studies (Jedeskog & Nissen, 2004; Kiili Laurinen, & Marttunen, 2009) indicate that many students concentrate on locating and gathering facts at the expense of deeply processing the information they find. These results suggest that students would benefit from challenging and purposeful online reading tasks that direct their thinking processes towards the construction of meaning and knowledge and do not lead them to simply gather facts.

In particular, solving problems, constructing an explanation, or deciding a course of action might be these kinds of purposeful tasks (Wells, 2007). The construction of meaning and knowledge is also likely to take place within an activity that asks students to read online information around a controversial issue and engage in collaborative argumentation. This study sought to explore this possibility by looking closely at the socially constructed interaction protocols as students completed this type of online reading activity.

## Research Questions

The research questions addressed in the present study were:
1. How do student pairs engage in online reading practices when they read on the Internet in order to explore a controversial issue?
2. How do student pairs co-construct meaning and knowledge when they read online in order to explore a controversial issue?
3. How do students, who use different collaborative reading patterns to co-construct meaning and knowledge, perform on an essay-writing task?
4. How do students experience collaborative work when reading online and composing a joint essay?

## Method

### Participants

The participants of the study were 38 students (23 females, 15 males), from 16 to 18 years of age, who attended the same Finnish upper-secondary school.

The activities in this study were integrated into a course on Finnish Language (mother tongue) and Literature. The national curriculum for this course (Text and Influence) included teaching the basics of argumentation (see Finnish National Board of Education, 2003, pp. 37–38). Four similar courses were simultaneously taking place, taught by four different teachers. The 38 students from these courses volunteered to participate in the study. The students who did not participate were given a compensatory individual essay task that they composed at home.

Finnish students are quite familiar with computers and Internet. According to a survey conducted among Finnish students aged 15 to 16 years (Luukka, Pöyhönen, Huhta, Taalas, Tarnanen, & Keränen, 2008), 95 % of students have a computer with an Internet connection at home. Eighty-four percent of boys and seventy-six percent of girls reported at least some daily use of Web pages. Browsing Web pages is more common at home than at school: 93 % of students said that they have browsed Web pages during last year at home and 73% reported their use at school. According to the teachers of the present study, traditional texts and individual learning methods are currently dominating in their Finnish Language classes.

In this study, the students worked in pairs. They were allowed to choose their partner freely so that the students who already knew each other could form a pair. This was thought to increase the likelihood of productive collaborative work because students were able to choose a partner with whom they felt comfortable in sharing their ideas. Previous research suggests that one important condition for productive collaboration is interpersonal trust (see e.g. Dirks, 1999; Kreijns, Kirschner, & Jochems, 2003). The self-selection process resulted in 10 pairs of girls, 6 pairs of boys, and 3 pairs consisting of a girl and a boy.

**Task**

The students were asked to write a joint argumentative essay on the issue "Should Internet censorship be tightened?" and consider the topic from different perspectives in their essays. Prompts during the task were not given. In argumentative tasks a topic has been found to have an important role in students' engagement in active, argumentative discussions (Salminen, Marttunen, & Laurinen, in press; Udell, 2007; Zohar & Nemet, 2002). The topic of Internet censorship was chosen for several reasons. First, the topic had relevance to students' lives. Second, it was thought that both genders would be interested in the topic. Third, the topic was discussed in public and in the press at the time of the study.

First, the pairs were asked to discuss the topic freely (10–15 minutes) in order to activate their prior knowledge. Next, they were asked to search for and read additional information on the Internet (30 minutes). Finally, they collaboratively discussed the content of the essay as they used a word processor to compose the essay together (45 minutes). Typically, essays were composed so that first, students negotiated which ideas would be included in the essay. Then, essays were typed by a single member of the pair, with the other playing an active role in dictating portions, making editing suggestion, and suggesting revisions, where needed. Throughout the task the students worked face-to-face and, in the searching and composing phase, the students worked on one computer. The researcher recorded data from one pair at a time as they completed each portion of the task.

At the end of the session, the students individually answered a short post-study questionnaire. The questionnaire contained 14 Likert-scale items (a five point scale ranging from totally agree to totally disagree) that focused on collaborative work compared to individual work.

**Interaction Protocols**

Rather than using a think aloud approach employed with individuals to gain access to solitary thinking processes (e.g. Pressley & Afflerbach, 1995), this study used an interaction approach to collect verbal protocol data. An interaction approach uses pairs, or groups, of participants who are instructed to talk together as they perform a given task (Miyake, 1986). Interaction protocols provided access to the collaborative meaning and knowledge construction that took place in each dyad. A software program was used to simultaneously capture into one video file all students' web-based activities as well as the face-to-face discussion between the dyads. Thus, transcribed interaction protocols included information about the Web pages students visited and the search terms that students used in their search queries, as well as the discussions. During the tasks the students visited different kinds of web pages that represented various views in terms of the topic. For example, the students used news pages, Wikipedia, discussion boards and blogs, interviews, and pages of Web communities.

Although systematic analysis of mouse movements on the screen was not done in this study, those mouse movements that helped us to interpret students' discussions

were taken into consideration. For example, some mouse movements helped us to know what part of a web page students were reading. In addition, when a student underlined a sentence from a text and said to his or her partner "this might be important" it was interpreted in the same way as an action of reading an important point from the text aloud.

**Students' Essays**

Following the collaborative reading of online sources, students wrote a joint essay. The four teachers evaluated the students' joint essays ($M$ = 275 words; $SD$ = 87 words). Each teacher evaluated the essays of their own students. The teachers applied national evaluation standards used in the scoring of matriculation exams for Finnish Language and Literature (exams for graduation from upper secondary school in Finland; see http://www.ylioppilastutkinto.fi/en) so that the emphasis was more on the quality of the content than grammar. The results of the scoring showed that the students performed well on the essay task with all essays receiving one of the three highest marks (see Appendix).

In the Finnish educational system, upper secondary school teachers' scoring of writing exams is constantly calibrated. The matriculation exams (in the end of the upper secondary school) are arranged twice a year. Each teacher scores his or her students' essays. Following this, outside evaluators appointed by the board of the matriculation exams score the essays. If there is a wide disagreement on scoring, a third evaluator scores the essay and the final score is informed to the teacher. Thus, it is likely that the scoring of essays was consistent across the teachers, given the regular training and calibration that teachers received. To evaluate this assumption, two essays from each of the three marks (a total of 6 essays or 32% of the essays) were randomly chosen and given to an independent rater who evaluated the essays. The evaluation of scores from this independent rater, following the study, found 83.3% agreement with the original teachers' marks. Given the more extensive training in scoring received by the teachers, their scores were used in the analysis.

**Analysis of Interaction Protocols**

The analysis of interaction protocols proceeded in three phases, with a different unit of analysis used during each phase (See Figure 1). In Phase 1, *episodes* were used as the unit of analysis to describe online reading practices. During Phase 2, *utterances* were used to identify collaborative reading strategies. During Phase 3, *collaborative reading patterns* were used to clarify how the student pairs co-constructed meaning and knowledge. The terms in italics are defined later on.

The analysis of different kinds of episodes enabled us to divide student discussions and related web-based activities into segments that described the student pairs' use of different online reading practices. Moreover, the analysis of episodes served as a basis for further analysis conducted in Phases 2 and 3. An episode as the unit of analysis has previously been used in studies on interaction during collaborative learning (Van

Boxtel, Van der Linden, & Kanselaar, 2000) and collaborative writing (Vass & Littleton, 2009).

In the second phase of the analysis, we identified the utterances that indicated the use of a collaborative reading strategy. However, the coding of the interaction protocols on the utterance level does not reveal the dynamics of students' discourse (Van Boxtel, Van der Linden, & Kanselaar, 2000). Thus, to be able to answer the second research question, a more holistic analysis of collaborative reading patterns (Phase 3) was needed. In this analysis, we combined the coding of collaborative reading strategies with the observations concerning the reciprocal nature of students' use of the collaborative reading strategies.

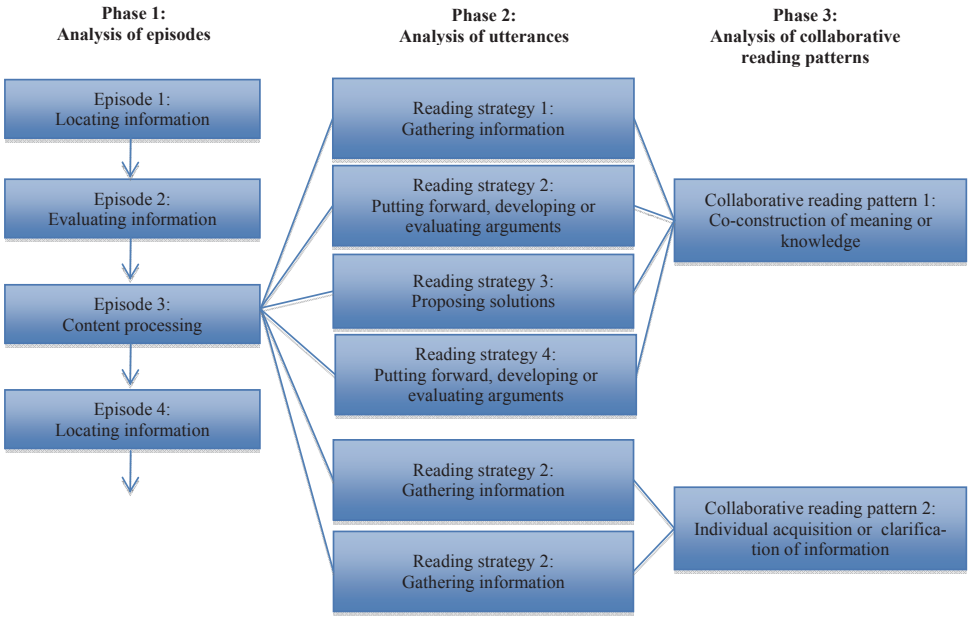


*Figure 1. Illustrative example of the progression of analysis.*

**Phase I: The analysis of episodes used to define online reading practices.**

The analysis began with defining and categorizing online reading episodes. An episode ($n$ = 562) was defined as a thematic entity consisting of successive activities and verbal interactions that served one of several specific reading practices: a) locating information; b) evaluating information; c) content processing; d) monitoring and regulating activities (one's own, other's, or joint activities), and e) off-task discussions. *In locating information episodes* ($n$ = 180) students considered their search strategy, formulated a search query, or chose links from the search results. *In evaluating information episodes* ($n$ = 90) students had to decide whether a certain Web page was worth opening or not. If they opened the page they had to evaluate whether it was reasonable to read it further. The students used credibility or relevance of information as evaluation criteria. *Content-*

*processing episodes* (*n* = 195) consisted of acquiring information, making sense of it, making connections between the text and relevant prior knowledge, and/or extending and exploring ideas presented in the text. *Monitoring and regulating episodes* (*n* = 93) included interactions when the students planned, monitored, regulated, or evaluated their own, their partner's, or their joint activities. O*ff-task episodes* (*n* = 4) were unrelated to accomplishing the task.

The first three aforementioned categories are based on Leu and colleagues' online reading comprehension theory (Leu, Kinzer, Coiro, & Cammack, 2004; Leu, Kinzer, Coiro, Castek, & Henry, in press). An additional category, monitoring and regulating activities, was included in the analysis. This category was added because monitoring and regulating one's reading processes are shown to be important both for reading traditional, linear printed texts (Baker, 2008) and for reading non-linear texts on the Internet (Coiro & Dobler, 2007; Kiili, Laurinen, & Marttunen, 2009). Since these five categories sometimes overlapped, the assignment of a category was based on the most dominant characteristics of the episode that best corresponded to the description of the category. The length (in seconds) of each episode was measured to determine the total amount of time the student pairs spent on it.

Because our focus was on the construction of meaning and knowledge, we concentrated the analysis of this study on content-processing episodes, the most numerous. During the second phase of the analysis, all of the utterances that took place during content-processing episodes and indicated the use of a collaborative reading strategy were identified and categorized in order to investigate the depth of the students' content processing.

**Phase II: The analysis of utterances used to identify collaborative reading strategies**

The categories of collaborative reading strategies emerged as a result of theory (Pressley & Afflerbach, 1995) and data-driven examination using an inductive analytic analysis (Bogdan & Biklen, 2003). We identified 944 utterances that indicated the use of a reading strategy. Since the reading strategies were shared and students had opportunities to build-upon one another's strategies, we refer to these as collaborative reading strategies. The categories of collaborative reading strategies, with examples, are presented in Table 1.

The reliability for coding collaborative reading strategies was examined by having another person code 4 out of the 19 interaction protocols. These protocols included 22.0 % of the collaborative reading strategies. We found 84.5% agreement. In all cases, the initial coding was used in the analysis.

Table 1
*Collaborative Reading Strategies*

| Collaborative Reading Strategy | Example |
|---|---|
| Gathering information | [Reading the sentence from the Web page]<br>*In Finland, Web sites containing child pornography have been censored since 1st of December, 2006.* |
| Considering concepts or their relations | *Doesn't censorship mean that people cannot put* [harmful] *material into the Web at all? The other option is that the material is removed from there later.* |
| Recapitulating information | *And the small summary here at the end. The point is A. whether it is possible to direct the censorship exactly towards these things* [child pornography] *and B. whether it is against the constitution and what is actually censored there.* |
| Using prior knowledge | *Well, nowadays it* [censorship] *is not that tight. Or at least not yet.* |
| Inferencing | *So, the child pornography is actually the main thing.* |
| Proposing a solution | *Children should be educated more. Put there* [notes] *that media education.* |
| Asking a question on the topic | *How can it* [censorship] *be controlled?* |
| Expressing an opinion or disagreement | *In my opinion all sites that provoke violence should be censored.* |
| Putting forward, developing, or evaluating arguments (e.g. arguments, counter-arguments, rebuttals) | *No censorship* [on the Web] *is needed if children and youngsters know what they are doing there* [argument].<br>*Well, on the other hand I am not sure whether it is good if they are chocked* [by harmful material]. [rebuttal] |

**Phase III: The analysis of collaborative reading patterns used to identify co-construction of meaning or knowledge**

The final phase of the analysis concentrated on exploring how students construct meaning or knowledge during content-processing episodes. The unit of analysis was a collaborative reading pattern, which consisted of an utterance or sequence of utterances that indicated a certain type of collaborative reading.

In the analysis, we applied the theoretical model of socially-regulated learning presented by Volet, Summers, and Thurman (2009, p.131). Their model comprises two dimensions: content processing and social regulation. The content-processing dimension is a continuum from low-level content processing (acquisition and clarification of information) to high-level content processing (construction of meaning). The social regulation dimension is a continuum from individual regulation to co-regulation as a group.

We modified their model to enable the framework to better fit the analysis of collaborative reading. Henceforth, we use the terms deep level of processing (construction

of meaning or knowledge) and shallow level of processing (acquiring or clarifying information) when we refer to the content-processing dimensions (see e.g. Friedman & Richards, 1981; King 2007). Since this study focuses on students' collaboration during reading in general, not particularly regulation processes, we replaced the social regulation dimension with the collaborative content-processing dimension. The collaborative content-processing dimension can be described as a continuum from individual content processing to collaborative content processing.

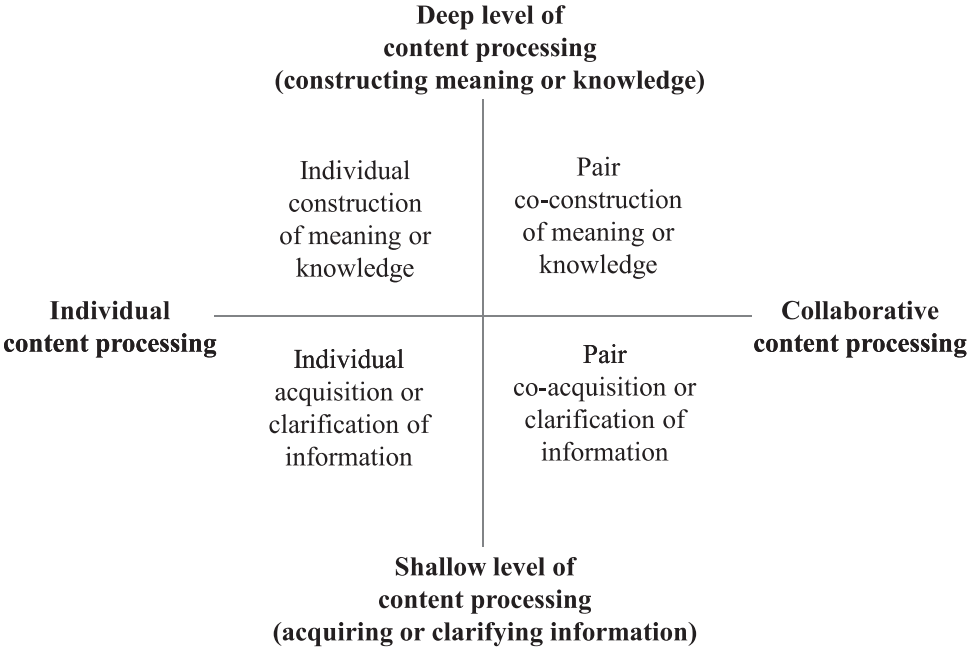


*Figure 2. Framework for analyzing construction of meaning or knowledge (modified from Volet, Summers, & Thurman, 2009, p. 131)*

On the basis of this analytic framework, four reading patterns (See Figure 2) were distinguished: a) individual acquisition or clarification of information; b) individual construction of meaning or knowledge; c) pair co-acquisition or clarification of information; and d) pair co-construction of meaning or knowledge. When defining and categorizing reading patterns, both collaborative reading strategies (whether strategies indicated deep or shallow level of processing) and students' contributions (whether emphasis was on individual or collaborative content processing) were taken into account. The patterns were categorized according to the dominant type of collaborative reading. For example, when a pattern appeared with students engaged in the co-acquisition or clarification of information at the beginning, followed by a short moment of individual construction of meaning or knowledge, and then ended with students engaged in the co-acquisition or clarification of information about the initial issue, the collaborative reading pattern was coded as the co-acquisition or clarification of information.

The reading patterns that appeared existed on a continuum that ranged from individual reading patterns to collaborative reading patterns. In this study, individual reading patterns were not purely individual because the reader shared his or her ideas with the listener, even if the listener did not respond or only made short comments to indicate that it had been heard. For this reason, we use the term individually-oriented collaborative reading pattern (henceforth individually-oriented reading pattern). The defining quality of an individually-oriented reading pattern was that something had been communicated to a partner about what had been read but that little discussion ensued. During collaborative reading patterns, there was back-and-forth conversation.

One individual reading pattern, silent reading, was added because it was impossible to determine whether a silent reader was acquiring information or constructing knowledge. When a student pair read silently for 15 seconds or more in the middle of other patterns, the silent reading was separated out and coded as pattern 5.

The boundaries of the collaborative reading patterns, i.e. where one pattern begins and where it ends, were determined by two kinds of shifts. First, because of the multilevel analyses some of the boundaries of the patterns were related to shifts in online reading episodes. The collaborative reading pattern either began or ended when an online episode of locating, evaluating, monitoring and regulating, or off-task discussion began or ended. For example, when students left the Web page and started to locate information both the content-processing episode and the collaborative reading pattern ended.

Second, the boundaries of the patterns were sometimes determined by a shift in the type of collaborative reading processing, i.e., the shift between individually-oriented and collaborative-oriented content processing and/or between shallow and deep content processing. The most common shift in the processing type occurred when students finished the discussion and started to read silently or vice versa. Finally, the shift in the processing type was sometimes related to the shift in the discussion topic or type of information encountered.

The reliability for coding collaborative reading patterns was examined by having two persons classify four (out of 19) interaction protocols. These protocols included 22.5% of all the reading patterns (the patterns of silent reading were excluded). The percentage of agreement was 83.9%. In all cases, the initial coding was used in the analysis.

*Pair co-construction of meaning or knowledge (n = 70).*

A collaborative reading pattern was coded as the co-construction of meaning or knowledge in those instances where students' content processing indicated only the co-construction of meaning, only the co-construction of knowledge, or both the co-construction of meaning and knowledge.

When student pairs co-constructed meaning or knowledge, both students made substantial contributions to the discussions and engaged in deep-level processing. The example in Excerpt 1, below, illustrates how Mari and Jaana engaged in deep-level content processing by using reading strategies such as inferencing and putting forward and

developing arguments. Both students also made considerable verbal contributions to meaning making and they built their ideas on their partner's thoughts. The students were reading online text material about the role of the Central Criminal Police in the censorship of child pornography in Finland. Excerpt 1 begins with Mari's question on the role of the police in censorship. In the next speech turn Jaana justifies the role of the police by reference to the law and proposes a consequence for illegal actions. Next, Mari agrees with the consequence by elaborating it. Finally, Jaana questions the effectiveness of the punishments for this crime.

**Excerpt 1**

Mari: *Is it a task for the police? Or should we now? I mean, is it the job for the police to organize censorship on the Internet?* **[Asking a question on the topic]**.

Jaana: *I think that it is a task for the police to impose a fine, because it's illegal* **[Putting forward, developing, or evaluating arguments—justification]**.
*If you violate the law, there should be [a fine], you know* **[Inferencing—consequence]**.

Mari: *They should impose a fine and then totally remove* it [harmful web site] **[Inferencing—consequence]**.

Jaana: *So it's a punishment. But, mm....Usually, the people who put these things on the Web don't care whether it is illegal or not. You know, it doesn't matter* **[Putting forward, developing, or evaluating arguments—rebuttal]**.
*They just want to make money when people visit their Web sites and people watch that stuff. There is some kind of payment so that these people get money* **[Putting forward, developing, or evaluating arguments]**. *So, they are not at all interested in whether it's illegal or not.*

To conclude, the excerpt above illustrated two critical features of the pattern of co-construction meaning or knowledge: The reciprocity in the elaboration of ideas and the use of those kinds of collaborative reading strategies that indicate a deep level of content processing.

*Pair co-acquisition or clarification of information (n = 85).*
A collaborative reading pattern was coded as the pair co-acquisition or clarification of information in those instances where students' content-processing utterances indicated only the co-acquisition of information, only the co-clarification of information, or both the co-acquisition and clarification of information.

During the patterns of pair co-acquisition or clarification of information, students reciprocally gathered or clarified information from the texts they were reading. The example in Excerpt 2, below, illustrates how Tiina and Kati gathered information from the Web site about censorship on the Internet. At the beginning of the excerpt Tiina pays attention to the definition of censorship and then Kati and Tiina gather information, particularly on how Internet censorship is unofficially conducted.

**Excerpt 2**

Tiina: *And it says what it [censorship] means in the world* **[Gathering information]**.

Kati: *Yes. Surveillance of the users* **[Gathering information].**
*It is said that it is impossible to control* **[Gathering information]**.
*What's this—release the operators? Over there...Interent operators*
**[Asking a question on the topic]**.

Tiina: *Mm. Then it says that like-minded communities have emerged into the discussion groups and they block out critical talkers* **[Gathering information]**. *I don't know. Maybe it works that way.*

Kati: *Where?* [Kati asks where the information is located on the Web page]

Tiina: *This last sentence.* [Tiina points the sentence with a mouse]

Kati: *Okay.*

Excerpt 2 shows that the students processed content in a reciprocal manner, but compared to Excerpt 1, the students applied a narrower repertoire of collaborative reading strategies by concentrating on gathering of information.

*Individual construction of meaning or knowledge (n = 26).*
An individually-oriented reading pattern took place when a single student expressed meaningful thoughts to his or her partner, without a pattern of collaborative construction in the utterances. An example of an individual construction of meaning or knowledge appears in Excerpt 3, below. Here Noora indicates how she is gathering information and putting forward, developing, or evaluating arguments but Sini only makes brief comments with the purpose of expressing acceptance.

**Excerpt 3**

Noora: *It said here that why not then letters, I mean post, is not controlled all the time.* **[Gathering information]**.
*But on the other hand, on the Internet everything spreads much wider.*
Sini: *Mmm.*
Noora: *That couldn't happen through the regular post. In a way that's the reason why precisely the Internet is controlled* **[Putting forward, developing, or evaluating arguments]**.

As shown in the Excerpt 3, the individual construction of meaning or knowledge is characterized by the fact that only one of the students expresses meaningful thoughts by using a collaborative reading strategy or strategies that indicated a deep level of content processing.

*Individual acquisition or clarification of meaning (n = 68).*
The pattern was coded as individual acquisition or clarification of meaning when a single student gathered or clarified information from a text as Tiina did in the following excerpt.

**Excerpt 4**

| | |
|---|---|
| Tiina: | *It says that the law does not have an effect on pedophiles* **[Gathering information]**. The*y get it* [pornography] *from elsewhere* **[Inferencing]**. |
| Kati: | *Mmmm.* |
| Tiina: | *In February the police accidentally added to their list* [a list for operators to censor particular sites] *a Web site that criticized censorship* **[Gathering information]**. *So, the police are in error* **[Inferencing]**. |
| Kati: | *Mmmm…* |

Excerpt 4 illustrates that in the pattern of individual acquisition or clarification of information, one student is responsible for it.

**Collaborative Reading Profiles – Hierarchical Cluster Analysis**
Following the identification of collaborative reading patterns, a hierarchical cluster analysis was conducted to identify students' collaborative reading profiles. Hierarchical cluster analysis is suitable when there are a limited number of cases (Aldenderfer & Blashfield, 1984). Our analysis was based on percentage of content-processing time spent by students in five areas: co-construction of meaning or knowledge; co-acquisition or clarification of information; individual construction of meaning or knowledge; individual acquisition or clarification of information; and silent reading. Between-group linkage was used as a clustering method and Squared Euclidean Distance as a clustering measure. Five clusters were identified on the basis of the generated dendrogram. The decision on the number of clusters was based on the basis of logical, identifiable clusters. The five clusters solution was chosen because in this solution each cluster had critical features that differentiated them from each other.

## Results

### Online Reading Practices

Table 2 shows that the student pairs spent, on average, 65.5% of their working time on content processing and 23.0% on locating information. There were considerable differences between the pairs in how they allocated the time they spent on different online reading practices. The time spent on content processing ranged from 31.5 % to 89.4% and time spent on locating information ranged from 4.1% to 52.3%. This result indicates that some student pairs had difficulty in finding relevant information. Evaluating information, monitoring and regulating activities, and off-task practices

appeared with far less frequency than content-processing practices and locating information practices.

Table 2
*Proportion of Time Spent on Different Online Reading Practices*

| | Proportion of the total working time | | |
|---|---|---|---|
| Online reading practice | *M* | *SD* | Min–Max |
| Content processing | 65.48 | 13.20 | 31.5–89.4 |
| Locating information | 22.97 | 10.64 | 4.1–52.3 |
| Evaluating information | 4.71 | 3.67 | 0–14.9 |
| Monitoring and regulating activities | 6.55 | 5.12 | 0–19.0 |
| Off-task | 0.29 | 0.79 | 0–2.7 |
| Total | 100.00 | | |

**Collaborative Reading Patterns**

Table 3 shows that student pairs spent 46% of their content-processing time on collaborative reading patterns, 45% of their time on silent reading, and 9% of their time on individually-oriented reading patterns. From collaborative reading patterns the student pairs spent more time on pair co-construction of meaning or knowledge (28% of total content-processing time) than on pair co-acquisition or clarification of information (18%).

Table 3
*Descriptive Statistics on Reading Patterns*

| Reading pattern | *f* | % | Proportion (%) of total duration | Mean duration (s) | Min–Max duration |
|---|---|---|---|---|---|
| ***Silent reading*** | 186 | 42.8 | 44.8 | 52 | 10–844 |
| ***Collaborative reading patterns*** | | | | | |
| Pair co-construction of meaning or knowledge | 70 | 16.1 | 28.3 | 88 | 10–371 |
| Pair co-acquisition or clarification of information | 85 | 19.5 | 17.7 | 45 | 4–204 |
| Collaborative reading patterns in total | 155 | 35.6 | 46.0 | 64 | 4–371 |
| ***Individually-oriented reading patterns*** | | | | | |
| Individual acquisition or clarification of information | 68 | 15.6 | 5.7 | 18 | 2–111 |
| Individual construction of meaning or knowledge | 26 | 6.0 | 3.5 | 29 | 10–90 |
| Individual reading patterns in total | 94 | 21.6 | 9.2 | 21 | 2–111 |
| Total | 435 | 100.0 | 146.0 | | |

The patterns of co-constructing meaning or knowledge ($n$ = 70) were on average the longest patterns, with a mean duration of 88 seconds; by contrast, the other patterns lasted, on average, from 18 to 52 seconds. The longest pattern of co-constructing meaning or knowledge was 6 minutes 11 seconds, which indicates that the pair in question was substantially engaged in co-construction of meaning or knowledge.

**Collaborative Reading Strategies and Their Distribution within the Collaborative Reading Patterns**

Table 4 provides descriptive information on the frequency of different collaborative reading strategies and how these were distributed within collaborative reading patterns. The most common reading strategy was gathering information, which accounted for 37.1% of all strategies. The second most common strategy, at 16.0%, was putting forward, developing, or evaluating arguments.

More than half of the reading strategies (512 strategies out of 944) were shared during the patterns of co-construction of meaning or knowledge. The most common strategy when co-constructing meaning or knowledge was putting forward, developing, or evaluating arguments ($M$ = 1.80 utterances indicating the use of the strategy) accounting for 24.6 % of all the strategies. The second most common strategy was gathering information ($M$ = 1.34). The difference between the total means for collaborative reading strategies involving patterns of co-construction of meaning or knowledge ($M$ = 7.32) and patterns of individual construction of meaning or knowledge ($M$ = 2.15) may be seen as evidence of good engagement in collaborative work among the population of this task. The same pattern can be found when comparing pair co-acquisition or clarification of information ($M$ = 3.28) to individual acquisition or clarification of information ($M$ = 1.43).

Table 4
*Collaborative Reading Strategies Within Collaborative Reading Patterns*

| | | | Frequencies, proportions and means within the reading patterns | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Collaborative reading patterns | | | | | | Individually-oriented reading patterns | | | | | |
| | In total | | Co-const. ($n$ = 70) | | | Pair acq. ($n$ = 85) | | | Ind.const. ($n$ = 26) | | | Ind. acq. ($n$ = 68) | | |
| Collaborative reading strategy | *f* | % | *f* | % | *M* | *f* | % | *M* | *f* | % | *M* | *f* | % | *M* |
| Gathering information | 350 | 37.1 | 94 | 18.4 % | 1.34 | 166 | 60 | 1.95 | 12 | 21.4 | 0.46 | 78 | 79.6 | 1.15 |
| Putting forward, developing or evaluating arguments | 151 | 16.0 | 126 | 24.6 % | 1.80 | 6 | 2.2 | 0.07 | 18 | 32.1 | 0.69 | 1 | 1.0 | 0.01 |
| Inferencing | 111 | 11.8 | 65 | 12.7 % | 0.93 | 34 | 12.2 | 0.40 | 3 | 5.4 | 0.12 | 9 | 9.2 | 0.13 |
| Using prior knowledge | 109 | 11.5 | 83 | 16.2 % | 1.19 | 16 | 5.8 | 0.19 | 10 | 17.9 | 0.38 | 0 | 0.0 | 0.00 |
| Asking question on the topic | 86 | 9.1 | 60 | 11.7 % | 0.86 | 20 | 7.2 | 0.24 | 4 | 7.1 | 0.15 | 2 | 2.0 | 0.03 |
| Expressing an opinion or disagreement | 50 | 5.3 | 27 | 5.3 % | 0.39 | 15 | 5.4 | 0.18 | 5 | 8.9 | 0.19 | 3 | 3.1 | 0.04 |
| Proposing a solution | 41 | 4.3 | 40 | 7.8 % | 0.57 | 0 | 0.0 | 0.00 | 1 | 1.8 | 0.04 | 0 | 0.0 | 0.00 |
| Considering concepts or their relations | 24 | 2.5 | 7 | 1.4 % | 0.10 | 12 | 4.3 | 0.14 | 1 | 1.8 | 0.04 | 4 | 4.1 | 0.06 |
| Recapitulating information | 22 | 2.3 | 10 | 2.0 % | 0.14 | 9 | 3.2 | 0.11 | 2 | 3.6 | 0.08 | 1 | 1.0 | 0.01 |
| Total | 944 | 100 | 512 | 100 % | 7.32 | 278 | 100 | 3.28 | 56 | 100 | 2.15 | 98 | 100 | 1.43 |

*Note.* Co-const.= pair co-construction of meaning or knowledge; Pair acq.= pair co-acquisition or clarification of information;
Ind.const.= individual construction of meaning or knowledge; Ind acq.= individual acquisition or clarification of information

When collaborative reading strategies were examined among the pairs, there was a wide variation in how the student pairs applied the strategies (Table 5). On average, the student pairs shared 49.7 collaborative reading strategies and the standard deviation among the pairs was 30.5. On average, the student pairs gathered information 18.4 times (*SD* = 9.5), put forward, developed or evaluated arguments 8.0 times (*SD* = 8.0) and made inferences 5.8 times (*SD* = 3.9).

Table 5
*Collaborative Reading Strategies Among the Student Pairs*

| Collaborative reading strategy | *M* | *SD* |
|---|---|---|
| Gathering information | 18.42 | 9.47 |
| Putting forward and developing arguments | 7.95 | 8.00 |
| Inferencing | 5.84 | 3.92 |
| Using prior knowledge | 5.74 | 4.53 |
| Asking questions | 4.53 | 6.21 |
| Expressing an opinion or disagreement | 2.63 | 2.50 |
| Proposing solutions | 2.16 | 3.80 |
| Considering concepts or their relations | 1.26 | 1.73 |
| Recapitulation | 1.16 | 1.21 |
| Total | 49.69 | 30.46 |

**Collaborative Reading Profiles**

In the cluster analysis five different collaborative reading profiles emerged: a) Co-constructers (*n* = 2 pairs); b) Collaborators (*n* = 2 pairs); c) Blenders (*n* = 6 pairs); d) Individually-Oriented Readers (*n* = 4 pairs); and e) Silent Readers (*n* = 5 pairs). The clusters were named by considering how the means of the different variables, used in the cluster analysis, were distributed. Table 6 presents the mean proportion of time the student pairs spent on different collaborative reading patterns.

*Co-constructors* (*n* = 2 pairs) engaged in collaborative content processing with a strong emphasis on pair co-construction of meaning or knowledge (83% of content-processing time). Co-constructors shared, on average, 110 collaborative reading strategies and, additionally, both pairs applied different reading strategies in a versatile way. They gathered information from the Web pages (on average, 28.5 strategies), put forward, developed, or evaluated arguments (*M* = 21.0), and asked questions (*M* = 17.0). Both pairs saw the task as a problem to solve; on average, they proposed a solution for solving the dilemma of Internet censorship on 11.5 occasions.

Table 6
*The Means of Each Cluster with Respect to the Proportion of Time Spent on Different Reading Patterns*

| Reading pattern | Co-constructors (*n* = 2) | Collabora-tors (*n* = 2) | Blenders (*n* = 6) | Individually-oriented readers (*n* = 4) | Silent readers (*n* = 5) |
|---|---|---|---|---|---|
| ***Collaborative reading patterns*** | | | | | |
| Pair co-construction of meaning or knowledge | 83.48 | 40.84 | 37.08 | 6.58 | 7.92 |
| Pair co-acquisition or clarification of information | 12.29 | 46.36 | 17.92 | 25.24 | 6.08 |
| Collaborative reading patterns in total | 95.77 | 87.20 | 55.00 | 31.82 | 14.00 |
| ***Individually-oriented reading patterns*** | | | | | |
| Individual construction of meaning or knowledge | 0.25 | 3.39 | 7.90 | 11.88 | 2.59 |
| Individual acquisition or clarification of information | 0.00 | 2.58 | 3.32 | 6.05 | 2.72 |
| Individually-oriented reading patterns in total | 0.25 | 5.97 | 11.22 | 17.93 | 5.31 |
| ***Silent reading*** | 3.99 | 6.84 | 33.79 | 50.26 | 80.69 |
| Total | 100.01 | 100.01 | 100.01 | 100.01 | 100.00 |

Like Co-constructors, *Collaborators* (*n* = 2 pairs) engaged mostly in collaborative content processing. While Co-constructors' collaborative content processing emphasized the co-construction of meaning or knowledge, Collaborators' collaborative content processing was distributed more equally between the co-construction of meaning or knowledge (41%) and the pair co-acquisition or clarification of information (46%). During their discussions Collaborators shared, on average, 58.5 reading strategies. The most common strategies included gathering information (*M* = 18.5) and using prior knowledge (*M* = 11.50). Collaborators also asked questions (*M* = 9.0) during their content processing.

The third cluster was labeled *Blenders* (*n* = 6 pairs), since these students mixed collaborative (55%) and individually-oriented (45%) content processing. They spent most of their time on the co-construction of meaning or knowledge (37%) and on silent reading (34%). Blenders shared, on average, 59.8 collaborative reading strategies during their content processing. Gathering information (*M* = 21.7) was the most common reading strategy and putting forward, developing, or evaluating arguments was the second most common reading strategy (*M* = 11.5).

*Individually-Oriented Readers* (*n* = 4 pairs), spent more time on individually-oriented content processing, with greater emphasis on silent reading (50%) than on collaborative content processing. They shared, on average, 41.0 reading strategies during their discussions. Like the student pairs in all the other clusters, Individually-

Oriented Readers also gathered information actively ($M$ = 24.5). Their second most common reading strategy was putting forward, developing, or evaluating arguments ($M$ = 5.3).

*Silent Readers* ($n$ = 5 pairs) spent most of their working time on reading silently (on average, 81% of content processing). Because of the vast amount of time spent on silent reading Silent Readers shared, on average, only 16.8 reading strategies during content processing.

The clusters were also compared in how they spent their working time using different online reading practices. The clusters that were most engaged in collaborative content processing appeared to also engage in the most monitoring and regulating activities. On average, Co-constructors spent 9.4% and Collaborators spent 11.9% of their working time on monitoring and regulating their activities. Blenders only spent, on average, 3.9%, Individually-Oriented Readers 5.2%, and Silent Readers of their working time on monitoring and regulating their activities. The time spent on other online reading practices was much the same among the each cluster.

**Students' Essay Performance**

When evaluating the student pairs' essays the teachers used only the three highest scores: outstanding (6 points), excellent (5 points), or good (4 points). The teachers indicated that these student pairs wrote substantially better than other similar students when composing an essay individually. The average mark awarded the pairs' joint essays was 4.79 ($SD$ = 0.79). Thus, on average, student scores on the essays fell between excellent and good, but closer to excellent. Four joint essays were evaluated as outstanding; seven as excellent, and eight as good. When the marks of the student pairs in the different clusters were compared, a downward trend was observed. Both student pairs in the cluster of Co-constructers received outstanding marks for their essays ($M$ = 6). The two pairs named Collaborators received excellent marks for their essay ($M$ = 5). The average mark of the Blenders was 4.83, that of the Individually-Oriented Readers 4.75, and that of the Silent Readers 4.20.

**Students' Experiences on Collaborative Work**

Table 7 reports students' responses to those post-study questionnaire items that concerned collaborative work compared to individual work in relation to: online reading practices (the first four sets of items), composition of a joint essay, or collaborative work in general during the entire task. In general, the students found collaborative work beneficial. A majority of the students (92%) found collaborative work particularly useful when it came to exploring different perspectives of the issue. Most of the students also reported that collaboration was beneficial for evaluating the usefulness of information (79%) or extracting main ideas from the texts (76%). The students also reported that they were able to regulate their understanding by asking their partner when he or she did not understand some issue in the text.

Table 7
*Students' Experiences on Collaborative Online Reading, Composing a Joint Essay and Collaborative Work in General*

| | Proportion of students ($n$ = 38) | | | |
|---|---|---|---|---|
| | Totally/partly agree | Neutral | Totally/partly disagree | Total |
| ***Collaborative online reading*** | | | | |
| Finding search terms was easier together. | 57.9 | 28.9 | 13.2 | 100 |
| When working alone I would have visited more web sites. | 39.5 | 31.5 | 29.0 | 100 |
| When working in pairs we considered more whether the information is useful for the task. | 79.0 | 10.5 | 10.5 | 100 |
| Reading together helped me to extract main ideas from the texts. | 76.4 | 18.4 | 5.2 | 100 |
| Reading together helped me to understand texts better. | 29.0 | 26.3 | 44.7 | 100 |
| Reading together hinders concentrating on the texts. | 31.6 | 18.4 | 50.0 | 100 |
| It would have been easier to take notes individually. | 13.9 | 16.7 | 69.4 | 100 |
| I was able to ask my pair if I did not understand some issues on the text. | 78.9 | 18.5 | 2.6 | 100 |
| I received useful feedback from my pair. | 47.4 | 44.7 | 7.9 | 100 |
| ***Composing a joint essay*** | | | | |
| I considered joint essay more critically than the essays written by myself. | 37.9 | 18.9 | 43.2 | 100 |
| If I had written the essay by myself it would have been better. | 15.8 | 36.8 | 47.4 | 100 |
| ***Collaborative work in general*** | | | | |
| When working in pairs more perspectives of the issue were explored. | 92.1 | 0.0 | 7.9 | 100 |
| I learned from my pair new means to utilize the Internet. | 11.0 | 21.0 | 68.0 | 100 |
| Collaborative work is not as efficient than individual work. | 23.7 | 44.7 | 31.6 | 100 |

## Discussion

This study sought to explore how students engaged in collaborative online reading as they co-constructed meaning and knowledge to explore a controversial issue. In addition, it sought to determine how student pairs, who used different collaborative reading profiles to co-construct meaning and knowledge, performed on an essay-writing task. While extensive research exists about reading as an individual practice, there is little research about reading as a collaborative social practice, especially in relation to the co-construction of meaning and knowledge that takes place with online reading. Reading multiple texts with conflicting opinions and discussing these different points of views was thought to promote students' co-construction of meaning and knowledge during online reading and, possibly, enhance performance on an essay-writing task.

The results of this study will be explored by discussing the larger, collaborative, online reading practices and then the reading patterns and specific collaborative reading

strategies that appeared within these reading patterns. The results suggest that patterns and strategies emerge during collaborative online reading that may be supportive of both meaning and knowledge construction.

**How do Students Engage in Online Reading Practices?**

Of all types of online reading practices observed, the greatest proportion of time was spent on content processing. On average, student pairs spent nearly two-thirds (65%) of their time on content-processing practices and 23% of their time on practices related to locating information. Only about 12% of the time, on average, was spent on other reading practices: evaluating information, monitoring and regulating activities, and off-task practices.

Content-processing practices and locating information practices accounted for 88% of the total working time and the variance for each was substantial. Time spent on locating information was negatively associated with time spent on content processing ($r$ = -.894; $p < 0.01$). Thus, about 80% of the variance in the time spent on content processing can be accounted for by knowing the time spent on locating. This pattern is consistent with a trade off between locating information and the content processing of information. That is, students who spent more time with locating information had less relative time for content processing. This supports the idea that the ability to locate information is important during online reading comprehension (Bilal, 2000; Kiili, Laurinen, & Marttunen, 2008; Kuiper & Volman, 2008) and that the two may be reciprocal (Henry, 2006). Being able to locate appropriate information efficiently may be a gatekeeping online reading practice, increasing opportunities to engage in content processing.

The results concerning the time spent on locating and content-processing practices, along with the substantial variance, were similar to the previous study by Kiili, Laurinen, & Marttunen (2008) in which students read individually. In both individual and collaborative reading contexts, students spent roughly similar amounts of time with locating and content-processing practices. Lazonder (2005), on the other hand, found that students located information more effectively in collaboration than alone. It is not clear why the results in this study, compared to the study by Kiili, Laurinen, & Marttunen (2008), did not show a similar pattern.

Although the episodic analysis used in this study provides a useful, initial, approach for exploring students' online reading practices, it is important to recognize that it only focused on the larger scale practices that took place during collaborative online reading. This was due to the fact that we categorized episodes according to the dominant online reading practice in each. There appeared to be some practices that were not the most dominant single practice but rather were interwoven throughout several of the larger, more visible practices. Monitoring and regulating activities, in particular, appeared within episodes of other dominant practices. Further research, that focuses solely on these important areas, needs to be conducted in order to more fully understand their contribution to collaborative online reading.

## How Do Student Pairs Co-Construct Meaning And Knowledge?

### Collaborative reading patterns

Although this study involved only a small number of student pairs, the nature of the reading patterns that appeared helps to expand our understanding of online reading, showing how online reading may be situated as a very collaborative, social practice that contributes to the co-construction of meaning or knowledge. Table 3 shows that student pairs spent, on average, 46% of their time on collaborative reading patterns, 45% of their time on silent reading, and 9% of their time on individually-oriented reading patterns. In addition, the mean duration of time spent on collaborative reading patterns was greater (64 seconds) than either silent reading (52 seconds) or patterns that supported individual content processing (21 seconds).

While this study found that a substantial proportion of time was spent on collaborative reading patterns, there is also the possibility that one, or several additional elements of the design contributed to this result. The topic, for example, may have played an important role. It seemed, at least for the researcher, who was present in the teaching experiment, that the task was engaging for the students. One reason for students' engagement may have been that the topic had relevance to the students' lives. In addition, it should be noted that the teacher did not assign reading pairs, but rather students self-selected their own partners. The possibility of choosing a partner might have helped students to feel safe to express their ideas to their pair. For example, Eteläpelto & Lahti (2008) found that among teacher students the most important obstacle for creative collaborative course work was an environment that was perceived unsafe. Future research will need to explore the relative contributions that each of these elements played in the positive results that were achieved. In addition, it would also be useful to explore the relative contributions of each of these elements at lower age levels in the proportion of time spent on collaborative reading patterns. Are older students more capable than younger students of working collaboratively during the reading of online information? If so, what types of supports might be provided to enable younger students to take greater advantage of the benefits we found in this study of collaborative online reading? How might we structure classroom lessons at every grade level, to achieve the pattern of results that emerged in this study? We do not yet know the answer to these questions.

In short, this study found substantial amounts of time being spent by students in pair co-construction of meaning or knowledge and pair co-acquisition or clarification of information when they read online together, exploring a controversial issue within an argumentation framework. This is not to say, however, that all of their reading time was spent in social interaction that contributed to meaning and knowledge construction. An important portion of time was spent on silent reading, the nature of which was impossible to determine in the present study. In addition, a smaller proportion of time was spent on individual content-processing patterns. Analogous to research in collaborative learning (Volet, Summers, & Thurman, 2009), this study suggests that when participating in a collaborative reading situation, students do not interact collaboratively or co-

constructively all the time. This study may, however, provide baseline data on social collaboration and collaborative meaning and knowledge construction for one type of lesson that may be compared to other types of lessons in which online reading takes place, evaluating the extent to which different types of lessons generate collaborative meaning and knowledge construction.

**Collaborative reading strategies within different reading patterns**

Data in Table 3 indicates that the patterns of pair co-construction of meaning or knowledge were, on average, more than three times longer (88 seconds) than the patterns of individual construction of meaning or knowledge (29 seconds). In addition, data in Table 4 indicates that patterns of pair co-construction of meaning or knowledge also contained more than three times as many collaborative reading strategies (7.32) than the patterns of individual construction of meaning or knowledge (2.15). Thus, both more time was spent and more strategies appeared during pair co-construction of meaning or knowledge patterns than individually-oriented patterns. These results suggest that in classroom lessons that aim at co-construction of meaning and knowledge students need adequate time to explore information sources and to engage in text-based discussions; these do not appear to be the type of lessons that should be rushed.

One explanation for the greater number of strategies in the pair co-construction of meaning or knowledge patterns might be that when a student finds a useful way to explore an idea, the other student begins to use similar types of productive strategies. Andersson et al. (2001), for example, found that certain discourse patterns, argument stratagems, had a snowballing or spreading activation effect on other participants. Once a useful argument stratagem, such as managing the participation of classmates, making an argument explicit, or acknowledging uncertainty, was employed, other students also started to use it. Thus, it may be that deep processing of information runs dry more quickly when only one student is responsible for it.

We also note that the most frequent collaborative reading strategy in this study was gathering information ($n$ = 350), accounting for slightly more than a third of all collaborative reading strategies. This supports the important role of locating information during online reading (Kuiper & Volman, 2008). The study also showed that each pair engaged in more gathering information strategies during collaborative content processing ($M$ = 1.34 for pair co-construction of meaning or knowledge; $M$ = 1.95 for pair co-acquisition or clarification of information) than during individually-oriented content processing ($M$ = 0.46 for individual construction of meaning or knowledge; $M$ = 1.15 for individual acquisition or clarification of information). This is consistent with the interpretation that active, productive collaboration took place during most aspects of online reading in this study.

The results of this study appear to suggest that collaborative online reading among self-selected pairs, organized around an argumentative task assignment, promotes information processing that goes beyond the simple gathering of facts and extends to the deeper construction of meaning or knowledge. Previous work (Kiili, Laurinen, & Marttunen, 2009), in which students were asked to read individually on the Internet in

order to prepare for an essay, resulted in students concentrating mainly on the gathering of facts; 80% of all reading strategies were classified as fact gathering in that study. In this study, the corresponding percentage was only 37%, a reduction of slightly more than half. Indeed, an analysis of Table 4 shows that nearly two thirds of the collaborative reading strategies used by students went beyond the simple gathering of facts. This is what may have led to the positive effects on the essay writing task, especially given that those students who engaged in greater co-construction of meaning (the Co-Constructors), appeared to achieve the highest average score on the essay assignment. Thus, the use of an argumentative task assignment may be useful in generating greater co-construction of meaning and deeper levels of online reading and thinking than other types of assignments. This finding may be especially important for teachers who seek to develop higher levels of thinking with online reading assignments in their classrooms. However, due to the small sample size, the results should be interpreted with caution, requiring both replication and additional study with larger sample sizes.

Table 4 also indicates that the most frequent collaborative reading strategy when co-constructing meaning or knowledge was "Putting forward, developing, or evaluating arguments" (25%). This strategy might have helped students to consider a topic from different perspectives and engage in more productive discussions and possibly learning. This is supported by the post-study questionnaire that the students filled in after the teaching experiment. In the questionnaire 92% of the students agreed with the statement "When working in pairs, more perspectives emerge on the issue under discussion compared to individual work." The positive impact of an argumentative task found here is consistent with several studies, in which university students worked online with restricted, pre-selected texts (Le Bigot & Rouet, 2007; Wiley & Voss, 1999). The present study shows that similar effects may be achieved with argumentative tasks when students are not restricted to the locations they use to gather information.

This study suggests that when we explore online reading as a collaborative process, as opposed to an individual process, additional opportunities emerge that may be supportive of both meaning and knowledge construction. As students engaged in content-processing practices, they frequently negotiated their understanding and put forward and developed arguments in order to convince their partner of their point of view. Since readers collaboratively built on one another's ideas, expanding their own thinking, collaborative online reading may support construction of meaning and knowledge beyond individual reading. Further research is needed to explore the full range of contexts in which this takes place with a larger and wider range of students.

Finally, it is important to also observe that using an interaction approach to the collection of verbal protocol data, as in this study, may provide certain methodological advantages. It appears to provide access to meaning and knowledge construction processes in a manner that is less intrusive and more consistent with more natural interaction patterns. Previously, students' individual reading processes have been widely studied by using think-aloud methods (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995). One concern of using a think-aloud method, raised by Miyake

(1986), is the artificial nature of the research situation, since readers are asked to think aloud in a situation in which they would normally be silent. Thinking aloud during reading intrudes on processing (Pressley & Afflerbach, 1995). Collecting data while students collaborate and discuss their ideas with their partner may provide access to otherwise hidden strategies in a more ecologically valid manner. This suggests that the use of interaction methods may be a promising methodological avenue to explore in future studies that use verbal protocol analysis.

**How Do Student Pairs, With Different Collaborative Reading Profiles, Perform on an Essay-Writing Task?**

The results in this study showed that student pairs clustered into five different reading profiles based on how they collaborated. Moreover, these profiles aligned closely with the students' essay-writing performance.

**Collaborative reading profiles**

Cluster analysis indicated that students varied considerably in how they collaborated. Five collaborative reading profiles appeared: Co-constructors, Collaborators, Blenders, Individually-Oriented Readers, and Silent Readers.

Overall, it appeared that some students were capable of working as pairs, and took full advantage of the collaborative situation by spending a substantial proportion of their time in the pair co-construction of meaning or knowledge. Others, by contrast, had a stronger preference for working alone. The differences that appeared in Table 6 are striking. There appeared to be a substantial difference in the proportion of time spent on the pair co-construction of meaning or knowledge between the Individually-Oriented Readers and the Silent Readers and the other three clusters. Individually-Oriented Readers and Silent Readers only spent, on average, 7–8% of their time on the pair co-construction of meaning or knowledge while the other three groups spent from 37% to 83%.

The results suggest that simply participating in a collaborative reading context does not ensure that all students will be able to collaborate in a fully productive manner. Thus, in the future, attention should be paid to developing methods for teaching students how to collaborate productively in order to achieve higher levels of collaboration and co-construction of meaning and knowledge. For example, Mercer and Littleton (2007) have obtained encouraging results in their long-term intervention studies in which pupils were taught to use explorative talk, both in classrooms and in group work. This may be a promising direction to pursue.

Since the co-constructors engaged to the greatest extent in co-constructing meaning or knowledge during content processing, they appeared to take the greatest advantage of the collaborative reading situation for thinking through the controversial issue together. Previous work suggests that engagement in argumentative discussions (Mercer & Littleton, 2007) as well as asking questions during collaborative reading (King, 2007; Volet, Summers, & Thurman, 2009) often plays an important role in

maintaining high quality interactions among students that benefits learning. This appears to be what happened in this study.

**Essay Performance**

Overall, the teachers in this study reported that the general level of the joint essays was noticeably better than individual essays, which students normally write in the class. While this is only self-report data it is consistent with other research showing the potential benefits of collaborative work (e.g. Gokhale, 1995; Yarrow & Topping, 2001).

This study found that mean scores on the joint essays mapped closely to the reading profile and the relative proportion of time that student pairs spent co-constructing meaning or knowledge during content processing. Both student pairs with the highest proportion of time spent co-constructing meaning or knowledge received the highest possible mark for their essay (6 = Outstanding). The two pairs in the profile Collaborators received the next highest mark (5 = Excellent). Continuing down the scale in terms of the proportion of time spent co-constructing meaning or knowledge the average mark of the Blenders was 4.83, that of the Individually-Oriented Readers 4.75, and that of the Silent Readers 4.20.

It seems, at least in this study**,** that students' essay performance appears to have benefited from engagement in collaborative and deep-level content processing during collaborative online reading. However, these results should be interpreted cautiously since the number of student pairs in each cluster was small. In addition, there might have been other factors, such as students' writing abilities and collaboration during composing the essay that might have affected the quality of student pairs' writing. Although all the student pairs were able to discuss the topic on the basis of their prior knowledge in the prior knowledge activation phase, differences on students' level of prior knowledge might also have played a role in composing the essay.

## Conclusions

This exploratory study examined how 16–18 year old students in Finland constructed meaning and knowledge during collaborative online reading about a controversial issue. It found several promising patterns that should be explored further with larger numbers of students, different age groups, with different types of tasks, and with greater controls. Much of the time in collaborative reading was spent in content-processing practices. Within these content-processing practices, student pairs spent a substantial percentage of time collaborating on content processing that supported collaborative meaning or knowledge construction. Patterns of pair co-construction of meaning or knowledge averaged three times as long as patterns of individual construction of meaning or knowledge and contained more than three times as many reading strategies than patterns of individual construction of meaning or knowledge. In addition, essay-writing performance aligned closely with the reading profiles of student pairs: Student pairs who spent the greatest proportion of time on co-constructing meaning or knowledge received the highest scores on their essays; student pairs who spent the least amount of

time received the lowest scores. These results suggest that lessons that are organized around collaborative online reading to foster the co-construction of meaning and knowledge may lead to positive outcomes but are likely to require greater time.

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**References**

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis.* Sage University Papers series, no. 07-044. Beverly Hills, CA: Sage.

Anderson, R. C., Nguyen-Jahiel, K., McNurlen, B., Archodidou, A., Kim, S-O., Reznitskaya, A., Tillmanns, M., & Gilbert, L. (2001). The snowball phenomenon: Spread of ways of thinking across groups of children. *Cognition and Instruction, 19*(1), 1–46.

Andriessen, J., Baker, M., & Suthers, D. (2003). Argumentation, computer support, and the educational context of confronting cognitions. In J. Andriessen, M. Baker, & D. Suthers (Eds.), *Arguing to learn. Confronting cognitions in computer-supported collaborative learning environments* (pp. 1–25). Dordrecht: Kluwer.

Applebee, A. N., Langer, J. A., Nystrand, M., & Gamoran, A. (2003). Discussion-based approaches to developing understanding: Classroom instruction and student performance in middle and high school English. *American Educational Research Journal, 40*(3), 685–730.

Australia Curriculum, Assessment and Reporting Authority (n.d.). *The Australian Curriculum, v1.2.* Available at: http://www.australiancurriculum.edu.au/Home.

Baker, L. (2008). Metacognition in comprehension instruction: What we've learned since NRP. In C. C. Block, & S. R. Parris (Eds.), *Comprehension instruction: Research-based best practices* (pp. 65–79). New York, NY: Guilford Press.

Barnes, D. (2008). Exploratory talk for learning. In N. Mercer & S. Hodgkinson (Eds.), *Exploring talk in schools* (pp. 1–15). Sage.

Bogdan, R. C., & Biklen, S. K. (2003). *Qualitative research for education: An introduction to theories and methods* (4th ed.). Boston, MA: Allyn & Bacon.

Bilal, D. (2000). Children's use of the yahooligans! web search engine: I. cognitive, physical, and affective behaviors on fact-based. *Journal of the American Society of Information Science, 51*(7), 646–665.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly, 42*(2), 214–257.

Coiro, J., Knobel, M. Lankshear, C., & Leu, D. J. (Eds.). (2008). Handbook of research on new literacies. New York, NY: Erlbaum.

Common Core State Standards Initiative. (2010). Common Core State Standards Initiative: Preparing America's students for college and career. Retrieved from http://www.corestandards.org/the-standards

Dillenbourg P. (1999) What do you mean by collaborative learning? In P. Dillenbourg (Ed.), *Collaborative-learning: Cognitive and Computational Approaches* (pp.1–19). Oxford, England: Elsevier.

Dirks, K. T. (1999). The effects of interpersonal trust on work group performance. *The Journal of Applied Psychology, 84*(3), 445–455.

Engeström, Y., & Sannino, A. (2010). Studies of expansive learning: Foundations, findings and future challenges. *Educational Research Review, 5*(1), 1–24.

Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data.* A Bradford Book. Cambridge, MA: Bradford Books.

Eteläpelto, A., & Lahti, J. (2008). The resources and obstacles of creative collaboration in a long-term learning community. *Thinking Skills and Creativity, 3*(3), 226–240.

Finnish Board of Education. (2003). National core curriculum for upper secondary schools 2003. Available at: http://www.oph.fi/download/ 47678_core_curricula_ upper_secondary _education.pdf

Friedman, F., & Rickards, J. P. (1981). Effect of level, review, and sequence of inserted questions on text processing. *Journal of Educational Psychology, 73*(3), 427–436.

Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. *Journal of Technology Education, 7*(1), 22–30.

Heisey, N., & Kucan, L. (2010). Introducing science concepts to primary students through read-alouds: Interactions and multiple texts make the difference. *The Reading Teacher, 63*(8), 666–676.

Henry, L. A. (2006). SEARCHing for an answer: The critical role of new literacies while reading on the Internet. *The Reading Teacher, 59*(7), 614–627.

Huey, E. B. (1908). *The psychology and pedagogy of reading (Reprinted 1968)*. Cambridge, MA: MIT Press.

Jadallah, M., Miller, B., Anderson, R. C., Nguyen-Jahiel, K., Zhang, J., Archodidou, A., & Grabow, K. (2009). Collaborative reasoning about a science and public policy issue. In M. G. McKeown & L. Kucan (Eds.), *Bringing Reading Research to Life* (pp. 170–193). New York, NY: Guilford Press.

Jedeskog, G., & Nissen, J. (2004). ICT in the Classroom: Is doing more important than knowing? *Education and Information Technologies, 9*(1), 37–45.

Kiili, C., Laurinen, L., & Marttunen, M. (2008). Students evaluating Internet sources: From versatile evaluators to uncritical readers. *Journal of Educational Computing Research, 39*(1), 75–95.

Kiili, C., Laurinen, L., & Marttunen, M. (2009). Skillful Internet reader is metacognitively competent. In L. T. W Hin and R. Subramaniam (Eds.), *Handbook of Research on New Media Literacy at the K-12 Level: Issues and Challenges* (pp. 654–668). Hershey, PA: IGI Global.

King, A. (2007). Beyond literal comprehension: A strategy to promote deep understanding of text. In D. S. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions and technologies* (pp. 267–290). New York, NY: Erlbaum.

Kintsch, W., & Kintsch, E. (2005). Comprehension. In S. G. Paris & S. A. Stahl (Eds.), *Children's reading: Comprehension and assessment* (pp. 71–92). Mahwah, NJ: Erlbaum.

Kucan, L., & Beck, I. L. (1997). Thinking aloud and reading comprehension research: Inquiry, instruction, and social interaction. *Review of Educational Research, 67*(3), 271–299.

Kuiper, E., & Volman, M. (2008). The Web as a source of information for students in K–12 education. In J. Coiro, M. Knobel, C. Lankshear, & D. Leu (Eds.), *Handbook of research on new literacies* (pp. 241–246). Mahwah, NJ: Erlbaum.

Kukla, A. (2000). Social constructivism and the philosophy of science. London, England: Routledge.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behaviour*, *19*(3), 335–353.

Labbo, L. D., & Reinking, D. (1999). Negotiating the multiple realities of technology in literacy research and instruction. *Reading Research Quarterly, 34*(4), 478–492.

Lazonder, A. W. (2005). Do two heads search better than one? Effects of student collaboration on Web search behaviour and search outcomes. *British Journal of Educational Technology, 36*(3), 465–475.

Le Bigot, L., & Rouet, J-F. (2007). The impact of presentation format, task assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research, 39*(4), 445–470.

Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of New Literacies emerging from Internet and other information and communication technologies. In R. B. Ruddell & N. Unrau (Eds.), *Theoretical models and process of reading* (5th ed., pp. 1570–1613). Newark, DE: International Reading Association.

Leu D. J., Kinzer, C. K., Coiro, J., Castek, J., & Henry, L. A. (in press). New Literacies and the new literacies of online reading comprehension: A dual level theory. In N. Unrau & D. Alvermann (Eds.), *Theoretical models and process of reading* (6th ed.). Newark, DE: International Reading Association.

Luukka, M-R., Pöyhönen, S., Huhta, A., Taalas, P., Tarnanen, M., & Keränen, A. (2008). *Maailma muuttuu - mitä tekee koulu? Äidinkielen ja vieraiden kielten tekstikäytänteet koulussa ja vapaa-ajalla*. University of Jyväskylä: Centre for Applied Language Studies.

Marttunen, M., & Laurinen, L. (2007). Collaborative learning through chat discussions and argument diagrams in secondary school. *Journal of Research on Technology in Education, 40*(1), 109–126.

Mercer, N. (1996). The quality of talk in children's collaborative activity in the classroom. *Learning and Instruction, 6*(4), 359–377.

Mercer, N., & Littleton, K. (2007). *Dialogue and the development of children's thinking: A sociocultural approach*. London, England: Routledge.

Miyake, N. (1986). Constructive interaction and the iterative process of understanding. *Cognitive Science, 10*(2), 151–177.

Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Models of innovative knowledge communities and three metaphors of learning. *Review of Educational Research, 74*(4), 557–576.

Palincsar, A. S. (1998). Social constructivist perspectives on teaching and learning. *Annual Review of Psychology, 49*(1), 345–375.

Pearson, P. D. (2001). Learning to teach reading: The status of the knowledge base. In C. Roller (Ed.), *Learning to teach reading: Setting the research agenda* (pp. 4–19). Newark, DE: International Reading Association.

PIAAC Expert Group on Problem Solving in Technology-Rich Environments (2009). PIAAC problem solving in technology-rich environments: A conceptual framework. OECD Education Working Paper No. 36. Available at:

ttp://www.oecd.org/officialdocuments/ displaydocumentpdf/?cote=edu/wkp(2009)15&doclanguage=en Paris: OECD.

Prawat, R. S., & Floden, R. E. (1994). Philosophical perspectives on constructivist views of learning. *Educational Psychology, 29*(1), 37–48.

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ: Erlbaum.

RAND Reading Study Group. (2002). Reading for understanding: Towards an R&D program in reading comprehension. Available at http://www.iapsych. com/articles/rand2002.pdf.

Reznitskaya, A., Anderson, R. C., Dong, T., Li, Y., Kim, I-L., & Kim, S-Y. (2008). Learning to think well: Application of argument schema theory to literacy instruction. In C. C. Block & S. R. Parris (Eds.), *Comprehension instruction: Research-based best practices* (pp. 654–668). New York, NY: Guilford Press.

Salminen, T., Marttunen, M., & Laurinen, L. (in press). Argumentation in secondary school students' structured and unstructured chat discussions. *Journal of Educational Computing Research*, *47*(2)

Smith, M. C., Mikulecky, L., Kibby, M. W., Dreher, M. J., & Dole, J. A. (2000). What will be the demands of literacy in the workplace in the next millennium? *Reading Research Quarterly, 3*(3), 378–383.

Suthers, D. D. (2006). Technology affordances for intersubjective meaning making: A research agenda for CSCL. *International Journal of Computer-Supported Collaborative Learning, 1*(3), 315–337.

Teasley, S. D. (1995). The role of talk in children's peer collaborations. *Developmental Psychology, 31*(2), 207–220.

Theisens, H., Roberts, K., & Istance, D. (2010). *Trends shaping education 2010*. Paris, France: Organisation for Economic Co-operation and Development & the Centre for Educational Research and Innovation.

Udell, W. (2007). Enhancing adolescent girls' argument skills in reasoning about personal and non-personal decisions. *Cognitive Development*, *22*(3), 341–352.

Van Aalst, J. (2009). Distinguishing knowledge-sharing, knowledge-construction, and knowledge-creation discourses. *Computer-Supported Collaborative Learning*, *4*(3), 259–287.

Van Boxtel, C., Van der Linden, & Kanselaar, G. (2000). Collaborative learning tasks and the elaboration of conceptual knowledge. *Learning and Instruction, 10*(4), 311–330.

Van Drie, J., Van Boxtel, C., Jaspers, J., & Kanselaar, G. (2005). Effects of representational guidance on domain specific reasoning in CSCL. *Computers in Human Behavior, 21*(4), 575–602.

Vass, E., & Littleton, K. (2009). Analysing role distribution in children's computer-mediated collaborative creative writing. In Kumpulainen, K., Hmelo-Silver, C. & César, M. (Eds.), *Investigating Classroom Interaction: Methodologies in Action* (pp. 99–120). Rotterdam: Sense Publishers

Volet, S., Summers, M., & Thurman, J. (2009). High-level co-regulation in collaborative learning: How does it emerge and how it is sustained? *Learning and Instruction, 19*(2), 128–143.

Vygotsky, L. S. (1986). *Thought and language*. Cambridge, MA: MIT Press.

Wells, G. (2007). Semiotic mediation, dialogue and the construction of knowledge. *Human Development, 50*(5), 244–274.

Wiley, J., & Voss, J. F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology, 91*(2), 301–311.

Yarrow, F., & Topping, K. J. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*(2), 261–282.

Zohar, A., & Nemet, F. (2002). Fostering students' knowledge and argumentation skills through dilemmas in human genetics. *Journal of Research in Science Teaching*, *39*(1), 35–62.

**Appendix**

Guidelines for evaluating good, excellent, and outstanding essays (http://www.ylioppilastutkinto.fi/fi/maaraykset/ainekohtaiset/aidinkieli2007.html).

The guidelines below are restructured and condensed from the original ones. All Finnish language teachers in upper secondary school use these criteria when they score their students' matriculation exams that students take when they finish their school. In the matriculation exams, students have six hours for composing their essay. The time allocated for the task is taken into account when teachers apply these guidelines in their classroom.

**Structure**

The structure of an outstanding, excellent and good essay is logical and coherent.

**Style**

The style of language and text in a good essay is appropriate in terms of the purpose of the text. Words and metaphors are successfully selected. In addition to the aforementioned criteria, in an excellent essay the language can be described as rich and fresh. An additional criterion for an outstanding essay is that the writer shows excellent ability to observe his or her surroundings and to formulate his or her ideas.

**Exploration of the Topic**

In a good essay the exploration of the topic is diverse and relevant. The choices of the content serve the whole. In an excellent essay the writer has successfully chosen his or her perspective and explores the topic accordingly. The writer is capable of using appropriate rhetorical means. In an outstanding essay, the exploration of the topic is interesting, deep and the chosen perspective is innovative (or original). The exploration of the topic is independent showing insight for understanding the core ideas and their relations. Argumentation in the essay is convincing and illustrative. The essay shows conscious and skillful use of rhetorical means.

**Use of the Source Text**

In a good essay the writer has understood the purpose, genre and content of the source text appropriately. The interpretations are adequate. Even if there might be some

remarks on the writers' interpretations of the source text it can be noticed that the writer has understood what he or she has read. The writer is capable of elaborating ideas on the basis of the source text in accordance with the task assignment. In excellent and outstanding essays the writer analyzes the source text in an appropriate way and brings to the fore ideas that are particularly relevant for the chosen perspective. The writer is able to construct a dialogue between the source and his or her own thinking.

**Overall**

As a whole, a good essay shows writers' ability to consider the explored issue in quite a versatile way. However, achieving a good mark does not require particularly skillful use of language or independent point of views. An excellent essay shows either expertise or personal use of language. Use of the language is skillful and fluent. As its best, an outstanding essay provides the reader with an emotional response. Interpretations in the essay are deep and enlightening and they create new connections between ideas. As a whole, an outstanding essay is impressive.

# IV

## ARGUMENT GRAPH AS A TOOL FOR PROMOTING COLLABORATIVE ONLINE READING

by

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# Argument graph as a tool for promoting collaborative online reading

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**Abstract.** This study explored how the construction of an argument graph promotes students' collaborative online reading compared to note-taking. Upper secondary school students (n = 76) worked in pairs. The pairs were asked to search for and read source material on the Web for a joint essay and either construct an argument graph or take notes during online reading. The data consist of transcription protocols of student pairs' discussions and joint essays. The study indicated that argument graphs may be useful tools when teachers want students to pay attention to the argumentative content of online sources and to consider relations between arguments. Additionally, with argument graphs teachers can support students' post-reading activities, such as source-based argumentative writing.

**Keywords:** online reading, reading strategies, argument graph, source-based writing

Nowadays, students are often referred to as digital natives (Prensky, 2001) or the net generation (Jones & Czerniewicz, 2010). However, recent research (Kiili, Laurinen, & Marttunen, 2008; Walraven, Brand-Gruwel, & Boshuizen, 2009) has indicated that not all students are that skilled at solving information problems on the Internet. The materials that students encounter on the Internet are diverse in their quality, structure, and argumentation. Therefore, to solve information problems adequately necessitates the ability to identify arguments, evaluate them, and understand how different points of views contradict or corroborate each other. In addition, future working life will increasingly require both online reading and engagement in collaborative literacy practices (Rouet, 2006; Smith, Mikulecky, Kibby, Dreher, & Dole, 2000). In order to prepare high school students for the world they are entering after school, these literacy skills need to be practiced in schools in authentic online environments (Leu, O'Byrne, Zawilinski, McVerry, & Everett-Cacopardo, 2009). At the same time, many teachers share a concern that when online sources are allowed in their classrooms students will tend to rely on a superficial copy-paste strategy rather than utilize different sources to construct a synthesis on the phenomenon they are exploring. There is a need for collaborative teaching methods that offer opportunities for students to explore in depth and synthesize information when reading multiple online sources. This study investigates whether the construction of an argument graph, as compared to note-taking, promotes students' collaborative online reading, and in particular, their reading to synthesize information.

## Online reading comprehension theory

The online reading comprehension theory defines online reading as a web-based inquiry process (Leu, Kinzer, Coiro, & Cammack, 2004) which displays notable differences to offline reading comprehension (Coiro & Dobler, 2007). Effective use of the Internet requires additional reading practices, skills and strategies that readers need to apply flexibly in parallel with traditional ones (Coiro & Dobler, 2007). At least five processing practices occur during online reading comprehension (Leu et al., 2004): 1) reading to identify important questions, 2) reading to locate information, 3) reading to evaluate information critically, 4) reading to synthesize information, and 5) reading and writing to communicate information. This study explores online reading practices with the focus on reading to synthesize information for the purpose of writing an essay.

## Reading to synthesize information during online reading

Synthesizing can be defined as the creation of an overall meaning by organizing pieces of information and by combining new ideas with earlier interpretations and one's previous knowledge (Keene & Zimmerman, 2007, p. 229). To be able to create such an overall meaning from one or multiple texts, skilful readers blend claims, arguments, and resources together (Bulger, 2006) by using various reading comprehension strategies, such as determining important ideas and combining them, inferencing, and activating one's prior knowledge (Pressley & Afflerbach, 1995; Eagleton & Dobler, 2007, p. 204).

Furthermore, while synthesizing usually occurs during reading, the process may also continue after reading (Magliano, Millis, Ozuru, & McNamara, 2007). This is the case, for example, when students compose an essay on the basis of the source materials they have read. Composing an essay on the basis of multiple sources requires discourse synthesis. By the term discourse synthesis, Spivey and King (1989) refer to a highly constructive process of selecting, organizing, and connecting content from multiple sources when composing a new text. Correspondingly, Segev-Miller (2004) argues that discourse synthesis tasks are cognitively more demanding than summary tasks. When producing a summary from a single text, students can rely on the structure of the original text whereas producing a synthesis from multiple sources requires that they create their own text structure.

Synthesizing is a challenging task for most readers (Rouet, 2006; Mateos & Sole, 2009) and the Internet introduces new complexities into the synthesizing process (Coiro, 2005). Since solving information problems usually requires that students synthesize information from multiple Web sources they need flexibility in shifting between multiple modes of information (Coiro, 2003; Rouet, 2006) and between different text structures and text genres (Eagleton & Dobler, 2007). Further, students have to consider how different texts inform or contradict one another (Castek & Coiro, 2010). The Internet also places additional demands on readers because the argumentative structures of texts on the Web are flexible (Carter, 2003). Identification and analysing arguments has shown to be difficult for students (Larson, Britt, & Larson, 2004; Marttunen,

Laurinen, Litosseliti, & Lund, 2005) even when they read traditional, linear texts; flexible argument structures of Internet sources makes this even harder.

In spite of the challenges that Internet sets readers, they can also benefit from exploring multiple sources on the Web. Reading across multiple sources may foster deeper understanding of the phenomenon than reading information from a single source (e.g. Wiley & Voss, 1999) as it requires that students make an effort to establish and explain connections within and across texts (Wolfe & Goldman, 2005). Some studies (Wiley & Voss, 1999; Le Bigot & Rouet, 2007) indicate that especially argumentative essay tasks facilitate deeper and more integrated text understanding than summary tasks. However, argument tasks are not necessarily optimal for all readers. Students with sophisticated epistemological beliefs may profit more from an argumentative task assignment than students with more naive beliefs (Bråten & Strømsø, 2010). Most of the studies on reading multiple sources have used printed texts (Wolfe & Goldman, 2005; Bråten & Strømsø, 2010) or the students have worked online with restricted, pre-selected texts (Le Bigot & Rouet, 2007; Wiley, Goldman, Graesser, Sanchez, Ash, & Hemmerich, 2009). There is a paucity of research on synthesizing information when students read on the open Internet and on how to support students' synthesizing processes when they read online. This article explores whether the construction of an argument graph helps upper secondary school students to synthesize information when they read online in pairs in order to compose a joint essay.

## Argument graph for promoting reading to synthesize

Theory of representational guidance (Suthers, 2003) frames representational tools as mediators of collaborative learning interactions. Representational tools provide readers with means to represent emerging knowledge and make it visible. The representational tool used in this study was an argument graph (Corbel, Girardot, & Jaillon, 2002) by means of which students were able to present arguments for and against a specific topic as well as to depict the relations between these arguments graphically. It has been found that argument graphs help students to make their thinking visible, to foster consideration of the relations between arguments (Suthers, 2001), and to support productive interaction in collaborative learning situations (Suthers & Hundhausen, 2003). Furthermore, an argument graph might help students to monitor their progress in the task (Cox, 1999), for example, whether arguments for and against are expressed in a balanced way (Van Drie, Van Boxtel, Jaspers, & Kanselaar, 2005).

When the Internet is used as an information source, some students just copy and paste material from the Web into their final products. Premier and Ploog (2007) found that students who created a text structure of their own scored significantly higher in the post-test of learning than students who mainly copy-pasted material in their text. The use of an argument graph during successive phases of reading activities might help students to move beyond the copy-paste strategy. An argument graph might help them to re-organize pieces of information (Cox, 1999) and use their own words in connecting the pieces of information together. In the present study, students' collaborative online

reading that aims at argumentative source-based writing was supported by an argument graph tool. Potential beneficence of an argument graph was studied by comparing the students who constructed an argument graph with the students who took notes by addressing the following research questions:

1) How did the student pairs in the argument graph and note-taking groups a) engage in online reading practices and b) what kinds of collaborative reading strategies did they share when exploring a controversial issue?

2) How did the student pairs in the argument graph and note-taking groups synthesize ideas in their essays?

   a) What kinds of content did the student pairs include in their joint essays?

   b) How did the student pairs synthesize arguments for and against the issue in their essays?

## Methods

### Participants

Seventy-six upper secondary school students (aged from 16 to 18 years; 47 females, 29 males) volunteered to participate in the present study. The joint essay they wrote compensated for an individual essay that the other students, who did not participate in the study, composed at home.

### Task

The students task was to write an essay on the issue *Should Internet censorship be tightened?* in pairs by utilizing the Internet as an information source. They were asked to consider arguments both for and against censorship of the Internet. This task assignment was chosen for two reasons. First, it is important for students to learn to carefully evaluate arguments that people or communities with different positions propose on the Internet and weigh their argumentation in order to take their own position. Second, the students were asked to search for and ponder arguments both for and against Internet censorship in order to avoid confirmation bias. Namely, it has been reported that if students are asked to express their opinion on a controversial issue prior to reading (Schwarz, 2003), or if they are given a specific viewpoint (against, neutral, for) in advance (Cerdán, Marín, & Vidal-Abarca, 2011), they tend to focus on reading only those sources or parts of them that support their own opinion or the viewpoint assigned to them.

### Procedure

The activities of this study were integrated into the course on Text and Influence (Finnish Language and Literature). The basics of argumentation were first taught in the class. In the experiment the students worked in pairs. They were allowed to choose their partner freely so that they would feel comfortable in sharing their ideas together (see e.g.

Dirks, 1999; Kreijns, Kirschner, & Jochems, 2003). As a result of the self-selection process 20 girl-girl pairs, 11 boy-boy pairs, and 7 girl-boy pairs were formed. The pairs representing each of these gender combinations were randomly divided into two conditions: an argument graph and a note-taking condition.

The researcher met each student pair at a time. The students in the argument graph group were trained to use the Web-based argument graph tool (5 to 10 minutes). With the tool, the students were able to write arguments in boxes, to draw links between the boxes, and to label the links as either supportive (+), critical (-), or neutral (?). The use of the argument graph tool was practiced so that the researcher and the students pondered together arguments for and against the increased use of nuclear power and students formed argument boxes, links and their labels with the tool (Figure 1). The researcher also explained to the students the idea of making argument chains.

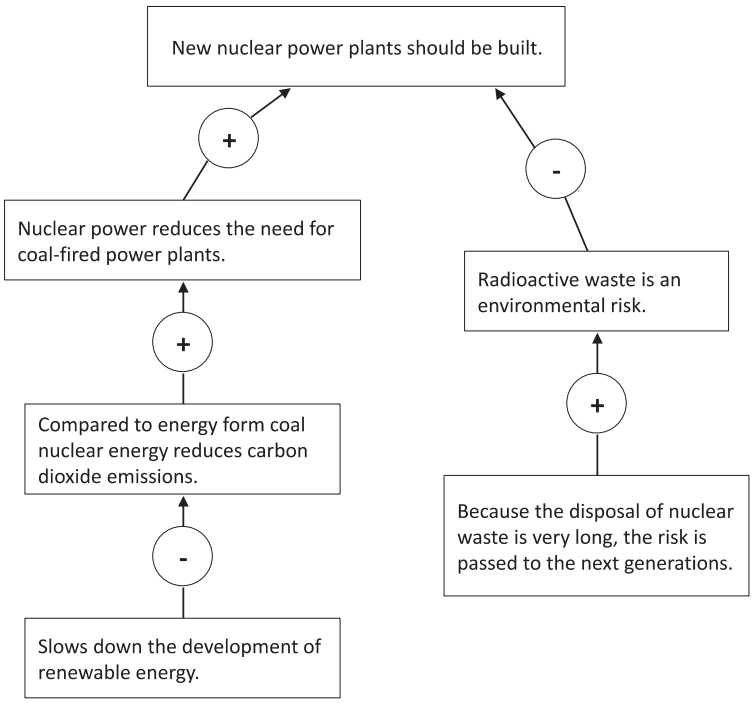


Figure 1. An example of an argument graph on nuclear power

The student pairs worked in three phases. First, the pairs in the argument graph group were asked to discuss the topic and construct an argument graph, while the students in the note-taking group were asked to discuss the topic and take notes (10 to 15 minutes). Second, the student pairs were asked to search for and read additional information on the Web for 30 minutes. The argument graph group was asked to modify their graph and the note-taking group was asked to take paper-and-pencil notes. Finally, the students composed a joint essay (45 minutes).

Throughout the task, the students worked face-to-face. The argument graph group worked with two computers. One computer was used for constructing the graph and for utilizing the graph in the writing phase, and the other computer was available for searching for information on the Web and for writing the essay. The note-taking group worked on a single computer. In order to prevent direct copying, the students were not allowed to use a word processor during the information searching phase.

## Data

### Interaction protocols

Interaction protocols (see Miyake, 1986) were analyzed in order to gain access to the online reading practices and collaborative reading strategies that took place during the discussions within each student dyad. A software program was used to capture as video files the discussions and all of the students' web-based activities on the computer screen. Thus, the interaction protocols included information about the Web pages the students visited and the search terms they used in their search queries, as well as their transcribed discussions. During the task, the students visited different kinds of web pages that represented various views on the topic. The students used, for example, news pages, Wikipedia, discussion boards and blogs, interviews, and pages posted by Web communities.

### Students' essays

Following the collaborative reading of online sources and making notes or argument graphs, the students wrote a joint essay ($n$ = 38). The essays in the argument graph group comprised on average 273 words ($SD$ = 76) and in the note-taking group 271 words ($SD$ = 88). Since the Finnish language has a highly productive compounding system, a rich derivational system and agglutinative morphology (Aro, 2004) the length of the essays in English would have been more than 400 words.

### Data analysis of interaction protocols

*Analysis of episodes used to identify online reading practices*

The analysis began with defining and categorizing the online reading episodes. An episode ($n$ = 1043) was defined as a thematic entity consisting of successive activities and verbal interactions that served one of the following reading practices: 1) locating information; 2) evaluating information; 3) synthesizing information; 4) monitoring and regulating activities (one's own, other's, or joint activities); and 5) off-task discussions. Analysis of episodes was done taking into account both verbal and screen interaction. The categorization was done according to the primary activity. The length (in seconds) of each episode was measured to determine the total amount of time the student pairs spent on each online reading practice.

*In locating information episodes* ($n$ = 312) students considered their search strategy, formulated a search query, or chose links from the search results. *In evaluating information episodes* ($n$ = 154) students had to decide whether a certain Web page was worth opening or not. If they opened the page they had to evaluate whether it was

reasonable to read it further. The students used credibility or relevance of information as the evaluation criteria. *Synthesizing episodes* (*n* = 384) consisted of making sense of acquired information by deciding it to be important, making connections between the text and relevant prior knowledge, and/or extending and exploring ideas presented in the text. *Monitoring and regulating episodes* (*n* = 180) included interactions where the students planned, monitored, regulated, or evaluated either their own, their partner's, or their joint activities. O*ff-task episodes* (*n* = 13) were unrelated to accomplishing the task.

*Analysis of utterances to identify collaborative reading strategies*

The analysis continued by defining and categorizing utterances (*n* = 1891) in order to identify the collaborative reading strategies that took place during the synthesizing episodes. The categories of collaborative reading strategies, with examples, are presented in Table 1. The coding reliability of collaborative reading strategies has earlier been found to be 84.5% between two independent coders (see Kiili, Laurinen, Marttunen, & Leu, in press).

Table 1. Collaborative reading strategies.

| Collaborative reading strategy | Example |
|---|---|
| Gathering information (e.g. facts, arguments) | *The Ministry of Social Affairs and Health suggested that online poker sites should be censored. They would censor them totally.* |
| Considering relations between concepts or arguments | *It* [difficulty to define what should be censored] *is slightly related to a 'police state' or to 'freedom of speech is violated'.* |
| Recapitulating information | Leena: They should be censored more carefully [related the discussion on school shootings]<br>Mari: So, these sites that young people constantly visit, for example, Galleria or YouTube<br>Leena: *Thus, the web sites that are favored by youth should be censored, if needed.* |
| Using prior knowledge | *But in China they censor the Internet a lot.* |
| Inferencing | *Right. Censorship has a long tradition.* |
| Proposing solutions | *In my opinion filters should be used.* [Filters] *should be installed more.* |
| Asking questions on the topic | *Then, what should be censored and why?* |
| Expressing opinion or disagreement | *Although I disagree with that* [censorship gives too much power to the police]. |
| Putting forward, developing, or evaluating arguments | *Well. Let say at least that censoring religious issues is against the freedom of worship* [an example of an argument against Internet censorship]. |

**Data analysis of the essays**

The essays were analyzed by exploring their content and the arguments presented for and against Internet censorship.

*Analysis of the content*

In order to describe the content of the students' essays, each sentence of the essay was classified. Five distinct categories emerged from data: 1) descriptive content, 2) argumentative content, 3) problem solutions, 4) problems, and 5) stance. Table 2 presents examples of the categories. The words included in each category were counted to determine the proportion of each content type in the essay. Two persons coded 6 of the 38 essays (16%) and achieved 96% agreement.

Table 2. Content categories of the essays.

| Content category | Example |
|---|---|
| Descriptive content | The purpose of Internet censorship is to prevent publication of pictures or texts that are illegal or harmful. |
| Argumentative content | For example, by tightening censorship rapid spread of racist ideas on the Web could be prevented. |
| Problem solutions | Internet operators should provide services for families with children that would inhibit children's access to Web sites prohibited to them. |
| Problems | The Internet is spread so widely that in practice it is almost impossible to fully control it. |
| Stance | Censorship can be tightened, as long as it is done legally and with respect for human rights. |

*Analysis of arguments*

In order to find out how the student pairs presented arguments for and against the issue, the argumentative content of the essays were explored more carefully. All the arguments for and counter-arguments against Internet censorship were identified (see example 1). At first, two persons identified and coded the arguments of 6 essays (16 % of all essays); the level of agreement was 80%. Disagreements were resolved by discussion, after which one person coded the rest of the essays.

**Example 1**

Censorship would prevent children from accidently accessing harmful sites [argument for]. On the other hand, the responsibility for children's use of the Internet rests with the children's parents [counter-argument]. However, parents may not always have time [argument for] or they have no interest in dealing with the matter [argument for]. Under these circumstances censorship would be a good thing.

## Results

### Online reading practices

Table 3 shows that both the argument graph and note-taking groups spent most of their working time on reading to synthesize information and on locating information. The argument graph group spent 70.5% and the note-taking group 65.5% on reading to synthesize. The corresponding proportions of time spent on locating were 16.4% and 23.0%. It is noteworthy that the student pairs who constructed argument graphs during online reading spent, on average, less time on locating information than the student pairs who took notes ($U = 248$; $p < 0.05$). The average number of locating episodes among the student pairs in the argument graph group was 6.95 whereas in the note-taking group it was 9.47 ($U = 262.5$; $p < 0.05$). The amount of off-task discussion was low in both groups, indicating that the students concentrated on the task.

Table 3. Mean numbers of episodes and proportions of time spent on different online reading practices in the argument graph and note-taking groups.

| | Argument graph group (n = 19) | | | | Note-taking group (n = 19) | | | |
|---|---|---|---|---|---|---|---|---|
| | Number of episodes | | Time spent on online reading practice | | Number of episodes | | Time spent on online reading practice | |
| Online reading practice | *M* | *SD* | *M %* | *SD* | *M* | *SD* | *M %* | *SD* |
| Synthesizing information | 9.95 | 2.61 | 70.52 | 8.44 | 10.26 | 2.81 | 65.48 | 13.20 |
| Locating information | 6.95[1] | 2.92 | 16.38[2] | 7.35 | 9.47[1] | 2.99 | 22.97[2] | 10.64 |
| Monitoring and regulating activities | 4.58 | 2.52 | 7.52 | 4.88 | 4.89 | 3.02 | 6.55 | 5.12 |
| Evaluating information | 3.37 | 3.69 | 3.39 | 4.27 | 4.74 | 2.66 | 4.71 | 3.67 |
| Off-task | 0.47 | 1.07 | 2.20 | 6.39 | 0.21 | 0.54 | 0.29 | 0.79 |
| Total | 25.32[3] | 7.34 | 100.01 | | 29.57[3] | 7.19 | 100.00 | |

[1] $U = 262.5$, $p < 0.05$; [2] $U = 248$, $p < 0.05$; [3] $U = 253$, $p < 0.05$

### Collaborative reading strategies

Both the argument graph and the note-taking groups applied collaborative reading strategies on average almost 50 times (Table 4). Within the both groups, there was a wide variation between the different pairs in the number of occasions on which these strategies were applied. This suggests that between some pairs collaboration was much richer than between other pairs. Gathering information was the most common reading strategy in the both groups. The argument graph group ($M = 9.16$) considered considerably more ($U = 16.5$; $p < 0.001$) relations between concepts or arguments than the note-taking group ($M = 1.26$). Putting forward, developing or evaluating arguments was also quite a common strategy in the both groups. This indicates that the argumentative task assignment applied in this study was probably successful in

directing students' collaborative reading towards argumentative discussion as shown in Example 2. The example also shows how the students came to a mutual agreement by taking into account both arguments for and against the issue at hand.

Table 4. Collaborative reading strategies used in the argument graph and note-taking groups.

| | Argument graph group ($n$ = 19) | | Note-taking group ($n$ = 19) | |
|---|---|---|---|---|
| Collaborative reading strategy | M | SD | M | SD |
| Gathering information | 14.95 | 6.63 | 18.42 | 9.47 |
| Considering relations between concepts or arguments[1] | 9.16 | 5.61 | 1.26 | 1.73 |
| Putting forward, developing or evaluating arguments | 7.79 | 8.99 | 7.95 | 8.00 |
| Inferencing | 5.42 | 4.05 | 5.84 | 3.92 |
| Using prior knowledge | 4.00 | 3.84 | 5.74 | 4.53 |
| Asking questions on the topic | 3.95 | 3.47 | 4.53 | 6.21 |
| Recapitulating information | 2.32 | 2.19 | 1.16 | 1.21 |
| Expressing an opinion or disagreement | 1.89 | 2.26 | 2.63 | 2.50 |
| Proposing a solution | 0.37 | 0.76 | 2.16 | 3.80 |
| Total | 49.85 | 21.38 | 49.69 | 30.46 |

[1] $U = 16.5, p < 0.001$

**Example 2**

A: Here is something about racism [gathering information]. We could add that it [Internet censorship] should not be tightened because if racism were not on the Web then it would move in greater extent to reality [putting forward, developing or evaluating arguments]. [The students add the idea into the argument graph].

B: But on the other hand, it [Internet censorship] could decrease racism if racist stuff would not be allowed on the Web then racist thoughts would not necessarily spread that much [putting forward, developing or evaluating arguments].

A: Oh, yeah. Lets' do another box. [The students add aforementioned idea into the graph].

B: People would act in the same way on the Web than they would act in real life. I mean that if you have a sort of ideology, for example, you think that all foreign people are stupid [putting forward, developing or evaluating arguments].

A: Yeah. But on the other hand, if you cannot release your aggression anywhere [putting forward, developing or evaluating arguments].

B: That is true.

Taking notes or constructing an argument graph can be called external reading strategies (e.g. Kobayshi, 2009) that help readers to connect ideas from different sources and recall them later. The argument graph group included, on average, 20.5 ($SD$ = 6.4) argument boxes in their graphs and the note-taking group included 19.0 ($SD$ = 9.3) ideas

in their notes that they presented in the most cases with bullets. A little more than half (10/19) of the students collected at least part of their notes into the separate columns of pros and cons. One student pair in the note-taking group constructed a concept map. Interestingly, 6 of 19 student pairs in the note-taking group took double notes, so that both of the students were taking the notes of their own.

**Content of the students' essays**

The students' essays were mainly argumentative in content. The essays of the argument graph group contained more ($U = 76$; $p < 0.01$) argumentative content ($M = 64.05\%$ of all content) than those of the note-taking group ($M = 44.35\%$), as shown in Table 5. In turn, the essays of the note-taking group were more descriptive in content than those of the argument graph group (23.23% *v*s.16.12%; $U = 248$; $p < 0.05$). The note-taking group presented more problems (18.98% *vs.* 12.30%) and solutions to problems (12.15% *vs.* 7.22%) related to Internet censorship than the argument graph group. However, these differences were not statistically significant.

Table 5. Proportions of types of content of the students' essays.

| | Argument graph group | | Note-taking group | |
|---|---|---|---|---|
| Content type | *M %* | *SD* | *M %* | *SD* |
| Argumentative[1] | 64.05 | 23.57 | 44.35 | 18.88 |
| Descriptive[2] | 16.12 | 12.72 | 23.23 | 12.46 |
| Problems | 12.30 | 10.45 | 18.98 | 14.38 |
| Solutions | 7.22 | 13.25 | 12.15 | 10.86 |
| Stance | 0.32 | 1.06 | 1.29 | 3.84 |
| Total | 100.01 | | 100.00 | |

[1] $U = 76$, $p < 0.01$; [2] $U = 248$, $p < 0.05$

**Arguments for and against the issue explored in the students' essays**

The argument graph group presented on average more (11.2 *vs.* 6.4; *SD*s are 6.4 and 5.3 respectively) arguments for Internet censorship than the note-taking group ($U = 74.50$; $p < 0.01$). The average total number of arguments was also higher in the essays of the argument graph group (18.3 *vs.* 11.7; *SD*s are 7.6 and 5.4) than note-taking group ($U = 98.50$; $p < 0.05$). The pairs in the argument graph group presented on average considerably more arguments for than against (11.2 *vs.* 7.1) Internet censorship ($Z = 2.86$; $p < 0.01$). On the contrary, the mean number of arguments for and against (6.4 *vs.* 5.3) Internet censorship was quite similar in the essays of the note-taking group ($Z = 0.94$; $p =$ ns.).

## Discussion

This study indicated that construction of an argument graph may promote students' collaborative online reading and source-based writing in three ways. First, the pairs in the argument graph group spent less time on locating information during online reading than the pairs in the note-taking group. This means that the students who used the argument graph had more time to concentrate on reading to synthesize information, which best supports developing an understanding of an issue, than the students who took notes. As in previous studies (e.g. Henry, 2006) locating information has been shown to be a gate-keeping skill for some online readers, further research is needed to explore the ways in which an argument graph can support information search.

Second, the argument graph group considered noticeably more relations between concepts or arguments than the note-taking group during the online reading. This indicates that constructing an argument graph provides students with opportunities to make relations between arguments more explicit. Occasionally, the graph caused the student pairs to negotiate whether a new argument box was related to previously added arguments and whether the new argument supported or opposed the previous arguments. It should be noted that the connections that the students created between the argument boxes on their graph without commenting on them aloud are not included in the present analysis. Thus, in addition to verbalized connections the students were able to share connections through visual means provided by the argument graph tool.

Third, the argument graph group included more argumentative content and more arguments (both for the issue and in overall amount) in their essays than the note-taking group. In line with these results, Jansen, Erkens, and Kirschner (2010) found some positive effects of the use of a Graphical Debate tool on students' source-based writing. The essays of the students who used the tool contained more grounds than the essays of the students who used the Textual Debate tool. They also found that the conceptual quality of the essays of the Graphical Debate group was higher. However, no difference was found in the average quality of the grounds between the groups.

Compared to the note-taking, constructing an argument graph offers students with opportunities to construct a shared representation. Almost a third of the student pairs in the note-taking group took separate notes of their own whereas the students in the graph group shared one representation on the screen. Compared to paper-pencil notes the construction of a representation on the screen is easier to follow by both students. As the argument graph tool automatically keeps the relations between argument boxes when boxes are added or replaced, it is also easier to keep up-to-date compared to paper-pencil notes.

In addition to the advantages found here, it has previously been found that argument graphs help students to consider arguments for and against in a balanced way (Van Drie et al., 2005). However, the present study did not support this result, as the pairs in the argument graph group presented more arguments for than against the issue in question (11.2 *vs.* 7.1) whereas note-taking group presented arguments in a more balanced way in the essays (6.4 *vs.* 5.3). A most obvious reason may be that it was

easier to find and elaborate arguments for than against Internet censorship as stated by some of the student pairs in both groups.

Although the arguments were not fully that balanced in the essays of the argument graph group, some of the student pairs counted the number of supporting (+) and critical (-) links directly connected with the main claim. Thus, these pairs were able to utilize the argument graph for monitoring their progress in the task. This potential use of an argument graph could be exploited by giving students more precise instructions with scripts (e.g. Weinberger, Fischer, & Stegmann, 2005) or metacognitive prompts during their collaborative work with the tool.

Overall, all the student pairs wrote an essay in which the text structure did not follow the same organizational structure as any of the original texts. Thus, none of the pairs, either in the argument graph or in the note-taking group, drew upon a systematic copy-paste strategy. There might be several reasons for this. First, the students had to blend arguments for and against the issue, and in order to do this most of the students not only used different sources but also engaged in text-based discussions to elaborate their ideas. Second, the argument graph might have helped the students to re-organize information, use their own forms of expression, and go beyond the meanings of the text. Third, the students in the both groups were not allowed to use a word processor during their information search, and hence were unable to quickly copy-paste text fragments from the Internet. When students use the Internet as an information source, the use of the copy-paste strategy may be prevented by using representational guidance, collaborative work, and by selecting topics that direct students to the use of multiple sources. This may help students to create a text structure of their own (Segev-Miller, 2004) and move from a knowledge telling to a knowledge transforming approach in their writing (Bereiter & Scardamalia, 1987).

One limitation of this study is that the treatment was very short. Despite this limitation, some important effects of the use of the argument graph were found. Since effective appropriation of a computer tool needs time and practice (De Smet, Broekkamp, Brand-Gruwel, & Kirschner, 2011), extended time for a writing task, greater specificity of instructions, and a repeated use of the graph might have even emphasized the effects found in this study.

Another limitation of this study is the lack of analysis that would have explored the connections between the interaction protocols and the essays. In the future, deeper analysis is needed to understand how student pairs utilize different sources, such as different web pages, their prior knowledge, and their emerging joint knowledge, when synthesizing information in order to compose a joint essay. The analysis could focus on tracking the sources of each sentence in the students' essays. However, an open Internet environment combined with a collaborative reading situation makes tracking of the origin of sentences in essays more complex compared to closed Internet environment and individual reading situation. This complexity could be overcome by using an argument graph as an analytical tool. Interaction protocols would enable the access to both the discussions that student pairs engage in when reading a certain Web page and the formulation of argument boxes related to those discussions. When student pairs then

compose their joint essay they probably rely on the content depicted in the argument graph and transfer the ideas from the graph into their essays. In other words, an argument graph could work as a mediator between the fragments in students' essays and the segments of the discussion where the idea presented in the essay was originally read and/or developed.

## Concluding remarks

This study indicated that the argument graph helped the students, in particular, to consider relations between arguments and to make these relations explicit. This demonstrates that with the help of an argument graph students are able to explicate their synthesizing processes more effectively. Furthermore, with argument graphs teachers can support students' post-reading activities, such as source-based argumentative writing. Compared to note-taking the argument graph aided the students to include more argumentative content and arguments in their essays. Thus, constructing an argument graph during online reading may support students in identifying arguments in texts, elaborating them jointly, and including arguments systematically in their joint essay. Additional advantages may be achieved with more thorough and explicit instructions and by using the argument graph tool several times during lessons. As many other digital computer tools, the argument graph tool is technically easy to use. Therefore, support for students on the appropriate use of the argument graph should, instead of technical matters, rather focus on higher-order thinking skills, such as understanding the argumentative structure and relations between the arguments in a text.

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## References

Aro, M. (2004). *Learning to read: The effect of orthography*. Jyväskylä Studies in Education, Psychology and Social research, 237. Jyväskylä, Finland: University of Jyväskylä.

Bereiter, C., & Scardamalia, M. (1987). The psychology of written composition. Hillsdale, NJ: Lawrence Erlbaum.

Bråten, I., & Strømsø, H. I. (2010). Effects of task instruction and personal epistemology on the understanding of multiple texts about climate change. *Discourse Process, 47*(1), 1–31.

Bulger, M. (2006). *Beyond search: A preliminary skill set for online literacy*. Published online by the Transliteracies Project, University of California, Santa Barbara.

Retrieved from http://transliteracies.english.ucsb.edu/research-papers/ translit-bulger-onlinelit.pdf

Carter, L. (2003). Argument in hypertext: Writing strategies and the problem of order in a non-sequential world. *Computers and Composition, 20*(1), 3–22.

Castek, J., & Coiro, J. (2010). Measuring online reading comprehension in open networked spaces: Challenges, concerns, and choices. Poster presented at Annual Meeting of American Educational Research Association, Denver, April 30 – May 4, 2010.

Cerdán R., Marín, M.C., & Vidal-Abarca, E. (2011). Perspective and source effects when high-school students read multiple contradictory documents. Paper presented at the 13th Biennial Conference Earli 2011, Exeter, UK, August 30 – September 3, 2011.

Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher, 56*(5), 458–464.

Coiro, J. (2005). Making sense of online text. *Educational Leadership, 63(*2), 30–35.

Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly, 42*(2), 214–257.

Corbel, A., Girardot, J., & Jaillon, P. (2002). DREW: a dialogical reasoning web tool. In A. Mendes Villas, J. A. Mesa Gonzalez, & I. Solo de Zaldivar (Eds.), Educational technology: Vol 1. *Proceedings of the international conference on ICT's in education (ICTE 2002)* (pp. 516–521). Badajoz, Spain: Junta de Extremadura, Consejeria de education, cienca y technologia.

Cox, R. (1999). Representation construction, externalized cognition and individual differences. *Learning and Instruction, 9*(4), 343–363.

De Smet, M. J. R., Broekkamp, H., Brand-Gruwel, S., & Kirschner, P. (2011). Effects of electronic outlining on students' argumentative writing performance. *Journal of Computer Assisted Learning, 27*(6), 557–574.

Dirks, K. T. (1999). The effects of interpersonal trust on work group performance. The *Journal of Applied Psychology, 84*(3), 445–455.

Eagleton, M. B., & Dobler, E. (2007). *Reading the Web: Strategies for Internet inquiry*. New York: The Guilford Press.

Henry, L. A. (2006). SEARCHing for an answer: The critical role of new literacies while reading on the Internet. *The Reading Teacher, 59*(7), 614–627.

Janssen, J., Erkens, G., & Kirschner, P. A. (2010). Effects of representational guidance during computer-supported collaborative learning. *Instructional Science, 38*(1), 59–88.

Jones, C., & Czerniewicz, L. (2010). Describing or debunking? The net generation and digital natives. *Journal of Computer Assisted Learning, 26*(5), 317–320.

Keene, E. O., & Zimmerman, S. (2007). *Mosaic of thought: The power of comprehension strategy* (2nd ed.). Portsmouth, NH: Heinemann.

Kiili, C., Laurinen, L., & Marttunen, M. (2008). Students evaluating Internet sources: From versatile evaluators to uncritical readers. *Journal of Educational Computing Research, 39*(1), 75–95.

Kiili, C., Laurinen, L., Marttunen, M., & Leu, D. J. (in press). Working on understanding during collaborative online reading. *Journal of Literacy Research.*

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behavior, 19*(3), 335–353.

Kobayashi, K. (2009). Comprehension of relations among controversial texts: Effects of external strategy use. *Instructional Science, 37*(4), 311–324.

Larson, M., Britt, M. A., & Larson A. A. (2004). Disfluencies in comprehending argumentative texts. *Reading Psychology, 25*(3), 205–224.

Le Bigot, L., & Rouet, J. F. (2007). The impact of presentation format, task assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research, 39*(4), 445–470.

Leu, D. J., Kinzer, C. K, Coiro, J. L, & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R. B. Ruddell, & N. Unrau (Eds.), *Theoretical models and process of reading* (5th ed., pp. 1570–1613). Newark, Del: International Reading Association.

Leu, D. J., O'Byrne, W. I., Zawilinski, L., McVerry, J. G., & Everett-Cacopardo, H. (2009). Expanding the New Literacies Conversation. *Educational Researcher, 38*(4), 264–269.

Magliano, J. P., Millis, K., Ozuru, Y., & McNamara, D. S. (2007). A multidimensional framework to evaluate reading assesment tools. In D. S. McNamara (Ed.), *Reading comprehension strategies: Theories, interventions and technologies* (pp. 107–136). New York: Lawrence Erlbaum.

Marttunen, M., Laurinen, L., Litosseliti, L., & Lund, K. (2005). Argumentation skills as prerequisites for collaborative learning among Finnish, French and English secondary school students. *Educational Research and Evaluation, 11*(4), 365–384.

Mateos, M., & Solé, I. (2009). Synthesising information from various texts: A study of procedures and products at different educational levels. *European Journal of Psychology of Education, 24*(4), 435–451.

Miyake, N. (1986). Constructive interaction and the iterative process of understanding. *Cognitive Science, 10*(2), 151–177.

Premier, B., & Ploog, M. (2007). The influence of text production on learning with the Internet. *British Journal of Educational Technology, 38*(4), 613–622.

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the Horizon, 9*(5), 1–6.

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading.* Hillsdale, NJ.: Lawrence Erlbaum.

Rouet, J. F. (2006). *The skills of document use: From text comprehension to Web-based learning.* Mahwah, NJ: Erlbaum.

Schwarz, B. (2003). Collective reading of multiple texts in argumentative activities. *International Journal of Educational Research, 39*(1–2), 133–151.

Segev-Miller, R. (2004). Writing from sources: The effect of explicit instruction on college students' processes and products. *L1 – Educational Studies in Language and Literature, 4*(1), 5–33.

Smith, M. C., Mikulecky, L., Kibby, M. W., Dreher, M. J., & Dole, J. A. (2000). What will be the demands of literacy in the workplace in the next millennium? *Reading Research Quarterly, 3*(3), 378–383.

Spivey, N. N., & King, J. R. (1989). Readers as writers composing from sources. *Reading Research Quarterly, 24*(1), 254–277.

Suthers, D. D. (2001). Towards a systematic study of representational guidance for collaborative learning discourse. *Journal of Universal Computer Science, 7*(3), 254–277.

Suthers, D. D. (2003). Representational guidance for collaborative inquiry. In J. E. B.
Andriessen, M. Baker, & D. D. Suthers (Eds.), *Arguing to learn. Confronting cognitions in computer-supported collaborative learning environments* (pp. 27–46). Dordrecht: Kluwer.

Suthers, D. D., & Hundhausen, C. D. (2003). An experimental study of the effects of representational guidance on collaborative learning processes. *The Journal of the Learning Sciences, 12*(2), 183–218.

Walraven, A., Brand-Gruwel, S., & Boshuizen, H. P. A. (2009). How students evaluate information and sources when searching the World Wide Web for information. *Computers & Education, 52*(1) 234–246.

Van Drie, J., Van Boxtel, C., Jaspers, J., & Kanselaar, G. (2005). Effects of representational guidance on domain specific reasoning in CSCL. *Computers in Human Behavior, 21*(4), 575–602.

Weinberger, A., Fischer, F., & Stegmann, K. (2005). Computer-Supported Collaborative Learning in higher education: Scripts for argumentative knowledge construction in distributed groups. In T. Koschmann, D. Suthers, T. W. Chan (Eds.), *Proceedings of Computer Supported Collaborative Learning 2005: The Next 10 Years!* (pp. 717–726). Lawrence Erlbaum Associates, Mahwah, NJ.

Wiley, J., Goldman, S. R., Graesser, A. C., Sanchez, C. A., Ash, I. K., & Hemmerich, J. A. (2009). Source evaluation, comprehension, and learning in Internet science inquiry tasks. *American Educational Research Journal, 46*(4), 1060–1106.

Wiley, J., & Voss, J. F. (1999). Constructing arguments from multiple sources: Tasks that promote understanding and not just memory for text. *Journal of Educational Psychology, 91*(2), 301–311.

Wolfe, M. B. W., & Goldman, S. R. (2005). Relations between adolescents' text processing and reasoning. *Cognition and Instruction, 23*(4), 467–502.

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26 Renko Manu, Opettajan tehokkuus oppilaiden koulusaavutusten ja persoonallisuuden kehittämisessä. – Teacher's effectiveness in improving pupils' school achievements and developing their personality. 144 p. Summary 4 p. 1971.
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