Guiding Students in Collaborative Writing of Wikipedia Articles – How to Get Beyond the Black Box Practice in Information Literacy Instruction?

Eero Sormunen
Tuulikki Alamettälä
University of Tampere
Finland
eero.sormunen@uta.fi
tuulikki.alamettala@uta.fi

Abstract: This paper reports the findings of a case study on teachers' practices in guiding students on a Wikipedia writing assignment in information literacy (IL) instruction. The point of departure is the tension between traditional teacher-centred pedagogical practices and learner-centred assignments. The concept of the Wikipedia writing assignment was developed by a team of literature teachers. A history teacher applied the assignment in her class and made it possible to collect comparative data from another subject. Guided Inquiry – a research-based teaching model for information literacy instruction – was used as an analytical framework to compare two case courses. The findings characterize the black box problem in designing and guiding student-centred learning assignments: the teacher mainly focuses on introducing the assignment and assessing the outcome. However, an emerging approach emphasizing the guidance during the assignment process was also identified in one of the case courses.

Introduction

Fluent literacy is a key competence enabling among other things independent learning, continuous development of professional expertise and full participation in the society. The internet revolution has radically broadened the concept of and requirements for literacy towards digital, information, and media literacies. Students are said to be fluent searchers of information since they daily "google" for information. However, recent research shows that most students do not master the basics of effective searching in complex tasks (e.g., Walraven, Brand-Gruwel, & Boshuizen, 2008). Students' skills are quite limited in planning and reformulating queries (Kiili, Laurinen, & Marttunen, 2009), assessing the credibility of information (Kiili, Laurinen, & Marttunen, 2008), and synthesizing information across sources (Sormunen & Lehtiö, 2011).

Pedagogical practices in schools do not keep apace with the rapidly changing media and information environment. Essay-type assignments which require independent acquisition and use of information sources are used to train students' information literacies (IL). Unfortunately, task assignment designs still tend to be traditional, and learning outcomes remain poor (Limberg, Alexandersson, Lantz-Andersson, & Folkesson, 2008). Recent studies (Hongisto & Sormunen, 2010; Limberg et al., 2008) show that teachers focus on the technical aspects of searching and citing information sources, while students' main problems concern developing own questions, assessing information, building meaning from sources, and constructing knowledge for their own texts.

Finland has been a top achiever in the PISA (Programme for International Student Assessment) results on reading literacy (Kuusilehto-Awale & Lahtero, 2014; Niemi, Toom, & Kallioniemi, 2012). Several factors in the Finnish school system have been proposed to explain high outcomes in reading such as university based teacher education (Master's degree required) and the autonomy of schools and teachers in implementing the national curriculum (Kuusilehto-Awale & Lahtero, 2014). Obviously, present pedagogical practices in the Finnish school have shown their effectiveness in literacy education. However, it is another question how these practices scale up in open, internet-dominated information environments which call for new literacies. Studies mentioned above suggest that there might be a gap between the present pedagogical practice and the needs to learn new literacies.

This paper reports the findings of a study on teachers' ways to plan and guide assignments for information literacy instruction. The data was collected in two upper secondary school classes, where students wrote Wikipedia articles as group work. We used Guided Inquiry (Kuhlthau, Maniotes, & Caspari, 2007) - a research-based teaching model for information literacy – as the framework of analysis for present pedagogical practices in IL instruction. The

goal was to find out which aspects of the research-based teaching model are exploited also in the present pedagogical practice and which are not.

Earlier research

Information and related literacies have been studied in different research traditions under various labels such as new literacies, digital literacies and media literacies (see e.g., Bawden, 2001; Lankshear & Knobel, 2011). In this paper we build on the tradition of information literacy and information seeking research – two subfields of information studies. They provide a solid theoretical and empirical basis to study information searching, assessment and use in learning. Information literacies refer to the various forms of competences and social practices which have become essential in the learner's interaction with the information resources shaped by the internet.

In information studies, students' information searching and use has been in the focus of research from the late 1980s. Kuhlthau (1991, 2004) revealed the complexity of information searching in a genuine learning situation. Drawing on the constructivist theories of learning, task-based approach to information seeking, and a long series of empirical studies in different educational contexts, she developed and verified the Information Search Process (ISP) model to characterize learners' information behaviours and experiences of uncertainty at different stages of the learning process. Based on the ISP model, Kuhlthau, Maniotes, & Caspari (2007) developed Guided Inquiry (GI) for information literacy instruction. The framework has been evaluated in a few classroom studies (Chu, Chow, Tse, & Kuhlthau, 2008; Chu, Tse, & Chow, 2011).

Recent research on information retrieval has also identified the link between learning and exploratory Web searching. While simple lookup searches (e.g. routine "googling") aim to find facts or single documents providing an answer to the searcher's problem, the goal of exploratory searches is to acquire knowledge and make sense in a process of learning or investigation (Marchionini, 2006). Researchers have identified a range of attributes characterizing exploratory searches: information needs are ill-defined and multifaceted, search outcomes cannot be specified in advance, and various search strategies needs to be attempted and different types of sources interpreted (Wildemuth & Freund, 2012). The challenge for educating students in information literacies is that students, as expressed by (Vakkari, 2010), should learn the principle that "… the solution to a problem is created, not found".

Our earlier study on students' behaviour in a Wikipedia writing assignment revealed differences between two classes in (1) how students used sources (Sormunen, Heinström, Romu, & Turunen, 2012), (2) how student groups collaborated (Sormunen, Tanni, & Heinström, 2013), and (3) what learning experiences they reported (Heinström & Sormunen, 2013). We also found that the teachers interacted differently with students which might be one reason for variation in students' behaviours and experiences. Overall, teachers tended not to intervene the inquiry process after introducing it and paid little attention to supporting students' collaboration during online inquiry (Sormunen, Alamettälä, & Heinström, 2013). In this paper we further elaborate teachers' ways of guiding student groups in their Wikipedia assignment.

Guided Inquiry (GI)

The underlying idea of the Guided Inquiry framework (Kuhlthau et al., 2007; Kuhlthau, Maniotes, & Caspari, 2012) is that information literacies are best learned by training appropriate information practices in a genuine collaborative process of inquiry. In this line of taught, the goal is that, in addition to information literacies, students learn curriculum content, how to learn (by working with sources), and social skills (collaborative knowledge building).

Guided Inquiry applies two collaborative forums. The whole class - called as an *inquiry community* – is used to introduce and motivate the assignment and share results. Small groups - called as *inquiry circles* - are the main forum of learning activities. Students are guided to enhance their learning by three *inquiry tools*: *inquiry journals* help reflect on personal learning, *inquiry logs* help keep track of and comment important information sources found, and *inquiry charts* help visualize, organize and synthesize ideas. Each inquiry tool is introduced at a pre-defined stage of the assignment and typically applied in all stages after that. The teacher team (e.g. a teacher and a teacher librarian) concentrates on organizing student groups to work collaboratively, explicating learning goals, monitoring the progress of groups and providing active feedback.

The eight stages of Guided Inquiry are illustrated in Table 1. The framework emphasizes (as made obvious by the ISP model) stages 1-4 before actual gathering of sources for the writing stage starts. Students are prepared for information gathering by activities stimulating curiosity and interests, sharing what are known already, discovering and exploring ideas how to study the topic and formulating questions. After these steps students are

expected to figure out what topic or problem they are going to study in the inquiry circle and personally, to have a preliminary understanding of their information needs, and to be able to formulate relevant search concepts. Further, they gradually develop more explicit criteria to select sources for use, and read sources more consciously from a specified viewpoint. The underlying aim is that students learn to manage the uncertainty inherent in the construction process of information searching and learning.

Table 1. The stages of Guided Inquiry.

Stage	Goals of core activities	Inquiry tools
1. Open	Invitation to inquiry, open minds, stimulate curiosity	Inquiry community introduced
2. Immerse	Build background knowledge, connect to content, discover interesting ideas	Inquiry circles and inquiry journals introduced
3. Explore	Explore interesting ideas, look around, dip in	Inquiry logs introduced
4. Identify	Pause and ponder, identify inquiry question, decide direction	Inquiry charts introduced
5. Gather	Gather important information, go broad, go deep	
6. Create	Reflect learning, go beyond facts to make meaning, create to communicate	
7. Share	Learn from each other, share learning, tell your story	
8. Evaluate	Evaluate achievement of learning goals, reflect on content, reflect on process	

Guided Inquiry shares the socio-constructivist theory base with the implementations of inquiry learning (inquiry-based, problem-based, project-based learning). Thus, when we are analysing teachers' practices in the GI framework, we examine whether or not teachers apply pedagogical ideas typical of inquiry learning.

Case study

Research question

Our aim was to find out through a case study how the present pedagogical practices in Finnish upper secondary schools relate to a teaching model – Guided Inquiry (Kuhlthau et al., 2007) - developed on the basis of extensive research on information searching and use in learning (Kuhlthau, 1991, 2004). We focused on one research question:

To what extent do teachers' ways to design collaborative Wikipedia writing assignments provide elements similar to the eight stages of Guided Inquiry?

Our goal is not to evaluate the case courses in terms of learning outcomes but to explore qualitatively to what extent teachers implement the ideas of inquiry learning in information literacy assignments. The results might contribute in introducing justified hypothesis how teachers' pedagogical practices affect students' behaviour in inquiry-type group assignments.

Case courses

Data were collected from two eight-week courses in an upper secondary school in the city of Tampere, Finland, during the spring term of 2011. Thirty students in ten groups completed a course in Finnish literature, and twenty-eight students in seven groups completed a course in Finnish history. In the literature course, the task was to write an article for the Finnish edition of Wikipedia while the history course used a dedicated school wiki as the writing forum. In both courses, the students were instructed to follow Wikipedia's conventions and requirements for authors. In the literature course each assignment was about a classic Finnish novel. In the history course, the teacher had prepared topics dealing with Finnish history from the period of 1918 to 1939.

The assignment was introduced, written guidelines distributed, groups formed, and the topics for articles were allocated for groups at the first meeting. The second meeting was a training session in the nearby city library. One 30-minute lesson was devoted to library searching and another lesson to Web searching. The librarian knew the students' topics and distributed materials from the library collection for the students. After the visit to the library, the students worked the next five (in the history course four) 90-minute sessions in the computer class to search for information, to select and read sources and to write text for the articles under the teacher's supervision. In the history course a substitute teacher was supervising the class for two sessions instead of the regular teacher.

The case courses were a part of "Tieto haltuun" development project initiated in 2008 to improve teachers' and students' information literacy skills in Tampere upper secondary schools (Sormunen, Eriksson, & Kurkipää, 2012). The concept of writing Wikipedia articles as an information literacy assignment was introduced by a team of teachers in mother tongue and literature (called here *literature teachers* for short). They had used the assignment three times before our case study but the teacher of the case course was personally applying it for the first time. In the history course, the teacher (called here the *history teacher*) was also applying the Wikipedia assignment for the first time. Obviously, the literature teacher had a more favourable position since the assignment concept was originally developed for literature classes, and she could enjoy the help of more experienced literature teachers. However, we regard both case courses as appropriate representatives of information literacy instruction built on teachers' professional practices in the Finnish upper secondary schools.

Data collection and analysis

The student groups were shortly interviewed by a research assistant during classroom sessions and more thoroughly at the end of the course. Interviews were used to collect data on teacher-initiated teacher/group interactions. The teachers were interviewed before and after the course. All interviews were recorded and transcribed. The research assistant wrote observation memos instantly after classroom sessions to record the overall course of classroom activities. We had access to all course materials including the teachers' written instructions. The materials also included students' progress reports, responses to homework assignments, article drafts, and the teachers' comments on them published in the Moodle learning environment. The data were used to compare the designs of the assignments and their implementation between the literature and history classes.

The interview transcripts were coded thematically (see Boyatzis, 1998) using Atlas.ti software package. We tried to find all instances where students mentioned an interaction with the teacher. Interaction categories were derived from the data and quantified in five main activities (planning group work, planning contents, searching & assessing sources, reading, writing and editing). All interviews and course materials were read systematically to find all details of the assignment designs and teachers' justifications of using a particular design.

Findings

We present the results of our analysis by reporting the activities the teachers had designed for the assignment related to each of the eight Guided Inquiry stages. Also the ways of exploiting collaborative forums (inquiry community and circles) and inquiry tools (journals, logs and charts) are described. Each section starts with a short reminder of the idea of the stage, and mentions if a collaborative forum or an inquiry tool is to be introduced to students (in *italics*).

Stage 1: Open. *The goal of this stage is to introduce the assignment to students, motivate them and stimulate their curiosity. Inquiry community introduced.* Both teachers had prepared written instructions for student groups and introduced them to students during the first classroom session. Teachers allocated students to groups and listed the themes for the articles. In the literature course, the groups were allowed to select the novel on which to work. The history teacher decided how themes were allocated to groups. In the introduction, both teachers focused on the requirements for the written articles, how the students should work in the groups and how to report their progress. No stimulating triggers (e.g., videos), nor classroom/small group discussions were used to motivate students for the task ahead. The first session took a traditional, teacher centred form. Students were not exposed to activities typical of, or in sense of a classroom community (cf. Scardamalia & Bereiter, 2006).

Stage 2: Immerse. *The goal is to 'connect to content', activate what is already known, and generate ideas related to the theme. Inquiry circles and journals introduced.* In the history course, the teacher listed 3-5 subtopics for each group to help them comprehend what to write about the imposed theme. The teacher did not activate the groups to explore their own knowledge or to generate ideas how the theme could be approached. In the literature course, each student had to read the novel selected by the group and write a literary essay. Thus literature students were exposed to an activity which moved their attention on the theme before they started to collect information

sources for the writing task. Literary essays also built shared knowledge about the novel within the group and probably helped discuss about ideas how to proceed with the assignment.

The teachers allocated students into groups and gave them instructions to work on the assignment. However, they did not explicitly guide student groups (inquiry circles) how to collaboratively 'connect to content' or develop ideas about it. Personal inquiry journals were not introduced but in the literature course literary essays played a similar function in activating students to think about the theme. However, reading a novel and writing an essay do not guide to reflect on personal learning and the activity does not continue across the whole assignment process as the inquiry journal does.

Stage 3: Explore. *At this stage students explore interesting ideas how to work with the theme by consulting information sources searched by students or made available by the teacher. Inquiry logs introduced.* In the history course, we could not identify organized activities related to the exploration stage. After the instructions were distributed (incl. the lists of subtopics for each group) and the students participated the teaching sessions in the library, they were expected to start searching information about their themes (i.e., skip to the Gather stage). The literature teacher activated students to explore the writing task ahead by a homework assignment: students had to study and report the writing conventions applied in Wikipedia. Further, the teacher guided student groups to select a well-written Wikipedia article about classic novels and their authors, discuss in the group about the contents, and based on their observations outline a content plan for their own article. The teacher also gave student groups selected information sources (or hints of such sources) to start exploring the theme.

The literature teacher exploited here the idea of inquiry circles by giving student groups a task to study Wikipedia articles and use the outcome in planning their own article. She also understood that at the exploration stage students need to use selected sources to learn basics of the theme. However, students were not advised to use tools (such as inquiry logs) to manage sources found along the process.

Stage 4: Identify. *The students should identify the questions to be worked on (focus formation), develop a plan what information needs to be searched, and outline a rough sketch for the text to be written. Inquiry charts introduced.* Writing an encyclopaedic article is not a genuine inquiry task. Rather than formulating research questions the author specifies a topic or a theme about which the article is about. Activities described at the exploration stage (studying some relevant sources, analysing similar articles) help clarifying the plan for the topical content (focus formation), identifying information needs and sketching a content plan.

The history teacher seemed to think that giving a theme title and 3-5 subtopic phrases to students is enough for them to form a focus for each group's article. Thus she did not see the need to expose student groups to guided activities where they collaboratively create their subjective interpretation about the theme. The literature teacher used quite elegantly the task of analysing related Wikipedia articles to direct students groups to discuss and plan the content of the own articles. Teachers did not introduce any tools such as inquiry charts to visualize ideas about the theme.

Stage 5: Gather. *Students guided by the teacher and the librarian should collect detailed information from various channels, assess them and select them for further inspection.* In both courses, students participated a teaching and practicing session on library and web searching organized by the local public library. The librarian had in advance collected materials related to the assignment themes and gave them directly to students in the end of the teaching session. Students in the literature course expressed that they were served by useful materials while students in the history course regarded given materials mostly as non-relevant. The session in the library took place early in the assignment process and especially history students were not very familiar with their themes at the time of searching.

The approaches adopted by the teachers in supporting searching for and selecting information sources were quite divergent. The literature teacher distributed actively materials she considered relevant. The history teacher expected students to search independently all sources needed. Guided Inquiry guidelines seem to balance between these extremes. An obvious consequence of "helping too much" was that literature students reported very low learning experience scores in Web searching. History students reported higher learning experiences but even for them learning experiences were lower than they regarded as typical of school assignments (Sormunen, Alamettälä, et al., 2013). The library offered an overall instruction for searching in the library and in the internet. However, both courses lacked activities which support student groups in analysing their themes to identify effective search concepts and strategies, or in reflecting on their search behaviours in an inquiry learning situation.

Stage 6: Create. *Students read and reflect on information sources selected and prepare a presentation answering the inquiry question (e.g. term paper, poster) and learn collaboratively.* No signs of activities or guidance related to reading and interpreting sources were observed except a few cases when students asked for help. In the literature course, the teacher required the student groups to upload text drafts onto the school's wiki platform and commented them actively. Most comments dealt with language or citations. However, these interventions activated

students during the process to assess their own work. The history teacher did not comment the texts before the final version.

Stage 7: Share. *The experiences gained and answers found are shared within the inquiry community*. In the history course, the articles were made available to the class in the wiki forum and the students were expected to read them all to prepare for an exam. In the literature class, student groups gave a short presentation of their article in the classroom. In Guided Inquiry presenting the documentary outcome is only one aspect of sharing in the classroom. Sharing experiences about the process and learning is emphasized as well. This side of sharing experiences was missing in our case classes (however, see stage 8).

Stage 8: Evaluate. *Students reflect on the learning process, assess the outcomes and share these experiences with others in the inquiry community*. Students filled in a self-assessment form and gave numerical ratings for various aspects of the article and the assignment process. They also wrote comments on their role and activity in the group work. However, students' learning experiences were not discussed in the classroom. Only the teacher presented overall verbal feedback in the classroom. Guided Inquiry emphasizes the teacher's role in evaluating students' progress and giving feedback during the process. This was very rare in the history class. The literature teacher made interventions more actively but focused mainly on commenting text drafts, i.e., on the end-product rather than the process.

Discussions and conclusion

Our study collected data from two case courses. Both teachers were using the Wikipedia assignment for the first time but the concept had been tested in literature courses earlier by other members of the teacher team. The history teacher made a pioneer's work in applying the assignment in history. The problems observed in her class suggest that borrowing a successful approach from one subject area might not be successfully transferred to other subject areas without customizing it. For example, in the history class, the themes were selected to match curriculum requirements for content and were apparently too broad to work as Wikipedia articles (to be synthesized by novice writers in history).

The unfavourable position of the history teacher gives us a chance to characterize the gap between the present pedagogical practice and the emerging new pedagogical practice for information literacy instruction. Second, the comparison of the literature course against the Guided Inquiry framework helps us demonstrate how present pedagogical practices may concretely turn into new practices matching better the requirements of information literacy instruction. Further, the results of the case study inform us about the strengths and weaknesses of encyclopaedic writing assignments in IL instruction.

We may consider the history course as a typical case where traditional pedagogical practice is applied to a learner-centred writing assignment based on independent acquisition of information sources. Characteristic to this approach is that the assignment process is seen as a black box: instructions (incl. generic library and web search training) are given as inputs, and the written text is evaluated as the output. The teacher do not identify the possibility to divide the process into stages as zones of intervention (Kuhlthau et al., 2007; Kuhlthau, 2004; Vygotsky, 1978). Especially, the guidance and activities related to the first four stages of Guided Inquiry (Open, Immerse, Explore, Identify) are seriously overlooked. Students face the challenges of Web searching unprepared since they have not developed a focused idea or viewpoint to study the theme of the assignment. Traditional practice in schools do not offer concrete pedagogical means for IL instruction as pointed out by Limberg et al. (2008).

The team of teachers in mother tongue and literature had developed the concept of Wikipedia writing assignment as a pedagogical practice in their curriculum subject. Their approach diverged from the simple black box model by introducing several specific activities for students at the early stages of the assignment similar to Guided Inquiry. For example, the personal exercise to study Wikipedia writing conventions and activating groups to analyse well-written articles before starting to plan their own article were good examples of these. Both activities turn students' attention on important issues that might otherwise be passed without reflection. Also Kiili, Mäkinen, and Coiro (2013) have emphasised the importance of opening the black box and the need for stage specific activities.

In the literature course, students reported high learning experience scores on three items: 1) understanding Wikipedia in general, 2) understanding difference between Wikipedia and other information sources, and 3) skills in source-based writing (Sormunen, Alamettälä, et al., 2013). These are relevant learning outcomes in IL instruction. However, low learning experience scores in Web searching indicated that some other sub-goals mentioned by teachers were not achieved so well. This variation in success suggests that students identified learning to happen when they were challenged by specific activities. On the other hand, routine doing as part of the assignment process (e.g., googling) does not have the same effect.

In a Wikipedia assignment, it is easy to cognitively challenge students in source-based writing and achieve learning goals accordingly. Writing and publishing in Wikipedia is a motivating context for students to practice information searching, assessment of sources and argumentative use of information (see Forte & Bruckman, 2009). However, the limitation of encyclopaedic writing is that it is not intended to generate new knowledge but to synthesize knowledge from existing sources (i.e., a type of literature review). Thus, the Wikipedia assignment is not an optimal tool to practice the core processes of inquiry, such as creative formulation of research questions. In our case course, the teachers did not pay much attention on guiding students in Web searching or critical assessment of sources but this is not a restriction of the Wikipedia assignment *per se* but a decision of the teachers in this particular situation.

Our study was qualitative in nature and based on a sample of two case courses only. The findings should not be generalized without care. At best, the findings could be applied in formulating informed hypotheses to study present practices in information literacy instruction and in evaluating new pedagogical approaches to improve practices. However, we have a strong impression based on various concrete experiences in schools that a black box syndrome is common in designing and guiding IL assignments. The analysis of case courses in the Guided Inquiry framework gave us an opportunity to make these impressions more explicit and concrete.

References

Bawden, D. (2001). Information and digital literacies: a review of concepts. *Journal of Documentation*, *57*(2), 218–259.

Boyatzis, R. E. (1998). *Transforming qualitative information: Thematic analysis and code development*. Thousand Oaks: Sage.

Chu, S. K. W., Chow, K., Tse, S., & Kuhlthau, C. C. (2008). Grade 4 Students ' Development of Research Skills Through Inquiry-Based Learning Projects. *School Libraries Worldwide*, *14*(1), 10–37.

Chu, S. K. W., Tse, S., & Chow, K. (2011). Using collaborative teaching and inquiry project-based learning to help primary school students develop information literacy and information skills. *Library and Information Science Research*, *33*(2), 132–143. doi:10.1016/j.lisr.2010.07.017

Forte, A., & Bruckman, A. (2009). Writing, citing, and participatory media: wikis as learning environments in the high school classroom. *Interational Journal of Learning and Media*, *1*(4), 23–44. doi:10.1162/ijlm

Heinström, J., & Sormunen, E. (2013). Students' collaborative inquiry – relation to approaches to studying and instructional intervention. In I. Huvila (Ed.), *Proceedings of the Second Association for Information Science and Technology ASIS&T European Workshop 2013* (pp. 19–32). Turku: Åbo Akademi University. Retrieved from http://www.abo.fi/sitebuilder/media/29327/aew2013proceedings.pdf

Hongisto, H., & Sormunen, E. (2010). The challenges of the first research paper–observing students and the teacher in the secondary school classroom. In A. Lloyd & S. Talja (Eds.), *Practising Information Literacy: Bringing Theories of Learning, Practice and Information Literacy Together* (pp. 96–120). Retrieved from https://www12.uta.fi/blogs/know-id/files/2010/05/Hongisto_Sormunen_v10_copy.pdf

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. doi:10.2190/EC.39.1.e

Kiili, C., Laurinen, L., & Marttunen, M. (2009). Skillful Internet reader is metacognitively competent. In L. T. . Hin & R. Subramaniam (Eds.), *Hanbook of research on new media literacy at the K-12 Level: Issues and challenges* (Vol. II, pp. 654–668). Retrieved from http://www.igi-global.com/chapter/handbook-research-new-media-literacy/35943

Kiili, C., Mäkinen, M., & Coiro, J. L. (2013). Rethinking academic literacies; Designing multifaceted literacy experiences for pre-service teachers. *Journal of Adolescent & Adult Literacy*, *Early View*. doi:doi: 10.1002/jaal.223

Kuhlthau, C. C. (1991). Inside the search process: Information seeking from the user's perspective. *Journal of the American Society for Information Science*, *42*(5), 361–371. doi:oi:10.1002/(SICI)1097-4571 (199106)42:5%3C361::AID-ASI6%3E3.0.CO;2-%23

Kuhlthau, C. C. (2004). *Seeking meaning : a process approach to library and information services*. Westport: Libraries Unlimited.

Kuhlthau, C. C., Maniotes, L. K., & Caspari, A. K. (2007). *Guided inquiry. Learning in the 21th century*. Westport: Libraries Unlimited.

Kuhlthau, C. C., Maniotes, L. K., & Caspari, A. K. (2012). *Guided Inquiry design* (p. 188). Santa Barbara: Libraries Unlimited.

Kuusilehto-Awale, L., & Lahtero, T. (2014). Finnish Case of Basic Education for All – With Quality Learning Outcomes. *Journal of Education and Research*, *4*(1), 1–18.

Lankshear, C., & Knobel, M. (2011). *New literacies: Everyday practices and social learning* (3rd ed., p. 296). New York: Open University Press.

Limberg, L., Alexandersson, M., Lantz-Andersson, A., & Folkesson, L. (2008). What matters? Shaping meaningful learning through teaching information literacy. *Libri*, *58*(2), 82–91. doi:10.1515/libr.2008.010

Marchionini, G. (2006). Exploratory search: from finding to understanding. *Communications of the ACM*, *49*(4), 41–46.

Niemi, H., Toom, A., & Kallioniemi, A. (Eds.). (2012). *Miracle of Education. The Principles and Practices of Teaching and Learning in Finnish Schools* (p. 38). Rotterdam: SensePublishers.

Scardamalia, M., & Bereiter, C. (2006). Knowledge building: Theory, pedagogy, and technology. In I. K. Sawyer (Ed.), *Cambridge Handbook of the Learning Sciences* (pp. 97–118). New York: Cambridge University Press.

Sormunen, E., Alamettälä, T., & Heinström, J. (2013). The Teacher's Role as Facilitator of Collaborative Learning in Information Literacy Assignments. In S. Kurbanoğlu, E. Grassian, D. Mizrachi, R. Catts, & S. Špiranec (Eds.), *Worldwide Commonalities and Challenges in Information Literacy Research and Practice SE - 67* (Vol. 397, pp. 499–506). Springer International Publishing. doi:10.1007/978-3-319-03919-0_67

Sormunen, E., Eriksson, H., & Kurkipää, T. (2012). Wikipedia and wikis as forums of information literacy instruction in schools. In R. Gwyer, R. Stubbings, & G. Walton (Eds.), *The Road to Information Literacy: Librarians as Facilitators of Learning* (pp. 310–327). Berlin: De Gruyter Saur. Retrieved from https://www12.uta.fi/blogs/know-id/files/2012/05/Sormunen_Eriksson_Tuulip??_final.pdf

Sormunen, E., Heinström, J., Romu, L., & Turunen, R. (2012). A method for the analysis of information use in source- based writing. *Information Research*, *17*(4), paper 535. Retrieved from http://InformationR.net/ir/17-4/paper535.html

Sormunen, E., & Lehtiö, L. (2011). Authoring Wikipedia articles as an information literacy assignment – copy-pasting or expressing new understanding in one's own words? *Information Research*, *16*(4). Retrieved from http://informationr.net/ir/16-4/paper503.html

Sormunen, E., Tanni, M., & Heinström, J. (2013). Students' engagement in collaborative knowledge construction in group assignments for information literacy. *Information Research*, *18*(3), paper C40. Retrieved from http://informationr.net/ir/18-3/colis/paperC40.html#.UoTV3eJZ7ZU

Vakkari, P. (2010). Exploratory searching as conceptual exploration. In *HCIR 2010: Proceedings of of the Fourth Workshop on Human-Computer Interaction and Information Retrieval* (pp. 24–27). Microsoft Research. Retrieved from http://research.microsoft.com/en-us/um/people/ryenw/hcir2010/docs/papers/Vakkari_fp10.pdf

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)*, *24*(3), 623–648. Retrieved from http://www.sciencedirect.com/science/article/pii/S0747563207000325

Wildemuth, B. M., & Freund, L. (2012). Assigning search tasks designed to elicit exploratory search behaviors. In *Proceedings of the Symposium on Human-Computer Interaction and Information Retrieval - HCIR '12* (pp. 1–10). New York, New York, USA: ACM Press. doi:10.1145/2391224.2391228

Vygotsky, L. S. (1978). *Mind in Society* (p. 158). Cambridge: Haward University Press.