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Book review:

Development of online research skills among lower secondary school students

Tuulikki Alamettälä (2022) Development of online research skills among lower secondary school students: The roles of formal instruction and personal factors. Tampere University Dissertations; No. 537, Tampere University, Tampere

Overview of the dissertation

Tuulikki Alamettälä's doctoral dissertation takes on a current, important and interesting research task: understanding and developing students' online research skills through Guided Inquiry Design (GID), carrying out teaching interventions. The study adopts the case study design with multiple data collection and analysis methods, addressing the research problems from several aspects. The study was conducted as a longitudinal two-year case study, in one Finnish lower secondary school, and quasi-experimental design was used to investigate the effects of the interventions over a period of time. The GID-model was experienced as promising among the participating teachers and the pre- and post-interventions showed a positive effect on students' online research skills, especially on a short term basis. The effects were most evident among students who were less active online searchers and social media users, and among students with a positive attitude to more traditional teacher-centred learning. There is a great variation in the students' online research skills and self-efficacy was clearly a key factor associated with these skills.

The results contribute to further development of pedagogical practices in relation to supporting students online research skills. The dissertation consists of a thesis summary, and four papers, two conference papers and two journal articles, all referee-based, international publications, and Tuulikki Alamettälä is first author, all co-authored with Eero Sormunen, and one also together with Md Arman Hossain.

In this review I will first present and discuss the contents from a more overall perspective, the research topic and motivation, the pedagogical framework Guided Inquiry Design, the research context and methodological choices, and then present the included papers more in detail. Finally I will summarise my impressions of the dissertation work.

A challenging and important topic

The research topic is well motivated and its importance clearly outlined. The literature review showed that young people have shortcomings in their online research skills although they have used the Internet for all their lives and the online environment is a natural part of everything they do. The main challenges are related to locating information, evaluating the quality and reliability of the information, and in connecting information from several information sources. Previous research covers to some extent what are the factors affecting the online research skills, such as personal factors, especially self-efficacy, as well as attitudes and gender. Still, there is limited research on how young people develop their online research skills and why there are individual differences. It is also shown that it is difficult to develop suitable pedagogical models to support teaching and learning of online research skills, and fairly little is known about the development work of new pedagogical models that can be used for these purposes.

The knowledge gaps mentioned above, underlines that the topic of the dissertation is current and important, but it is also challenging. Online research skills are multi-dimensional and therefore also difficult to study. It is hard to measure all that influences these skills and in what ways. In this study, online research skills are defined with help from frameworks from two different disciplines. Online research became a key concept in educational sciences when reading and comprehension of online material became more common (Leu et al. 2011; 2015), and focus shifted from managing traditional reading, towards the importance of effective information search, selection of relevant sources, and synthesizing information from multiple sources. The other framework used in this study is the information literacy framework, a key concept within library and information science, and it has been studied for decades. Still, the information literacy concept is known to have many different definitions depending on context, and there are various information literacy scales. Organisations developing library and information services (e.g. ACRL, CILIP), as well as international organisations, such as UNESCO, have emphasized the importance of information literacy for lifelong learning and informed citizenship, applying the more generic understanding of information literacy as a set of information skills (ACRL 2015, CILIP 2018, Grizzle et al. 2014). The criticism towards capturing information literacy in a simple list of skills is acknowledged in the theoretical background of this work, referring to e.g. Limberg et al. 2012 and Tuominen et al. 2005, who emphasise the need to understand information literacy in context, and as sociotechnical practice. However, the skill-based conception of information literacy was chosen for this work as it is in line with the context studied, the Finnish school curriculum identifies information literacy as information competencies.

Connecting online research from educational science, and the generic information literacy concept from library and information science, gives this study a good ground for managing the multi-dimensional study object. The dissertation doesn't discuss how the research traditions possibly overlap, but it could be interesting to elaborate how interdisciplinary research between these areas could advance the support of young people's information literacy, an increasingly important topic for society at large, not only in educational context. An additional challenge to this topic is that while dealing with a multi-dimensional concept, online research skills, it is difficult to measure, and the choice of suitable research methods is difficult. For example, Alamettälä brings forward that the relationship of students' computer use with computer and information literacy has been widely

studied, but with mixed results. This is an important note, and it would be interesting to elaborate further on the topic, what are the reasons for this?

The Guided Inquiry Design

The pedagogical framework of this study is the Guided Inquiry Design, introduced by Kuhlthau, Maniotes and Caspari (2012; 2015), applying constructivist pedagogy theories and the information seeking process (ISP) model. The GID model has been developed especially for information literacy instruction with the aim to engage students in the information inquiry process through instructive interventions, offering targeted support for the different phases of the process. The model involves eight different key phases with focus on the phases before the information search, making students better prepared for information-gathering activities. Also other pedagogical models are presented, but the GID model was chosen because it is anchored in extensive empirical research and there are detailed guides for its implementation. However, the model is developed in the context of the North-American school traditions and is less known and studied outside the USA. In this respect this dissertation study contributes with testing the model in other school traditions, bringing it into the Finnish school context, giving a good opportunity to discuss how generic or universal the model is.

Research context, design, and methodological choices

The research context is the Finnish school system, and more specifically, the lower secondary school. In 2014, the national core curriculum introduced seven cross-cutting competencies extending across all school subjects, and one of them was multiliteracy. Multiliteracy is defined as a set of competencies needed for accessing, interpreting, producing, and evaluating information in various forms and formats. In this respect, the Finnish school system was a very good ground for testing how the teachers work with literacy instruction in general, and pedagogical designs for online research instruction in particular. The overarching goal for this dissertation work was therefore to develop a better understanding of the roles of formal learning and personal factors in learning online research skills. The research questions focused on finding out how teachers develop their practices of instruction in online research, after having been introduced to the GID framework, and examine the effects of the intervention on the students. The study also focused on students' skill profiles and personal factors that are associated with how students' online research skills are developed.

The research strategy is based on a case-study approach, which is well motivated in the dissertation. Also, the research design, how the different parts of the case-study are performed are clearly presented and described, and the strength of the study is definitely in its longitudinal approach, and the naturalistic setting, although only one school and teacher (and teacher team) was studied. In the centre of the study was the mother tongue teacher and two history teachers who co-operated in the second intervention course, and they were interviewed several times during the study. In addition, 94 lower secondary school students participated in the study, divided into one intervention group and one control group. The interventions were integrated into three different courses during two following school years (2015-17). Pre-, post-, and follow-up-tests were conducted and data were collected through questionnaires, self-efficacy and performance tests. The collected data were analysed using both quantitative and qualitative methods, the interview data through content analysis, and the questionnaire and test results through e.g. mixed between- and within-subjects analysis of variance, t-tests, and cluster analysis. Overall, the research design and methodological choices are clearly motivated and the research process transparent and systematically presented.

Publications

Publication 1: Alamettälä, T. & Sormunen, E. (2018). Lower secondary school teachers' experiences of developing inquiry-based approaches in information literacy instruction. In: Kurbanoglu, S. et al. (Eds.), Information literacy in the workplace. Springer. (ECIL conference proceedings).

The paper reports on the part of the longitudinal case study where the Guided Inquiry Design (Kuhlthau et al. 2012) was introduced in a Finnish lower secondary school, addressing what kind of pedagogical designs do teachers develop for inquiry-based information literacy instruction, to what extent were the designs similar to the designs of GUID, and how do teachers experience their possibilities and success in developing inquiry based IL instruction in their everyday school context. Data was collected during 2015-16 and 2016-17 through thematic interviews. The teacher(s) were relatively positive about GUID, and experienced that their investment in the first phases of the inquiry paid off. Some challenges were detected especially with students who are not used to or like a learner-centred approach. This paper is an important part of the dissertation, mapping the teacher perspective of GUID and their experiences on a longitudinal level. The paper reports only on experiences from one school, and mainly one teacher, but nevertheless the longitudinal approach brings valuable knowledge on a complex process.

Publication 2: Alamettälä, T., Sormunen, E. & Hossain, M.A. (2019). How does information literacy instruction in secondary education affect students' self-efficacy beliefs and attitudes? In: Kurbanoglu, S. et al., Information literacy in everyday life. Springer. (ECIL conference proceedings).

This paper reports on the students' self-efficacy in and attitudes to online research that were developed in the interventions during the longitudinal case study reported in paper 1. The research data was collected through questionnaires to the participating students before, during and after the intervention. The analysis shows that the teaching intervention changed the students' intentions in relation to evaluation of search results and in source-based writing, but no effects were seen in attitudes or self-efficacy. The quantitative data is relatively small and a larger sample might have given more nuances. A methodological discussion could have been added here, the challenges in measuring information literacy instruction are numerous, including both conceptual and methodological concerns.

Publication 3: Alamettälä, T. & Sormunen, E. (2020). The effect of a teaching intervention on students' online research skills in lower secondary education. Information Research, 23(2), paper 861.

This paper reports further on the quasi-experimental study, testing the effects of the intervention among students in the lower secondary school. The focus here is on the students' learning outcomes from the online research skills interventions, investigating if the teaching intervention improved their online research skills, and whether individual factors such as IT activity, self-efficacy and attitudes affect these learning outcomes. Pre- and post-tests of the online research skills were conducted with 87 students divided into one intervention group (n=55) and one control group (n=32). The results show that the interventions had effects on some of the students online research skills and the intervention group scored better after the interventions compared to the control group which scores remained the same. The effects were most efficient in search planning and query formulation. Some skills were not affected by the interventions, such as critical evaluation of sources. Also individual factors were analysed to see if there is a relation between IT activity, social media activity, self-efficacy, attitudes to online learning and traditional learning, and behavioural intentions. The analysis shows that IT and social media activity play a role in the learning outcome in the way that less active students get a boost of the intervention and have a greater learning outcome. Also the (positive)

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attitude toward traditional learning was showed to influence the learning outcome positively, generating some challenges to the interpretation of the results.

Publication 4: Alamettälä, T. & Sormunen, E. (2021). Learning online research skills in lower secondary school: Long-term intervention effects, skills profiles and background factors. Information and Learning Sciences, 122(1/2), 68-81.

The fourth paper focuses on the long-term effects of the teaching interventions and the skills profiles of the students involved in the longitudinal case study reported in papers 1-3. The research data was collected through (a follow-up) test in the simulated online environment NEURONE and the task was to compose an article for the school magazine on the advantages and disadvantages of computer-gaming. The system guides the students' search process, step by step through subtasks of information searching, evaluation and use. In addition the students' self-efficacy in online research, their attitudes to learning and behavioural intentions were collected through the questionnaire developed and reported in paper 2. The analysis of the test scores between the intervention and control group show no difference, and the teaching intervention did not seem to have a long-term effect on the students' skills. A cluster analysis was performed to reveal online research skills profiles of the students, showing three clusters, namely high, medium, and low performers. A comparison of high and low performers and their individual factors (self-efficacy, attitudes, ICT activity) showed that high performers have higher self-efficacy, but other relations were more difficult to find. Although it is difficult to find clear connections between individual factors and online research skills, this kind of analysis helps in mapping how well a group of students perform in relation to different online research skills and helps in planning teaching interventions.

Summarising impressions

As concluded already in the beginning of this review, this doctoral dissertation takes on an important task in investigating students online research skills, competencies that have been showed to be surprisingly difficult to teach and learn. The study develops a better understanding of how teaching these skills can be supported through a specific pedagogical approach developed for information literacy instruction (GID). The strength of the study is its longitudinal case-study approach, conducted in one lower secondary school in Finland. The carefully designed case-study, including very many different sets of data (interviews, observations, surveys and tests), were collected and performed over a two-year period, so that the students' progress and learning could be followed. The GID model was experienced as helpful among the teachers, and the results of the interventions pointed at some effects, improving students' online research skills in some skill areas, and that self-efficacy, ICT activity and attitude to learning affect learning outcomes. The four papers that constitute the main part of the dissertation, report on different aspects and the different sub-studies within the longitudinal case study, and they clearly show the progress of the research.

The thesis summary is relatively short, binding together what is reported in the four papers. The conceptual and theoretical discussion could have delivered some more in-depth analysis as the study investigates complex competencies. The GID model could have been discussed in more detail, and in that way, given room for developing the model further, as the research design is really robust and gives an excellent opportunity to evaluate the model itself. However, the study contributes with important knowledge and advances concretely the pedagogical approach to online research interventions. It also shows that a pedagogical model like GID has a lot of potential as it is based on the broadly studied and used model of the information seeking process (Kuhlthau 2004). To conclude, Alamettälä's work brings together research on information literacy represented in LIS and in education research which is very welcome in order to build a more coherent picture of the complex

online research skills and how to support young people in navigating today's challenging information landscape.

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