



# Supporting upper secondary students' online inquiry competencies

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<https://blogs.sis.uta.fi/aroni/>



## Background of the study

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Previous studies show that upper secondary students leave the school with insufficient and heterogeneous information competencies (Hautamäki et al., 2012; Kiili, 2012; Lundahl et al. 2010; OECD, 2010).

Existing teaching practices or models need to be updated for teaching relevant digital online literacy (Breakstone, McGrew, Smith, Ortega, & Wineburg, 2018). Also here thoughts of Byeong-Young Cho in his key note presentation!

Our aim was to create a practical four-step intervention process following an inquiry process for teaching online inquiry skills and to investigate teachers' and students' experiences when using it. For this, we used both pedagogical, literacy and information science expertise.

# Developing pedagogy for supporting students' online inquiry skills

## MAIN GOAL

To develop models and practices for teaching online inquiry skills

## SUBGOALS

To develop instruments for evaluating students' online inquiry skills and use them to evaluate current skills

To examine teachers' current pedagogical practices in building students knowledge work competence

To examine students' conceptions of knowledge and everyday online practices

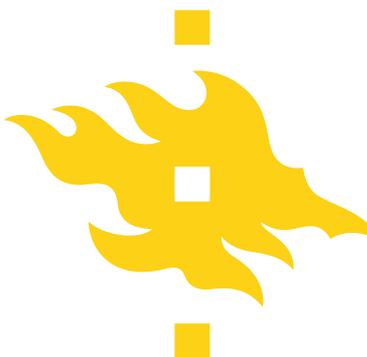


To develop a model for teaching online inquiry skills and knowledge work competence as well as test it with teachers



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**Today the aim is to describe some results  
of the intervention study (2018-19).**



# The intervention approach: simulating real life processes of online inquiry

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- In general, we used the dialogical design principles as guidelines (Paavola, Lakkala, Muukkonen, Kosonen, & Karlgren 2011) and results of a previous sub study (Ilomäki, Lakkala, Muukkonen, Paavola, & Toom, submitted)
- ➔ A collaborative object for students' work was an “authentic”, contradictory health issue (e.g. sleeping pills). A few topics which the groups could choose one.
- Working groups were based on students' interest of the topic, work in groups was obligatory.
- Work was organised using a collaborative writing template which followed the recommended phases of information processing.
- A limited Google search engine in use
- Reflective questions about the process and the outcomes after every phase (Agarwal & Roediger, 2018)
- Teachers followed the together planned working schedule and they had all materials ready-made.

# Organization of the intervention assignment

## Working process

Lesson 1: Searching for relevant sources

Homework 1 (if necessary):  
Searching for sources

Lesson 2: Evaluating the credibility of sources

Homework 2 (if necessary):  
Evaluating / comparing sources

Lesson 3: Preparing a synthesis based on multiple sources

Homework 3 (if necessary):  
Finalizing the group report

Lesson 4: Presenting and discussing about the syntheses

## Web-based platform for sharing materials and links (OneNote)

Instructions for the assignment

For each phase/lesson:  
Teaching material about online inquiry strategies

Working instructions

Links to work documents of the groups

## Work document template for each group (Google doc)

Authors:

Topic:

Interests in the topic

Planning the search process

Examining the sources

Reflecting the process and outcomes

Äidinkieli 4, Tutkiva nettitutkiminen ARONI, <https://ojs.sis.uta.fi/aroni/>

**TYÖSKENTELYDOKUMENTTI - Ryhmä X, lukiota ja kurssikoodi**

**RYHMÄN JA AIHE**

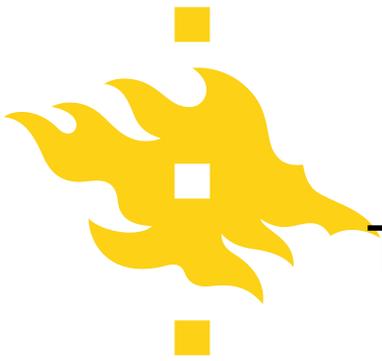
Ryhmän jäsenten nimet:  
Aihe:  
Miksi aihe on kiinnostava?

**TEHDÄNÄKÄSI, INKITTÄÄ**

Mitä asioita nettisivuilta tutkittavasta asiasta voitaisiin kertoa?

Mitä asioita keskeisiä käsitteitä tutkittavaan asiaan liittyy? Mitä asioita hauskoilta voisi löytyä tietoa tutkittavasta aiheesta? Minkä organisaation tai julkaisijan sivuilta löytyy tietoa? Kuka tai ketkä voisivat kirjoittaa asiasta? Täydennetään taulukkoon:

KESKEISET AIHETTA KUVAAVAT KÄSITTEET JA HAKUSANAT	
Pääkäsitteitä edustavia hakusanoja	
Rajavia käsitteitä edustavia hakusanoja	
LUVUTTA MAHDOLLISIA HAKURAJAUKSIA	
Toimijat, organisaatiot, sisärynnät	



## Teacher data of this sub-study

Teaching online inquiry and knowledge practices

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### Observations (5)

How the teacher applied the model

### Diaries (9)

How the teacher applied the model  
Experiences about the model, suggestions for improvements

### Interviews (5)

Experiences about the model, suggestions for improvements;  
Self-reflection about pedagogy & own expertise,  
Teacher collaboration



# Student data of this sub-study

## Learning online inquiry and knowledge practices

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### Individual (both test and control groups)

Collaborative knowledge practices (CKP) questionnaire



Self-assessed learning of knowledge practices

CKP Open questions



The process of the teaching model

### Working group (only the test group)

Working documents



Quality of working; self-reflection about working

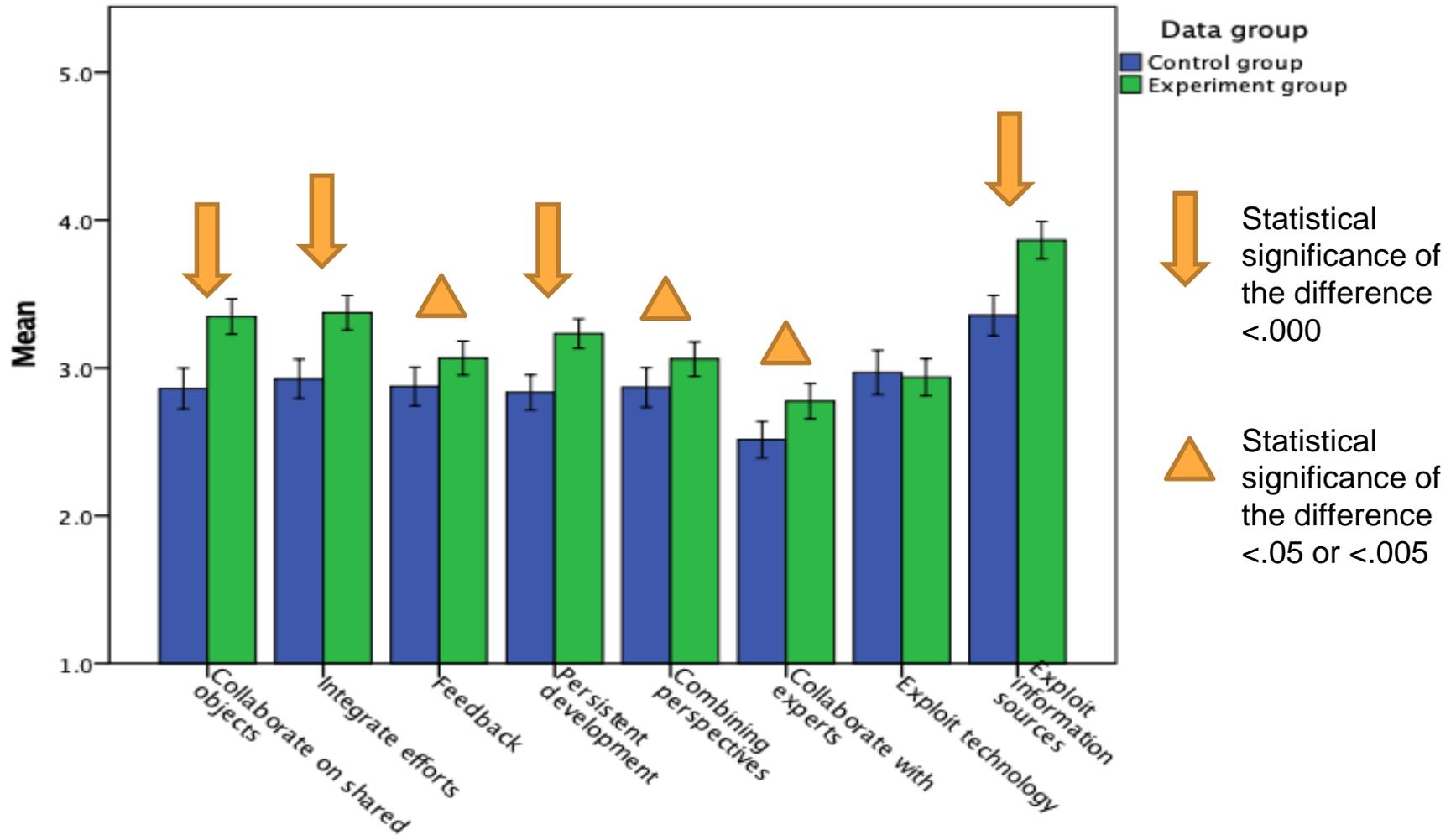


## Some results of the intervention study

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1. How did students evaluate learning of knowledge work practices during the intervention (test group) vs. no intervention (control group)?
2. How did students evaluate the experiences during the intervention (test group)?
3. How did teachers evaluate the experiences of the intervention?

# Students' self-evaluated learning of knowledge work practices (CKP questionnaire)



Error Bars: 95% CI

# Experiences described by students in free-text CKP answers

(9 courses, 146 students; number of mentions in parenthesis)

## Positive or impressive (183)

**Online inquiry (88 / 48,1 %):** Learnt critical evaluation (49), Learnt to find sources (15), Learnt to use sources (12), Exploring sources (7), Making a synthesis (5)

**Project task (57 / 31,1 %):** Interesting and enjoyable (15), Different than usual (12), Learnt something new (10), Focussed exploration (4), Comprehensive (4), Interesting topics (3), Freedom of working (3), Appropriate challenge (3), Useful (3)

**Collaboration (32 / 17,5 %):** Working in the group (27), Different viewpoints (3), Learnt group work skills (2)

**Organization (6 / 3,3 %):** Well-structured (4), Material from researchers (2)

## Challenging or disturbing (140)

**Online inquiry (33 / 23,6 %):** Challenges in evaluating sources (17), Challenges in finding sources (14), Challenges in making a synthesis (2)

**Project task (55 / 39,3 %):** Not interesting (19), Too long and laborious (16), Nothing new (9), Challenging (11)

**Organization (30 / 21,4 %):** Poor instructions and materials (16), Tight timetable (9), Unclear structure (5)

**Collaboration (22 / 15,7 %):** Challenges in group work (13), Uneven participation (9)

## Teachers' evaluations of the intervention in diary statements (9)

Statement	Totally agree	Somewhat agree	Neutral	Somewhat disagree	Totally disagree
The teaching entity worked well.	2	<b>7</b>			
Time for the assignments was sufficient.	2	4	1	<b>2</b>	
The assignments were on appropriate level.	4	3	2		
Students were engaged in doing the assignments.	2	5	1	<b>1</b>	
The learning goals were realistic.	<b>5</b>	4			
Students learnt the skills of information search.	2	<b>7</b>			
Students learnt the skills of critical evaluation.	2	<b>7</b>			
Students learnt the skills of making synthesis.	2	<b>7</b>			



# Teachers' evaluations in the interviews (5): The most often mentioned (ATLAS.ti analysis)

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- Digital technology: students did not need any help.
- Positive project, all teachers will re-use this model, succeeded well, matched well in the course (Finnish language and literature, course named Influencing).
- The assignment was good.
- The materials were excellent: Information slides, Clear assignments, Working document good.
  
- To be improved: the topics (now limited because of the study), guidance (more guidance needed, not skills to guide groups)
- Too many groups



## Teachers' evaluations in the interviews (5): The most often mentioned (ATLAS.ti analysis)

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- Making the synthesis and comparing references was difficult.
- Students had difficulties in understanding various stakeholders (meaning to use different opinions).
- Students pre-attitudes (“*we know this information search*”) was not true.
- Teachers needed to guide students: Search words, Focusing the search, Evaluating the references
- Students succeeded differently and the level of the outcomes varied. They especially learnt how to create search words and how to evaluate information or a reference.

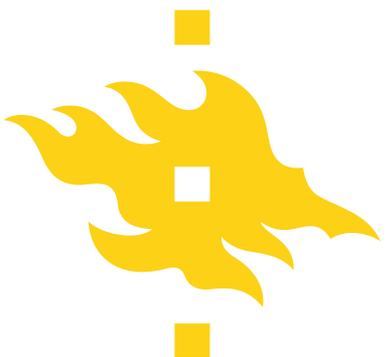
Exceptions of the intervention plan: only the use of time.



# Discussion and conclusions

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- ❑ In general, the intervention succeeded, based both on teacher and student data: the idea, the process and the teaching & learning materials.
- ❑ Small adjustments needed, e.g. topics. Should the projects always also respect the content?
- ❑ More emphasis on students' engagement – how?
- ❑ Self-reflection and presenting the results in groups (not teacher-led) were (too) new to teachers and to students.
- ❑ Increased consciousness about the phases of online information search - also among teachers.
- ❑ A more accurate and detailed analysis of the process needed, based on the both data.



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