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Supporting Scholarly Thinking in a Nordic Teacher Education Webinar Practice

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Supporting Scholarly Thinking in a Nordic Teacher Education Webinar Practice

Abstract

With this study we have a twofold aim. Firstly, to develop a model for identifying and analyzing the status of students' scholarly thinking, and secondly to design and evaluate an educational practice with the aim of supporting these skills. A series of webinars connected researchers and students from Finland, Norway and Sweden and gave the students access to an authentic Network of researchers, otherwise not accessible to them. The webinars were recorded and an analysis, inspired by variation theory, were conducted in order to identify signs of scholarly thinking in student reasoning when discussing students' final thesis. Findings were then used to construct a model for identifying variations of scholarly thinking as qualities of scholarly discernment, identified in students' communicative actions. Two critical aspects for stimulating scholarly thinking during webinars emerged from data. First the diversity of language and knowledge and secondly, a more informal framing. A carefully staged webinar using these two critical aspects, offers a socialization of students in professional training, to an academic discourse where the production and evaluation of knowledge is part of students' identity and constantly debated.

Keywords

Global classroom, mediation, pre-school teacher program, scholarly training

Cover Page Footnote

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Introduction

This study has been driven by an aspiration to better support the development of sustainable scholarly skills in students of teaching. Many higher-education scholars are part of research networks that have an implicit or explicit role in underlining educational programs with their contemporary research. Being responsible for diversified and updated content in educational programs is just one aspect of this task. Associated with the confrontation of research is the necessary competence of students to think at a meta-cognitive level about the construction of knowledge as a research process; the researchers themselves, who have first-hand experience of research, are valuable to students in helping them gain such competence. We therefore applied for money to extend the role of a network of researchers to stimulate preschool student teachers' scholarly thinking in different teaching programs in the Nordic countries by using webinars. All participating researchers in the network acknowledged the difficulty of fostering critical-thinking skills and students' difficulty in grasping the role of theory and research in professional training.

The grant resulted in a series of webinars that connected researchers and students from Finland, Norway and Sweden and gave the students access to an authentic network of researchers they could not otherwise have accessed. The webinars were recorded and an analysis, inspired by variation theory, was conducted to identify signs of scholarly thinking associated with the conditions framing the webinars. The theoretical framing underlining the study acknowledges that 1) aspects of scholarly training can be discerned from communicative actions, 2) educational practice is subject to mediation and 3) constitutive aspects influence higher-education practices. The grant was used for meetings with researchers to plan the webinars and the model used for analysis was developed into a tool for distinguishing signs of scholarly thinking in student seminars.

Two critical aspects for stimulating scholarly thinking during webinars emerged from data: diversity of language and knowledge, and a more informal framing. A carefully staged webinar using these two critical aspects helps students in professional training to become socialised to an academic discourse where the production and evaluation of, and debate about, knowledge is part of students' identity.

Scholarly thinking in teacher education

The purpose of this study was to construct a model (Table 2) for discerning scholarly thinking during seminars, and to put the tool into practice in a pedagogic context especially designed for this purpose. We consider our main result to be the determination of affordances resulting from a weaker framing of the educational practice and its diverse character (e.g. languages, competences, roles).

Scholarly thinking – the ability to reflect critically about the construction of knowledge – is a trademark of higher education. Swedish preschool teachers' degree objectives include the ability to demonstrate good judgement in a teaching practice based on scholarly thinking. However, students and teachers often regard it as less important than first-hand occupation-related knowledge. This study therefore has a twofold aim: first, to develop a model for identifying and analysing the status of students' scholarly thinking; and second, to design and evaluate an educational practice with the aim of supporting these skills.

Defining scholarly thinking

Societal changes have resulted in an increased complexity and uncertainty that individuals must master. These changes, which are related to technology, the access to information and globalisation, introduce new challenges in designing education that helps students develop necessary critical competencies to master the resulting complexity (Espey, 2018; Murtonen, 2015). Biesta (2017) has identified a risk of having too strong focus on learning, which can shift focus away from discussions of content, purpose and relationships of education.

Students of teaching play an important part in future generations' ability to develop judgement and critical-thinking skills that can help them master complexity and uncertainty. Scholarly thinking is, in this context, a key competence reflecting the ability to think at a meta-cognitive level about the construction of knowledge as a research process, and to apply relevant critical-thinking skills in complex contexts.

Barth, Godemann, Rieckmann, and Stoltenberg (2007) suggest that the ability to reflect on decisions, consequences, responsibilities and ethical standards is necessary to cope with complex situations. The competence of scholarly thinking, according to Sellbjer (2011), involves making connections, considering relationships, constructing new ideas and using divergent thinking – higher-order thinking skills. Wernersson and Hansen Orwehag (2016) talk of the development of an intellectual autonomy, a clear and open mind and sharpened cognitive tools that allow individuals to develop “a profound understanding of one’s field of expertise” (p. 231).

Kuhn, Iordanou, Pease, and Wirkala (2008) identify three aspects of scientific thinking as essential for students to master. On a strategic level there is the ability to coordinate the effects of multiple causal influences on an outcome. The second is a fundamental and mature understanding of the epistemological foundations of science, as constructed by humans. The third is the ability to engage in skilled argumentation in the scientific domain.

Definitions of scholarly thinking are often presented as general skills and communicative actions. What is often missing is the connection from generic higher-order thinking skills to specific aspects of scholarly thinking. This study will regard the concept of scholarly thinking as wider than scientific thinking, since it is applicable to more situations than the production and consumption of research, and are necessary as generic skills in any professional practice. Scholarly thinking as such is mainly associated with independent thinking in terms of taking on more perspectives, performing systematic and critical analysis and applying good judgement – a combination of the production and the use of knowledge.

Conditions for developing scholarly thinking

The Swedish Higher Education Act emphasises student autonomy and an ability to apply critical thinking and good judgements in a scholarly context (SFS, 1992:1432), and notes that all Swedish university training programs are expected to combine teaching with relevant and contemporary research (Ordinance, 1993). However, research, theoretical reasoning and critique as aspects of scholarly thinking often receive less emphasis than first-hand occupation-related knowledge (Furlong, McNamara, Campbell, Howson, & Lewis, 2008).

Three aspects of the development of students' scholarly thinking stand out. The first is the problem of students and some teachers assigning lower value to scientific knowledge and scholarly thinking than to occupational skills. Hansen Orwehag (2008) suggests that the tension

between professional and scholarly skills should be resolved by integrating the two, although this has proven difficult (Wernersson & Hansen Orwehag, 2016).

A second aspect is students' frequent lack of basic understanding of fundamental questions and concepts associated with scientific knowledge. They have often found it difficult to judge, value, compare and discuss their own and others results. Murtonen (2015) reported that students had problems understanding basic concepts, and even displayed "severe confusion [among] the terms empirical, theoretical, qualitative and quantitative" (Murtonen, 2015, p. 695).

A third aspect is a frequent lack of informed and progressive teaching that encourages students to embrace scholarly thinking (Willison, 2018). Social sciences and behavioural sciences, including teacher training, traditionally offer courses in general methodology that are separate from those in qualitative and quantitative research and statistics, which does not promote the students' understanding of the process of producing knowledge (Murtonen, 2015). Arneback, Englund, and Dyrddal-Solbrekke (2016) argue the need for multiple discourses when discussing students' independent work, which supports the students' development of professional-reflective skills. Carlström-Hagman (2005) emphasises the importance of conceptualising the *why*, rather than the *how*, when linking to research in everyday teaching and the design of courses.

In Finland, courses are integrated with research and aim at students producing a master's thesis and integrating research with their teaching practice. One of the characteristics of Finnish research-based teacher education is the organisation of training in such a way that students practice "argumentation, decision-making and justification while investigating and solving pedagogical problems" (Toom et al., 2010, p. 333). In Munthe and Rogne (2015), both students and teacher educators emphasise the importance of the educators' own first-hand experience of research for a research-based education. A study by Jyrhämä et al. (2008) found that students valued methodological studies as all-around knowledge and stressed that these courses should start sufficiently early in their studies.

Sachs (2016) describes the need to create discursive spaces addressing the different competences of educators and teachers, where a "research-engaged teaching profession could develop and thrive" (p. 424). Bergöö (2009) identifies aspects to address when working with research-based education and students' development of higher-order thinking skills, based on discursive spaces for students, where issues of knowledge production are discussed in oral and written practice. Like Bergöö (2009) and Lehtinen (2007), Alvunger and Wahlström (2017) stress the importance of students' continuous socialisation throughout their professional training.

Through participation in academic discourses where the production and evaluation of knowledge is constantly debated, students can integrate critical thinking and good scholarly judgement as part of their identity. That would ideally mean that they are not simultaneously confronted with understanding and connecting general concepts and the need to employ them in a bachelor's or master's thesis. Murtonen (2015) stresses that in teaching research methodology, universities often focus on the conduct of research, overlooking the students' need to understand the production, use and reliability of knowledge and the ability to argue and justify decisions when working in an expert society. Koyabashi et al. (2015) have studied the advantages of having more than one supervisor, as is common in PhD training, as this can create tensions in scientific discussions that can become learning opportunities.

These suggested practices could foster the development of discursive skills necessary for participating in contexts of research and promoting critical thinking and the handling of scholarly

problems in a variety of contexts. To foster the necessary discursive skills to participate in research practices means to consider the nature of relations as they emerge in education, and to recognise that education is inherently dialogic, but sometimes distorted because these practices are guided by anti-dialogic projects (Matusov, 2009).

Differences emerging in dialogue do not necessarily constitute obstacles; they can also provide opportunities for creating relations of understanding and support (Burbules, 1993). Finding structure in dialogue is supported by open-ended objectives, abandoning one-to-many communication, taking additional structural actions in communication with students and urging students to apply theoretical tools in determining their own objectives and movements between discursive practices (Reneland-Forsman, 2016).

This section has examined the literature to identify critical issues associated with teaching scholarly skills to students. In response to some of these issues, we have designed an analytical tool for identifying variations in scholarly thinking and an educational practice we call a Nordic seminar. The framing components for this educational practice are guided by the need to carefully load the learning environments with different experiences and competences in “authentic” conditions involving researchers with first-hand experience of research. There is an important shift here compared to the design of teacher-education practices involving writing a final thesis. The focus in the Nordic seminar is on the process, and not primarily on the final product – the thesis. Finally, the Nordic seminar represents a situation where students have the opportunity to actively discuss problems, disharmonies and what they think they know in a more informal context than traditional higher-educational practice.

Aims and scope

Our aim with this study has been to develop and test a tool, a conceptual model for distinguishing variations of scholarly thinking in student reasoning, and to design an educational practice aimed at supporting these skills.

By “scholarly skills” we mean an approach distinct from methodological thinking; rather, we are referring to what Kuhn et al. (2008) call scientific thinking: a mature understanding of the epistemological foundation of science that also includes the skills required to use knowledge in professional practice. The analytical tool in the study has been further developed using empirical data emerging from the Nordic seminars to form a richer conceptual model. By adding the results from our own testing to insights from the literature, we trust the tool’s fitness for identifying and supporting students’ scholarly thinking.

Participants and research context

This study emerged from our role as examiners in higher education and the difficulty experienced in designing for sustainable knowledge of how to conduct research by integrating teaching with relevant and contemporary research (Ordinance, 1993). A research network let us connect students in several Nordic teaching programs and gain access to active researchers in a field of relevance to the students, as recommended in the Swedish Higher Education Act (SFS, 1992:1434). The Nordic Early Literacy Education Network participated with active researchers at Linnaeus University (SE), University of Gothenburg (SE), Åbo Akademi University (SF) and Western Norway University of Applied Sciences (NO), who interacted with students and actively informed the educational practice through a series of webinars for students of preschool teaching.

The study targeted the scholarly thinking of students of preschool teaching during their process of writing a final independent thesis (mainly at the undergraduate level). As suggested by Bergöö (2009) and Alvunger and Wahlström (2017), these seminars could address the need for students to participate in academic discourses where the production and evaluation of knowledge is constantly being debated. The framing of the seminars also took into consideration the possible distortion of dialogical conditions stipulated by (Matusov, 2009) to design a practice outside the course context, though coinciding with writing a final thesis. The students interacted with researchers who were not their supervisors and whom they were not going to encounter again. The researchers were only requested to put in time during the webinars; there was no reading in advance, and follow-up tasks were not required. The use of webinars meant that we could create a context with access to skilled researchers who seldom find time to participate in teaching at an undergraduate level, and a cohort of students whose circumstances were different enough to create some tensions and generate a need for clarifications in the course of discussions.

A first webinar took place in the autumn of 2015, followed by two in 2016. During each webinar, which lasted for about two hours, the four universities were connected using telecommunication. Communication was facilitated by the fact that, while people from Nordic countries speak different languages, they can generally understand each other. It should be noted that the Finnish participants were from the Finland-Swedish speaking parts of Finland. The interface of the webinar was a screen initially divided into four equal spaces, with all participants visible throughout the seminar. The presenting participants were allocated a larger space area of the screen.

All participating students were working on a bachelor's-level thesis, with the exception of the Finnish students, who were working at the master's level. Participating researchers were professors or assistant professors. In total there were four to six researchers and eight to 10 students in each webinar. Participation was voluntary for students. Students were asked to prepare a three-minute presentation on the status of their independent project, and to take responsibility for commenting on fellow students' work. The two final webinars had a core of students participating for a second time.

Informing theory and method

We set out to acquire knowledge about how variations of scholarly thinking might be detected based on students' discursive skills. Rather than measuring actual learning by isolating the learning gained from this particular practice, we oriented our analysis towards an enacted object of learning – scholarly thinking, discerned as variations of students' understanding (Marton, 2015) of a scientific process (Table 2). The acknowledgement of the educational practice as influencing and constraining human behaviour also motivates this analysis (Matusov, 2009; Resnick, 1994; Sachs, 2016). The specific setting of webinars (telecommunication between groups) means that the digital medium is mediating the social practice. The Nordic seminar is also mediated by language, and its intersubjective character goes beyond the isolated individual in trying to understand human action (Wertsch, 1998). Mediation should here be regarded, in line with Vygotsky, from a developmental transforming perspective rather than an assimilative one (Wertsch, 2007, p. 179).

Students search for coherence between a learning environment and their expectations and act accordingly (Entwistle & Peterson, 2004; Marton, 1997). In this context, the framing of the discourse of knowledge production and its intrinsic grammar have a strong impact through

different actors with different statuses in the academy (Bernstein, 1990). The strong structural imprints of the higher-educational context and the distributed hierarchical roles associated with this educational practise influence the space where a subject emerges and intersubjectively interacts with others (Biesta, 1999).

Summing up, theoretical assumptions guiding the study acknowledge that:

- aspects of scholarly training can be discerned from communicative actions
- the educational practice is subject to mediation
- there are constitutive and framing aspects of the higher-education practice.

To analyse incidents of scholarly thinking from these recorded seminars required a method that could fill the gap between the analysis of communicative action and studies of the recipients' reactions. Such a method should focus on the role of language in complex situated action and capture the interrelationship of dialogue where discourses of interest are represented as social action, not simply as text. Mediated action, as the object of analysis, was used to stress the dialectic between action and its means (Scollon 2001). A content analysis was applied to the three recorded seminars, which together resulted in six hours of film. Variation theory inspired the categorisation of content as signs of scholarly thinking (Marton, 2015) to identify what the students understood, what they managed and what they struggled with when producing a scholarly product. First, communicative acts, relevant as aspects of scholarly thinking, were identified using a condensed transcript (exemplified below). This initial analysis was carried out as a separated round of analysis and was followed by a final joint analysis. Below is a summarised linear example of a situation where students presented their reasoning.

Italics are presenting students' communicative acts. Non-italics are the communicative acts of participating researchers or other students.

- *Student introduces context for the study*
- *Presents working hypothesis*
- *Confirms that the study supported the hypothesis*
- *Introduces and argues for another result*
- *Presents implications for practice*
- *Presents research method*
- *Criticises own methodological choice*
- *Reflects on validity*
- *Declares a consequence – the exclusion of existing data*
- *Argues for another alternative*
- *Anchors this new alternative with an additional critical aspect of methodological choice*
- A methodological question from researcher
- *Answers with reliability argument*
- (Confirmation from other students)
- Researcher acknowledges innovation and courage but keeps discussing initial methodological question
- *Answers from an ethical standpoint*
- *Underlines standpoint taken*
- *Introduces a shift to the professional practice and implications for it*
- Researcher makes a reference to previous study of relevance
- *Ends by problematising study object – what is possible to know anything about*

As a second step, analytical concepts (Table 1) were applied to identify situations associated with scholarly thinking, such as making connections, considering relationships, constructing new ideas, applying divergent thinking, making and using references and expressing judgement.

Table 1. Categories identified as related to scholarly thinking in students' communicative actions

Communicative action related to scholarly thinking

Making connections
 Considering relationships
 Constructing new ideas
 Applying divergent thinking
 Making and using references
 Expressing judgement

Results

Empirical data from this study has been used to:

- a) inform the analytical concepts used to identify variations of scholarly thinking and produce an analytical tool as an elaborated conceptual model, and
- b) study and discuss what educational practice can contribute to the development a scholarly competence.

The sections below present the conceptual model and the results of the analysis of the educational practice.

Identifying scholarly thinking – the conceptual model

The model (Table 2) illustrates variations of scholarly thinking as qualities of scholarly discernment, identified in students' communicative actions. The column to the left represents areas of scholarly thinking of importance for the aim of the educational practice – to design, master and document a basic research process as part of an exam given to students of preschool teaching. The other columns show categories of student understandings emerging from the video analysis. These categories can support teachers' identification of students' expressed notions of scholarly thinking. What might appear to illustrate a progression from left to right should rather be perceived as different qualities of assessing a particular performance in a representative practice.

Table 2. Areas and qualities of scholarly discernment visible in empirical data

| | Variation | | |
|---|---|--|--|
| Understanding | <i>Recalls relevant content (isolated declarations)</i> | <i>Shows awareness (trying new ideas)</i> | <i>Implies consequences (declarations based on argumentation)</i> |
| <i>Meta-cognitive understanding of the research process</i> | Makes statements of actions as fragments | Considers relationships in the process | Identifies ethical issues Applies divergent thinking Shows accepted responsibility |
| <i>Epistemological and methodological relations</i> | Describes methods used without arguments | Introduces options for methods but not linked to influences on results | Suggests multiple effects of influences of an outcome (identifies alternative causes) |
| <i>Central concepts/discursive knowledge</i> | Tries definitions Links and relations still unclear | Puts concepts in play explicitly and/or implicitly | Picks up and rephrases in a context |
| <i>References</i> | Makes references | Recalls content | Applies theories and previous research based on relevance and relation Evaluates and makes distinctions |

Identifying conditions for supporting scholarly thinking – the Nordic seminar

The second step of the study aimed at identifying framing conditions for the educational practice with a potential to influence students' scholarly thinking. Keys to a further understanding of the research process were identified as variation in *language*, *competence* and *complexity*. Aspects of these variations were added to Table 1, and the analytical tool as an elaborated conceptual model was constructed (Table 2).

A multi-language environment

The fact that students spoke different languages often created difficulties during the seminars. A turn-taking structure emerged where clarifications were sent back and forth; for example, "Did I understand you right if I say", "So your main argument is", "Let me try to summarise". This pattern in communication was present through all three seminars. What initially could appear as unclear meanings in communication were further elaborated on. Building on explicit communication rather than taking things for granted was a prerequisite for being able to continue the communication. Misunderstandings and misconceptions helped identify different aspects of scholarly thinking in need of elaboration.

In the second seminar, the students from Finland had difficulties in understanding the dialect of a Norwegian student. The Norwegian student was repeatedly asked to clarify and exemplify the

research design. In the discussion following, different understandings of the concept of discourse between the different researchers and supervisors emerged. What was initially a language barrier, in time revealed itself to be a conceptual barrier based on the connotation of “discourse”.

In the third seminar, misconceptions regarding different national preschool practices surfaced (differences in the number of immigrants in the two countries) which had influenced one student’s understanding of the preschool contexts. Her preconceptions had influenced the suggested research design. When, during the seminar, the student elaborated on the design of the study, one of the researchers asked what the student expected to find out from a comparative study of two nationally different preschool practices. When the conversation moved from the student’s perceived “known” context to the “unknown” introduced to her, she started considering established relationships and questioned her preconceptions. A taken-for-granted difference between the two national contexts was replaced with a more nuanced picture; this moved the discussion, with the help of the group, beyond the previously known. A different national context worked as a mirror for the student to become aware of her study object and resulted in a meta-cognitive comment that she might be anticipating certain results. Student preconceptions were challenged, and this resulted in a changed design – constructing new ideas where the comparison of national contexts was removed from the foreground.

Presence of different competences

Researchers of varying academic positions, whom the students had not previously known, participated in the seminars. Only a few students had their supervisors present. The participating students’ experience and understanding of research and scholarly thinking varied, creating a situation of richer supervision involving both students and researchers.

A researcher challenged one student about methodological choices. The researcher’s question concerned the relationship between the knowledge sought and the study object: by studying policy documents, what did the student think they would learn about? The concept of validity and research interest came into focus for the student, and the important relation between these two emerged as connections and consequences in the discussion that followed. The student realised that the method recommended by the supervisor did not match the intended research question – a mismatch not previously visible to either the student or the supervisor.

In this example, the researcher was able to make a point with the student, but prerequisites for understanding each other were not always present. When the researcher failed to align with student understanding, other students with a qualitatively different understanding interjected. These more experienced and knowledgeable students had the advantage of detecting what their peers found difficult to grasp, as they had recently struggled with the same or similar questions.

Complexity at play

The complexity of the assessment – writing a final independent thesis (at an undergraduate level) – was difficult for students to grasp. Communications in seminars revealed that some of the students could not discern the consequences of choices made in the scholarly process; for example, not being able to make connections and consider relationships. The data showed a span between some students acting out of a more instrumental, fragmented understanding, and others acting upon identified consequences, expressing a richer understanding and being able to link outcomes of studies to different causes or influencing factors.

When struggling with a fragmented understanding, students tended only to recall different actions taken or planned and not ask questions at all. When students possessed a more detailed knowledge of the research process, complexity was demonstrated in terms of different options and consequences, not only in making different choices but also in refusing options. In the first seminar, students from Norway gave an account of their decision to exclude data from their study. Their answers reflected an understanding of the whole process underlying the decision to exclude data they had already obtained. When the students presented their reasoning during the seminar, a senior researcher asked them several questions about why they had excluded the data. In the discussion, they proved able to make independent ethical judgements regarding research design, and acted autonomously in relation to supervisors and participating researchers; this set an example to other participating students.

Discussion and implications for the educational practice

This study has been driven by an urge to design more effectively for students' development of continuous and sustainable scholarly skills. This section presents the study's conclusions, followed by a discussion of how to implement these findings in teacher-training programs.

The purpose of this study was to construct a model (Table 2) for discerning scholarly thinking during seminars, and putting the tool into practice in a pedagogic context especially designed for this study. We consider our main result to be the affordances associated with a weaker framing of the educational practice and its diverse character (e.g. languages, competences, roles).

Affordance of a "weaker framing"

The educational practice had weak constitutive aspects (Bernstein 1990; G. Biesta 1999). Bernstein's concepts of weak and strong framing provide a analytic tool for discussing orientations of students' communicative actions in data where student actions can be traced to how they identify relevance in a given context (recognition rules) and how they act upon it (realisation rules) (Bernstein 2000). There were several different academic roles present, representing different responsibilities, and no underlying assessing agenda. Some students interacted in what seemed to be a more informal way with researchers. They helped each other to build arguments and were proactive in initiating and contributing to discussions, and there was room for laughter. This weaker framing seemed to encourage student initiatives and agency as part of an academic identity (c.f. Alvunger & Wahlström 2017). Aspects dismantling the strong academic framing in this study might be related to fact that the seminars did not include assessments, and also to the novelty of the activity, which meant that the participating students did not really know what to expect. Roles and expectations were instead established in interaction (recognition rules and realisation rules) (Bernstein 2000). This discursive practice offered alternative repertoires to students and furthered their experiences (c.f. Entwistle & Peterson 2004; Laurillard 2012; Marton 1997). The fact that the students were not likely to encounter this group constellation again could have encouraged a more reflective thinking not oriented towards keeping up appearances or focusing on the academic product, the thesis or paper, to be compared to reasoning on skills rather than ownership (Jenkins, Breen, & Lindsay, 2003). When carefully orchestrated, such an interaction might be more explorative. The framing of the educational practice and the invitation to students made it clear to them that they were not assessed, but had an opportunity to rethink and learn about their work (c.f. Arneback et al. 2016).

Aspects of diversity

Additional to the weaker framing, three aspects of diversity emerged as possible affordances of this educational practice: the multi-language environment, the presence of different academic competences, and a variation of experiences and understanding of scholarly processes among participating students.

We found indications that language differences did not generally obstruct students' understanding, but could contribute to student meaning-making in line with Burbule's (1993) claims that differences have a potential to synchronise understandings as relations and cooperations in dialogue. Misconceptions were detected and understandings brought forward, as clarifications were commonly asked for. A lack of consensus on central concepts can lead to misconceptions and taken-for-granted meaning when students communicate in their native language without dialogue. When students experience difficulties when not using their native language, these could be turned into a possible affordance in terms of the alibi it gives to investigate and negotiate understandings. The advantages of processing more precise and shared meaning risk being overlooked in a monolingual setting. To take time with and investigate a student's understanding can also be incorporated in research-related discussions in monolingual cultures, and tensions in scientific discussions can then become learning opportunities (c.f. Kobayashi et al. 2015).

Another aspect of diversity is the different competences present. The data represents situations where researchers did not manage to interact in a way that promoted student understanding, due to what seemed to be the student's very shallow understanding. When researchers failed to evoke an understanding, or establish a common ground with the student, more knowledgeable peers were observed to mediate between the less knowledgeable students and the researchers. A path beyond "the known" was created by a student who had recently been in the same situation. The researcher's knowledge sometimes proved to be an obstacle in gaining access to the student's understanding – what is sometimes referred to as "the curse of knowledge". Sellbjer (2011) mentions the risk of performing an "academic drill" in only letting students discuss the production of knowledge with PhD-trained teachers. Previous research also stresses the need for teachers and supervisors to have their own first-hand knowledge of research (Munthe & Rogne 2015). The risk of the academic drill was reduced in this scenario with a varied group that included novices and the more knowledgeable, who could all occupy a discursive space addressing the different competences (c.f. Sachs 2016). Student-driven seminars might offer more-coordinated perspectives.

The seminars illustrated a diversity of qualitatively different understandings (c.f. Marton 2015) of research processes. Some students showed a naïve, fragmented understanding that was visible in analysis mainly as recollections of their own actions. The extended number of participating researchers meant that many aspects of a complex educational practice were considered. Students interacted with researchers who demonstrated a model of higher-order thinking skills – the pursuit of knowledge as a complex process, not an ownership of knowledge represented by the right answers. A team of "supervisors" provided contrast not by supplying more of the same, but by illustrating different relational knowledge as consequences (Marton 2015). The seminars thus offered additional experiences for all participants. There were, however, few examples of students exploring alternative scenarios – more of declarations or statements. The researchers opened up for a discussion on alternative research designs that supervisors sometimes neglect (c.f. Kobayashi et al. 2015). Both students' and researchers' "safe grounds" were put to the test. In hindsight, the seminars would have benefitted from a slightly different design. We had asked the students to present their scope and design in three minutes. These prepared presentations can provoke more of

a defensive approach in discussions. We could have just let them present their main objective and then let the other students brainstorm on how such knowledge could be pursued, so as to encourage a journey beyond the known; in other words, letting them reflect on their decisions as consequences for research design more openly (c.f. Barth et al. 2007).

Implications for the educational practice

The suggested affordances of diversity and a formally weaker framing of an educational practice aimed at developing students' scholarly thinking evokes some didactical consequences. The construction of mono-cultural practices in terms of language and competence risks overlooking differences in conceptual understanding and too often taking joint perspectives for granted. The aim should be to design for an educational format that identifies and challenges students' preconceptions by introducing these variations. The resulting presence of qualitatively different scholarly understandings reduces the risk of incompatible competences (the curse of knowledge) and can promote students as mediators between senior researchers and peers. Engaging in discussions with active researchers who are not assessing the students can help the students to practice a more reflective thinking not oriented towards keeping up appearances or focusing on the academic product – the thesis. The often-established model of seminars, where students present and argue for their theoretical and methodological choices, risks putting students in a defensive position that will not promote reflection and further understanding. And finally, the use of technology gave students access to an international research practice not otherwise accessible to them, with researchers who were not assessing or supervising the students giving the practice some notion of authenticity.

There is a need for higher education to facilitate learning scenarios bearing similarities to informally and authentically framed learning. Such learning scenarios create a framing of cooperation and confidence that differs from the traditionally strong framing of higher education (c.f. Bernstein 1990). Bergöö (2009) suggests designing the scholarly conversation as a collection of cultural practices with oral and written activities. Initiatives such as this study could enrich undergraduate programs to become research-rich environments by offering teachers and researchers the chance to collaborate, rather than conducting their work as entirely separate entities. Initiatives like this could also offer students education as a "space": neither an institution of schooling nor an activity of teaching, but a space that allows students to enter as a constitutive element of an intersubjective practice in which understanding grows.

The results of this study offer teacher trainers an empirically constructed model for identifying signs of scholarly thinking in educational practices and recommendations for framing them. The model can be used to orient discussions and seminars towards a further elaborated and developed way for students to think, which is needed for orienting themselves in the world and in their future professional practice.

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