"You Learn How to Write from Doing the Writing, But You Also Learn the Subject and the Ways of Reasoning"

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Abstract

The research question addressed in this paper is: How do the activities of writing mediate knowledge of writing, disciplinary knowledge, and professional knowledge as intertwined sites of learning? To conceptualise the role that writing can take in these complex processes, we apply an analytical framework comprising two core concepts; mediation and learning trajectories. We draw on an empirical study from the context of initial teacher education in Norway. From our analysis, we identify three qualities of writing as important. First, the writing process should include responding to and sharing drafts. Other important qualities include high teacher expectations and continuous reflection. From the perspective adopted here, learning is understood to be distributed and situated. In particular, in situated cultural contexts, collaborative writing can become a significant mediational tool for learning. Initial teacher education seeks to prepare the student teacher for a highly complex professional competency, developing both professionally and in individual subjects. To do so, students must transform social structures and the tools embedded in practices into psychological tools. We contend that writing is one significant tool in moving through complex trajectories of learning towards becoming professional teachers.

Keywords

Mediation, learning trajectories, writing across the curriculum, teacher education, collaboration, professional competency

Introduction

The title of this article is a quote from one of the student informants enrolled in the empirical study described here. The study aimed to explore in depth how the dynamics of

writing activities create mediational tools for developing knowledge of writing, disciplinary knowledge, and professional competence as intertwined sites of learning. To conceptualise these complex processes, we apply an analytical framework comprising two core concepts. The first of these concepts is *mediation* (Wertsch, 1998, 2007). We are interested in how tools for thinking and acting are made available to students through writing in initial teacher education (ITE), with particular regard to what Vygotsky characterised as *psychological tools*: signs, symbols, and words. In this paper, we conceptualise writing as a nexus for exploring such tools (Wittek, 2013). In using the term *writing*, we have in mind the whole process, beyond the production of the text and including such actions as drafting, rewriting, receiving and giving feedback, transforming thinking into written sentences and vice versa. The second core concept is *learning trajectories* (Dreier, 1999, 2008), emphasising the timeline within which competence building and learning occurs, as well as the diversity and multidimensionality of learning processes (Lahn, 2011, p. 53). The actions of exploring, comparing, and contrasting different social experiences provide the dynamic of learning trajectories.

The study addresses the following research question: *how do the activities of writing mediate knowledge of writing, disciplinary knowledge, and professional knowledge as intertwined sites of learning?* To approach this question, we divided our research into three phases: identifying students' perceptions of writing and their experiences of writing as a tool for learning in ITE; identifying and investigating in depth the specific writing activities that students perceived as exemplary instructional practices; and analysing the findings from phases one and two in light of the core concepts above.

The following text is organised as follows. We start by anchoring the study in other relevant research; then, we elaborate on our analytical framework. The next section describes key aspects of the empirical case study and the methodology. In the final sections, we present and discuss the findings of the study and our conclusions.

Background

Our contemporary understanding of all higher education, in which ITE in Norway is situated, is that it is a place for written knowledge production (Kruse, 2006). Writing is generally regarded as an educational tool that enhances learning (Burgess & Ivanič, 2010; Carter, 2007; Dysthe, 2002; Flower & Hayes, 1981; Langer & Applebee, 1987; Wittek, 2013; Wittek, Askeland, & Aamotsbakken, 2015). In recent years, research on the processes of writing has shifted from strictly cognitive accounts of learning to write or revise content to fit genre conventions (e.g., Bereiter & Scardamalia, 1987; Flower & Hayes, 1981) to the importance of acquiring knowledge of the genres and conventions of writing within a structured social setting (e.g., Bazerman, 2009; Myhill, 2009; Prior, 2009; Russell, 2010). On this latter approach, writing is understood as a social practice and activity (e.g., Graue, 2006; Wittek et al., 2015). For example, Nystrand (1986) has argued that writing is a social activity that develops from the relationship between writers and readers as well as the writer's developing understanding of the conventions of text genres.

Substantial evidence supports the idea that dialogical pedagogy can be productive for students' learning (e.g., Alexander, 2008; Karsten, 2014; Thompson & Wittek, in press; Wells, 1999). Several studies (e.g., Karsten, 2014; Prior & Shipka, 2003) have explored the relationship between writing and dialogic activity, concluding that exactly this combination has clear potential to enhance learning. Researchers have also offered some

evidence of the importance of the expressive mode of writing (Britton, Burgess, Martin, McLeod, & Rosen, 1975) as a mediational tool for development (e.g., Brand, 1987; Dysthe, 2002; Lerner, 2007; Smagorinsky, 1997). Activities such as producing assignment drafts, giving and receiving feedback, and rewriting existing drafts have significant potential for social learning (Linell, 2009) that transcends those activities themselves (Burgess & Ivanič, 2010). However, little research has investigated how writing mediates knowledge about writing, disciplinary knowledge, and professional competence as intertwined sites of learning along a timeline.

As indicated above, research in the field of writing as a tool for learning has gradually shifted from strictly cognitive accounts of learning to a focus on social influences on cognitive activity (Smagorinsky, 1994). According to Lea and Street (1998), current educational research on student writing can be characterised in terms of three main strands. The first of these is the *study skills* approach, which assumes that literacy is a set of atomised skills "which students have to learn and which are treated as a kind of pathology" (Lea & Street, 1998, p. 159). The second strand is the *academic socialisation* approach, which assumes that students learn what and how to write because university instructors induct students into the academic culture of the discipline or profession. The third model, *academic literacies*, originated in the so-called "new literacy studies" (Barton, 2007; Barton & Hamilton, 1998; Barton, Hamilton, & Ivanič, 2000; Hamilton & Pitt, 2009; Lea & Street, 2006). The present study is positioned within that last model, which will be described below.

Within the new literacy approach, several scholars have foregrounded the close relationship between writing and learning (e.g., Barton, 2007; Barton & Hamilton, 1998). Others have asserted that student writing and learning are issues of identity rather than skills or socialisation (Ivanič, 2004; Thompson, 2015). New literacy research has demonstrated the power of writing in improving literacy as well as its impact on identity formation. Macken-Horarik, Devereux, and Trimingham-Jack (2006) investigated the literacies of pre-service teachers and the implications for mapping and developing students' literacy competencies. They concluded that students integrate sometimes-competing meaning potentials through the production of a text in a particular genre. In another article, Burgess and Ivanič (2010) proposed a framework for investigating the discoursal construction of writer identity. They rejected asocial conceptualisations of literacy as a set of autonomous, decontextualised skills located in the individual, instead conceiving of literacy as *social practices* (Brandt, 1990; Ivanič, 2004). Ask (2007) investigated how student teachers perceived their own knowledge of academic writing in the final phase of teacher training. She concluded that responses from teachers and peers were of most importance. Rienecker (2007) echoed these conclusions, finding that the activities of writing and active involvement in response activities were the most important aspects of developing both academic writing and content knowledge. This finding corresponds well with our study, so we will address it again later. Rienecker also found that learning of academic writing and subject content are reciprocal, mutually supporting processes.

Within the new literacy approach, research has focused in particular on writing in literacy education, exploring cognitive processes related to writing as social practices in interesting ways. This article considers writing as a tool for learning and thinking beyond literacy education. Addressing the development of writing skills, disciplinary knowledge, and professional competence as intertwined processes in ITE, we explore how these are linked in students' trajectories of learning. The aim is to add depth and nuance to the existing body

of research by investigating how writing can help student teachers to explore, develop, and organise their thoughts as an ongoing process of relating, comparing, and contrasting social experiences.

Analytical framework

Our analytical framework assumes that the world comes to us in *mediated* form (Vygotsky, 1978; Wertsch, 1998)—that is, people do not act in a direct, unmediated way in the social and physical world but through tools or mediators of various kinds. As Säljö (1999) explained, "There is no such thing as pure cognition that can be assessed per se". A range of historically and culturally developed tools specific to the profession of teaching are mediated to the students through activities of writing. We are social beings, thoroughly dependent on each other, and there will always be a link between individual cognition and social activity within a given context. Writing is in itself a way of using language as a mediational tool and is therefore important for cognition (Vygotsky, 1978). In the activities of writing, a wide range of tools such as theories, concepts, and cultural and professional norms and guidelines come into play. Writing is action at an individual level, bringing together different social and cultural signs, symbols, and words into new senses of "meaning" (Wittek, 2013). Psychological tools are devices for influencing the mind and behaviour of oneself or of others (Daniels, 2015). Tools mediate and *reshape* both the activity and the learning and thinking at a personal level (Vygotsky, 1978; Wittek & Habib, 2014). The process of writing is thus interaction, not only with culturally developed tools (such as instructions on how to write an assignment) but also with others on the periphery, or *third parties* (Linell, 2009), such as the author of a syllabus book or an internship mentor referred to in conversation.

In his analysis of Vygotsky's writings, Wertsch (2007) distinguished between two main categories of mediation. While *explicit* mediation involves "the intentional introduction of signs into an ongoing flow of activity" (Wertsch, 2007, p. 185), *implicit* mediation typically contains signs "in the form of natural language that have evolved in the service of communication, and are then harnessed in other forms of activity" (Wertsch, 2007, p. 185). In the context of ITE, an example of explicit mediation is where student teachers are introduced to concrete theories, didactical models, or instructions for a written assignment. Implicit mediation can include specific ways of reasoning, procedures for finding the right answer, or accepted ways of arguing in an assignment written for a specific discipline (Wertsch, 2007). Typically, these processes are not made explicit but must be unpacked by the students themselves. Implicit mediation becomes possible when students participate in developing and exploring the meaning potentials of the tools they use (e.g., concepts, theories, didactical models, or electronic devices for teaching and learning), often without fully understanding those tools.

The second component of our analytical framework is the concept of *trajectories of learning* (Dreier, 1999). To speak of trajectories rather than developmental processes is to take into account the diversity and multidimensionality of learning, as well as the embeddedness of trajectories in systems that vary along temporal and spatial dimensions. Experiences are interpreted and transformed into psychological tools in creative ways within timelines, and trajectories of learning develop continuously as participants engage in social practices (Wittek et al., 2015). This concept of trajectory focuses on the exploration of different experiences in relation to one another. Learning trajectories imply continuous motion, and the actions of exploring, comparing, and contrasting different ex-

periences in their relation to one another—as students must do when writing assignments—are important in enhancing this motion (Dreier, 1999, 2008).

Empirical context and methodology

The four-year ITE programme under investigation is based at a medium-sized university college in Norway and accredits students to teach in lower secondary school. Years 1–3 include pedagogy (teaching on campus plus internship; 60 credits); Norwegian or mathematics (60 credits); and two other selected subjects (30 credits each). Students in their fourth year can choose either to specialise in an additional subject (60 credits) or to turn that final year into the first year of a master's programme. The core tool for learning and assessment is continuous work throughout the entire programme, including an individual portfolio of written texts in different subjects. The guidelines for the ITE programme emphasise that all written works produced by the students during the programme must be assigned to the individual portfolio established at the outset. According to the guidelines:

> A working portfolio is a digital portfolio that includes all the works of a student during ITE. The portfolio serves as documentation of the student's progression within the subjects taken at the university campus and in internship. (…) The working portfolio needs to be submitted within the actual deadlines, and compulsory supervision on the assignments has to be completed for a student to be allowed to sit an exam. (Guidelines, 2012, p. 6)

The case study formed part of a large Nordic research project entitled *The Struggle for the Text*, financed by the Swedish Research Council. Our case study employed a longitudinal, ethnographically inspired research design (Alvesson & Sköldberg, 2000) drawing on several data sources, including selected student assignments and interviews with both students and teachers about their experiences of writing in ITE. In the present paper, we concentrate on the interview findings, with a brief description of our methodology to place the interviews in context.

Each of the 18 students in the sample was interviewed on two occasions. Each participant agreed (a) to attend focus group interviews in autumn 2012 and spring 2013 (2–5 students per group) and (b) to send copies of written assignments from Years 3 and 4 of their studies. Altogether, we conducted 12 interviews with students from different subject areas during the two-year period of the study.

In the final semester (spring 2014), we conducted follow-up interviews with three students. We chose these students because their perspectives on writing as a tool for learning reflected the dominant views of participants. Additionally, we knew from previous interviews that these students were able and willing to share interesting descriptions and reflections on their experiences. Concentrating on only three students in this phase allowed us to get more information about their personal learning trajectories than we could obtain through focus group interviews. All interviews were semi-structured around themes that included self-reflection on writing in different subjects during ITE. We used interview guides in the manner of a typical focus group interview, where the research defines the topics (Morgan, 1996). We aimed to ensure that we covered the main themes in all interviews even though individual questions were slightly adjusted based on how the communication in the different groups developed. We used everyday language to make students feel comfortable and free to talk about their writing and learning experiences. We

also sought to elicit ideas about future practices and learning trajectories in becoming professional teachers. The questions were essentially the same as in the first and the second interviews, focusing on the themes *past and current experiences with writing*, *possible connections between writing and learning*, and *forward perspective* (see Appendix 1 for the complete interview guide).

Table 1: Overview of interviews with students

Group	No. of students	Interview schedule
Group 1	5	September 2012 May 2013
Group 2	3	September 2012 May 2013
Group 3	5	September 2012 May 2013
Group 4	5	September 2012 May 2013
Group 5	3	May 2014

At the same time intervals, we also interviewed course teachers, beginning with four individual interviews with those responsible for courses running in 2012 (pedagogy, social science, natural science, and religion). After obtaining initial information from these four teachers, we used student recommendations to identify two other teachers for interviews. They were teachers of first-year subjects: pedagogy (Otto) and mathematics (Hege) because students regularly mentioned them as being especially influential in encouraging learning. The students' regard motivated us to record their personal reflections about their teaching approach, in which writing was central. We first interviewed them individually (in spring 2013) and then together in spring 2014, as both claimed to have learned from the other's teaching approach. In all the interviews with teachers, we concentrated on the following themes: *own relationship with writing*, *conception of discipline-oriented writing*, *appropriate ways of using writing in ITE*, and *possible connections between writing and learning* (see Appendix 2 for the complete interview guide).

Table 2: Overview of interviews with teachers

Lecturer's name	Course	Interview schedule
Tor	Social science	September 2012
Hanne	Pedagogy	September 2012
Fred	Natural science	September 2012
Tom	Religion	September 2012
Otto	Pedagogy	May 2013 May 2014
Hege	Mathematics	May 2013

	May 2014

All interviews were audio-recorded and lasted between 60 and 120 minutes. They were transcribed verbatim and analysed by all three researchers, first individually and then in collaboration. Quoted excerpts were jointly translated by the authors. In the first part of the analysis, we focused on

1. categorising what the students described as their most important experiences of writing as a tool for learning; and
2. identifying concrete examples of exemplary writing practices highlighted by students.

The study design, interviews, and interpretation and analysis of the data sought to exploit the benefits of an "insider/outsider" perspective (Jacobs, 2005; Solbrekke & Sugrue, 2014). We applied an abductive mode of analysis, inspired by what Alvesson and Sköldberg (2000) described as "reflexive interpretation" (p. 247), which is characterised by iterative and critical reading of data interpretations. In so doing, we benefited from the "insider" researcher's context knowledge and familiarity with the ITE institution and practices while also adopting a critical stance based on the distanced views of the two "outsider" researchers.

We are mindful that the research design has clear limitations because of its narrow scope. However, this in-depth focus yielded deep insights into what mattered in students' learning trajectories (and why it mattered). The findings must be seen in the context of a cumulative contribution to the existing body of research (Neuman & Guggenheim, 2011), enabling subsequent research to systematically address the conditions in which writing can work as a mediational tool for learning within certain circumstances, and the conditions in which learning is diminished or strengthened.

Results

To begin, we elaborate on the two exemplary writing practices identified by students in phase A. When asked to provide concrete examples of writing practices that mattered most in their processes of learning, students repeatedly mentioned the courses taught by Hege and Otto. Having identified a focus and potentially rich material, it was natural to dig deeper into the characteristics of how exactly these two teachers encouraged learning through writing. It is interesting to note that some of the basic assumptions shared by Otto and Hege correspond well with the body of research on writing for learning outlined earlier. For example, both emphasised the importance of feedback from both teachers and peers in becoming a skilled writer. Further on, they highlighted the use of writing as a tool for reflection and learning, as has been well-documented in recent research (e.g. Ask, 2007; Rienecker, 2007). While both engaged heavily in teaching and supervising and facilitated peer response, they differed in their teaching strategies, feedback patterns, and personal styles.

According to a majority of the students, the following are crucial aspects of writing as a tool for learning:

1. response activities and a culture of sharing;
2. high expectations; and
3. continuous reflection.

In the following sections, we describe the practices of Otto and Hege under each of these themes and go on to explicate why these practices made a difference, based on students' accounts and the teachers' own rationales.

Response activities and a culture of sharing

Our student informants made it clear that the most important enhancers of learning processes were *response activities* and *collaboration forms that encouraged a culture of sharing*. While the two responsible teachers organised response activities and plenary discussions in quite different ways, they shared some basic principles for running their courses. For example, it was compulsory in both courses to participate in a core group of five to eight students. Within these groups, students were expected to collaborate intensively, for instance by responding to each other's assignment drafts.

The following extracts are representative of student interviews. It should be noted that they referred to themselves retrospectively, as they were describing experiences from the two years previously.

Student 5: It is our strength that we have developed a culture of sharing. Not many students have this.
Interviewer: How did you get this?
Student 1: Otto.
Several students (simultaneously): Yes, I agree. That's right, mmm…
Interviewer: What did Otto do?
Student 1: Electronic portfolios.
Student 2: He forced us to submit our assignments on an electronic webpage, so that we could read one another's assignments…
Student 5: …yes, and we were supposed to refer in our texts to at least two other assignments written by peers. And maybe show that we have come to the same conclusions; then you just *have to* read the assignments of your peers.
Student 1: This was highlighted from the first day—that we shall be part of a culture of sharing, and that we ourselves learn more from being part of a culture of sharing. We learn from each other.
All students nod their heads and say: Mm, yea, that's right.
Interviewer: But do you feel comfortable about *being forced* to do this?
All students simultaneously: Yes!
Interviewer: So this is good? Why?
Student 2: We learn more …
Student 3: … We respond to one another …
Student 2: … and you become more conscious of your own knowledge then …
Student 1: …you learn a lot from reading the texts that your peers have written …
Student 2: ... and you see that, if you only read your own assignments, you turn a blind eye to your own text after a while. (Group 1)

In the sequence above, the students appeared very engaged and often talked simultaneously, as if they felt it was important that we understood the exact significance of what they were trying to explain. They expressed that the culture of sharing they experienced played a significant role in making movement in their learning trajectories. The portfolio structure was an important mediational tool in this regard. It needs to be noted that Otto had a leading role in designing the portfolio structure. From our analysis, we identified that the

students adopted the portfolio as a tool for learning during the course taught by Otto, as elaborated in more detail below. In the interviews, the students clearly underlined that they had no choice during that particular course. Otto "forced" them to work hard, and the portfolio structure formed the basis for this work. However, an interesting observation is that the students continued to work on their texts in this manner later in the programme, even though the teachers did not pay much attention to the portfolio structure. The next extract is from a single voice within a group interview. The other participants nodded their heads as Student 2 said:

> The pedagogy teacher forced us to work very hard. We had to share and respond to very early drafts of our assignments in an electronic portfolio. This portfolio was open to anyone, and we submitted our assignment drafts from our earliest days as student teachers. This was scary at the beginning. (Group 2)

While Hege (mathematics) typically read and responded carefully to students' texts, Otto (pedagogy) left response activities up to the student groups. Student comments on the differences in the two practices emphasised the learning potential of both practices:

> In pedagogy, it was the students who began to respond to one another, but in mathematics, the teacher started. In mathematics, Hege set an example by going first. We listened to her and got an idea about how it should be done. (Group 1)

Otto explained that he engaged closely in the processes of writing during the first weeks but that, after a while, "*the students developed their own drivers*". He went on to explain that a culture of sharing developed and took on a life of its own without constant involvement on the part of the teacher. However, in cases where students did not engage in response groups or left the job to other students, Otto took action. He required these students to submit extensive individual assignments in addition to those already given. According to Otto, this kind of "punishment" worked, as these students subsequently did what was expected of them, and rumours about "*what happens if you don't*" spread quickly. Otto was convinced that future teachers must develop skills in collaboration with others in different roles, which is why he invested so much effort in creating a culture of sharing:

> It is completely conscious on my part ... to set expectations; here we work together, and this is important. It is my commitment [to set expectations], but I get some expectations back too of course ... But it is precisely how we have to work—together, continuously.

Otto designed student assignments for four different purposes. First, some assignments specifically required the student to read the syllabus. For example, in one such assignment, students were asked to present different approaches to the concept of identity, based on a certain source in the syllabus. A second type focused on linking theory and practical internship experiences, as in the assignment on "assessment for learning", based on data collected during internship and on relevant literature from the syllabus. A third type of assignment was the internship report without any requirement for theoretical discussion.

Finally, the main purpose of the fourth assignment type was reflection. An assignment might also take the form of a post on Facebook, and some students noted that Facebook is a useful resource for learning in general. They reported that they often posted a question and received quick responses from peers and teachers; "*There is always someone there to respond*" was typical of student statements. Otto explained that the processes of writing must be organised as part of a larger whole; specifically, he stated, "*Writing, sharing, dialogue, discussions, and response must all be part of the process, and the teacher must participate as a facilitator of learning activities*".

Hege gave her students two types of assignments: didactical discussions and problem-solving tasks. In addition, she often introduced small writing activities during her lectures. For example, she might ask her students to write about a specific theme for three minutes at the beginning or end of the class, and she always required students to write a short log of the day's teaching at the end of each lecture. Hege also set high standards for participation and sharing, and students indicated that she always participated as well. Her rationale for this was closely linked to the course's disciplinary aims, as Hege's intention was to help students to understand mathematics. She expressed a belief that she had to adopt this approach in her lectures so that students would gain experience in using these methods themselves, and she designed all her mathematics assignments with this in mind:

> I have always asked what I can do through my teaching to help the students to understand mathematics and how to reason to solve problems. It's more fun to do mathematics when you understand how to reason; they will then know more of mathematics. Quite often, I meet students who express attitudes like "I cannot understand math and will never learn mathematics" or "Mathematics … it's dreadfully boring". So I have really fought throughout my entire career to find the proper methods.

Otto also affirmed that he made a concerted effort to engage students in study and encouraged them to share and collaborate. The students expressed themselves in ways strikingly similar to Otto when talking about writing as a tool for learning and how they planned to use writing as part of their future work as teachers. For some pedagogy assignments, students had to refer to at least three assignments written by their peers. For example, one student explained that "Otto made us read the texts that other students had written, and he made us refer to texts written by peers" (Group 4). Overall, the students made it clear that learning outcomes were good because of student involvement and sharing, as illustrated by the following excerpt:

> A typical feature of pedagogy assignments was the culture of sharing. We had to read each other's assignments, and I felt then that I wrote for a larger audience. It was not like that in Norwegian, and not always [like that] in religion, either. In Norwegian, the focus was on grammar and correct spelling. (Group 2)

Otto did not involve himself directly in the activities of writing, leaving the job to groups of students from the outset. The students acknowledged that they missed Otto's feedback. One stated, "In pedagogy, the only response we had from the teacher was that the reference list looks okay" (Group 1), while another mused, "I can hardly remember any response from the teacher" (Group 2). In contrast, Hege saw her role as far more than just

facilitating a sharing culture. She asserted her belief that it was important that, as an expert, she should engage in response activities. According to the students, she did so in an exemplary way by starting the rounds of feedback in plenary:

> The responses from the teacher in mathematics were just fantastic! They are in a class of their own—both the responses we had as individuals and in the classes. That teacher was amazing. I did not look forward to mathematics, but with this teacher, nothing was difficult. She gave very specific instructions, and it was clear to us what she expected. And her comments were so specific and good—they were of great help in pushing you forward. I believe that all the students in this class agree with me on this; she was fantastic! (Group 4)

As demonstrated above, the distinct writing practices initiated by Otto and Hege certainly had great potential for mediation. Students were forced into committed relationships, to which they had to contribute both by producing draft texts and by responding to drafts written by their peers. In both "cultures of sharing" described above, the teachers led the students into active participation. The writing activities required all students to participate and to listen to one another, comparing and contrasting different interpretations, positioning themselves, and adopting a stance.

Clearly, however, Hege and Otto facilitated collaborative work among their students in different ways. Hege was present in most of the activities, sometimes by being part of a discussion and sometimes by providing written feedback to the individual student. Her expert comments and questions were important elements of this writing practice, which led to a high degree of explicit mediation in these activities. On the other hand, Otto mostly left response activities to the student groups themselves, making them responsible for finding the right answers in the syllabus and for providing adequate feedback. In this context, mediation was more implicit, as students had to unpack accepted ways of acting and thinking by trying out different possibilities, without the presence of an expert voice.

Both of these writing practices showed real potential to enhance students' trajectories of learning. Relations between students were activated through the high demands for collaboration, and the teaching design strongly emphasised varying interpretations and collective exploration of the tools involved in the process of writing. However, it was up to the students as individuals to use and make sense of the collaboration and to transform these mediational tools into psychological tools. At certain points in time, they had to submit their own assignments in finalised form; this activity can be understood as an action—regulating their own writing and taking a stance—with great potential to create movement in learning trajectories (Dreier, 1999), as students explored and discussed the concepts and theories they wrote about in assignment drafts, as well as the professional implications of the academic ideas they were exploring.

High expectations

The participating students also emphasised the motivating effect of teachers' high expectations of students, and that it was important for teachers to remind students of the requirements for final assignments and exams. In this regard, they identified Otto as exemplary:

> Student 4: Otto placed very high expectations on us, and that was good …

Interviewer: Did you work better because of the high demands from the teacher?
Several students: Yes!
Student 2: It was hard then, […], but those of us who made it are still the strongest ones.
Several students: Yes …
Student 1: …Yes, it was worth it. (Group 3)

Otto is usually responsible for the first-year students, which is also the case in our empirical case. During one interview, he clearly stated that students had received too little training in academic writing from upper secondary:

They just have not learned how to write academic texts. So, the first thing I have to do when they come to my class is to provide an extensive introduction to basic academic writing. For example, what does it mean that the sources we refer to are research-based? They just don't know that. But they should have learned it!

According to Otto, a good assignment is characterised first by its application of relevant research, second by operationalising those theories in a way that is relevant for practical work with students in the classroom, and third by referring to discussions of relevant research. Otto also valued students taking a stance of their own, as long as they could show how it was supported by research.

Students reported that Otto organised learning activities in ways that made them work hard throughout the year. Most of the students added that Otto's tough demands made them feel anxious during their first semester. He would announce that not everyone is suited to teaching, and that a part of his job was to see how everyone performed against the criteria for certification as a professional teacher. In both interviews, Otto repeatedly stressed the importance of hard work and putting pressure on students from day one. The following is typical of student responses to Otto's high demands:

Student 1: The high expectations have been a driving force for me during the whole programme – it has been expected that you sit there at the library, working.
Interviewer: Who is expecting that?
Students 1 and 2: The teachers.
Interviewer: The teachers? All of them?
Student 2: It was the first term in pedagogy—Otto. It was like being whipped on the back.
Interviewer: How was that?
Student 2: It was scary to begin with. Unusual … I was used to reading, but it was new to me to have those high expectations—Otto expected us to enact at a top level, always. And he was not satisfied until he saw that we had done our best. It helped me greatly in terms of motivation. And it is still inside me. It is so internalised now that it has become part of me. (Group 5)

Another student stated:

Otto followed us carefully to make sure that we did a good job. That made me a bit anxious. I think a lot of the other students felt the same way. Our class was reduced […] during the first months, and that might be because of the high demands. But it was good.… I needed it … to understand that I had to read. Results do not come out of nothing; you have to work. (Group 1)

It is interesting to note that students confirmed in the last interviews also that they continued to work as they learned from Otto for the rest of the ITE programme, regardless of whether other teachers designed for it. Otto emphasised the importance of process-oriented writing, and the distribution of outlines as part of the writing process, to enhance learning from writing:

> I think portfolio writing is a proper tool for making processes of learning visible … I mean to organise processes of learning in ways that make them share their drafts, like you can do in an electronic portfolio, and make students respond to each other's portfolio assignments.

The concrete instructions and structures offered by the portfolio as a tool for learning is an example of explicit mediation. However, a range of aspects are involved in processes of writing, and not all of these aspects can be explicitly mediated to the students. There will, for example, be particular ways of building up an argument that are highly context sensitive, and other genre norms must be carefully adjusted to the theme or problem at stake. These refer to skills and understandings that take time to develop, and that have to be learned through processes of active explorations (Thompson & Wittek, 2016).

Hege explained that her equally high expectations were strongly linked to what she knew students would have to cope with as trained teachers of mathematics. Hege taught the students exploratory mathematics and noted that, to teach this subject, individuals must understand what they are doing when calculating. She also explained that students found the process of completing their reflection logs difficult:

> It is extremely hard for the teacher to teach exploratory mathematics in the classroom. Many internship mentors work very traditionally with mathematics, demonstrating the curriculum on the blackboard. They show the pupils how to do it, and afterwards, the pupils attempt the exercise in their books, rather than asking questions and exploring together. I teach students to explore first and then to find some rules in collaboration with pupils. That is very demanding for the teacher, and to be able to do it in the classroom, I have to take them through that way of teaching during ITE. They have to work hard to understand what they are doing when performing calculations, and so my students have to write a meta-text at the end of every lecture. They think this is hard, but I know that this is exactly what they have to do—it makes something happen to their understanding.

What strikes us as particularly interesting here is that, when Otto and Hege placed pressure on their students, their reasons for doing so were a complex combination of factors. First, they wanted students to read the disciplinary syllabus carefully and to work on their understanding of it. Second, they wanted their students to work continuously on the links between processes of unpacking theories and ideas from syllabus books and the practical implications for teaching. Third, they held that teachers must apply pedagogical approaches that they consider relevant for use by their students as future teachers. Finally, they aimed to help students to learn how to unpack guidelines and genre norms in order to successfully complete assessed work. At that point in time, students were in their first year of ITE, and it might be difficult for them to unpack such complexity.

As we drew our data from Years 3 and 4, participants were describing their previous experiences of writing retrospectively and in a reflective mode, commenting on differences

between courses and comparing them. To some extent, they even unpacked the differing intentions of individual teachers, although these were rarely explicitly commented upon. Both Otto and Hege envisaged complex classroom situations when designing their teaching. However, the ability of first-year students to grasp the complexity of professional competencies is very limited. Hege's approach, modelling to make explicit how her students can work with exploratory mathematics in the classroom, appeared to be particularly useful to the students. Hege's way of giving instructions can be labelled as explicit based on the rather concrete instructions and supervising she offered her students. She was highly involved, responding to her students' practices in both written and verbal form. But even though both Otto and Hege offered explicitly defined tools for their students to apply when they worked on the themes at stake, there are always aspects of interpretation involved. Thus, implicit and explicit mediation are intertwined in both of the instructional writing practices unpacked in this paper. The following statement is typical of student observations in this regard:

> When you start working on something you have never done before, you become insecure about yourself. But the responses from Hege were so concrete and good that she helped you to take a big step forward with just a very small comment or sentence. (Group 4)

During the early stages of ITE, the most significant demands on students were what they have to cope with *as students*—in particular, what demands that had to meet to pass the various courses and exams. To be successful, they had to deliver a paper that fulfilled the requirements of the portfolio assignments. In the interviews, we asked the respondents, "Do you write as a student or as a professional teacher?" All of the 18 informants promptly responded "as students". In contrast, Otto and Hege highlighted the importance of professionalism and of helping students to transform their knowledge into how to act in the future as teachers in classrooms. In other words, they assumed that their students wrote and talked as future professional teachers, and these tensions may be challenging for students. The complexity of the teachers' intentions was primarily implicitly mediated, and students were themselves expected to unpack the different layers of meaning. However, our analysis suggests that students gradually unpacked these expectations and learned a lot from explorative activities of this kind as long as there was support from peers and teachers. Students had to work hard to understand the subject matter thematised by the assignments, for example, by reading the syllabus carefully.

However, our analysis of the interviews also identified elements of explicit mediation in both teachers' writing practices. In his plenary lectures, Otto highlighted how an academic text should be written. Hege approached it differently—specifically, she provided detailed written comments on draft assignments, which the students said they found extremely useful.

Continuous reflection

The students emphasised the learning outcomes gained from writing assignments that involved reflection on their role and practice as future teachers. According to the students, reflection on the relevance of syllabus theory for practical work in the classroom should always form part of an assignment, as this kind of written reflection is important for learning and in particular for their personal and professional development. As one student

stated, *"By writing the assignments in pedagogy, I developed as a person"* (Group 4). An-
other student said, *"Assignments in pedagogy are more about me generally as a teacher,
the profession of teaching in all its complexity. Assignments in the disciplines are more
about the academic stuff ... and, to a certain degree, issues in didactics"* (Group 1).

Otto considered it problematic that the other disciplines focused so little on how to work
as a professional teacher—a view that was also expressed by the students. However, the
students said that Hege was an exception to this. As a mathematics teacher, Hege encour-
aged her students to look for connections all the time, not only between theory and
practice but also between the mathematics syllabus and the pedagogy syllabus. She stated,
*"They have to understand what they are doing themselves, and it is often useful for the
students to use elements from pedagogy in their assignments."* Hege continued:

> The didactical assignments are mostly about reflection and acts of making connections between
> theory and practice. This is an important activity in helping students towards becoming profes-
> sional teachers in mathematics. They get to know disciplinary concepts in depth, and they have
> to read the relevant literature. When it comes to the arithmetic assignments, it makes them bet-
> ter as professionals … because they have to solve problems. They also have to practise
> presenting problems and their solutions to the other students, and sometimes they create the
> tasks themselves. The purpose of all of this is to make students more confident. At the same
> time, they develop ideas and ways of working that they can later use in class as teachers.

One of Hege's most significant activities with her students was facilitating reflections
connecting theory and practice. Students began by reading theory in-depth before trying
out their theoretical perceptions during internship. Then, they wrote about the theory, their
practical experiences, and their reflections on it. Students emphasised that these activities
enhanced their learning and inspired their educational practice. We selected the excerpt
below from one interview, but it should be noted that all of Hege's students made similar
statements.

> Interviewer: So, I understand that you work quite differently from discipline to discipline. What
> do you get out of the different ways [of working]?
> Student 1: In math, I experienced a larger learning outcome…. It is difficult to explain….
> Student 2: We learned about how to talk with the pupils. About how to teach, how you can ask
> questions to enhance learning.
> Student 3: You do get specific stuff … didactics.
> Student 2: If you ask the pupil, "What do you think now?" then you can make them explain
> things instead of just….
> Student 1: … The biggest difference is that the teacher in math talked to us like we should talk
> to the pupils—when we have them. So we learn more directly from her. In pedagogy and in
> science, they do not talk to us as we should talk to our pupils. While they talk to us [and not
> with us], Hege uses didactics with us that we can use in the same way with our pupils. (Group
> 3)

In these respects, both Otto and Hege facilitated mediation. They explicitly addressed the
links between theory and practice in their lectures and in how they designed student as-
signments. As illustrated above, they did this in different ways, but the student informants
clearly stated that they learned a lot from both practices. According to Vygotsky, writing

is the most prominent way of using language in general and scientific concepts in particular (Vygotsky, 1986, p. 149). One of our student informants explained:

> You learn how to write from doing the writing, but you also learn the subject and the ways of reasoning that belong to the discipline. Writing actually makes you good at doing the job, structuring yourself, putting pressure on yourself in respect of things that you're not very good at. (Group 4)

The statement above illustrates one core finding from our study, namely that writing can work as a nexus that links different experiences and different mediational tools in students' trajectories of learning. Students learning from and about writing entails different combinations of actions that include planning, participating in workshops, writing and rewriting, and giving and receiving feedback. Students also encounter different perspectives in dialogue with internship mentors and pupils. The students viewed encounters with different traditions as an advantage rather than as a problem. As one of the students explained, "There are different disciplinary traditions you have to get to know as a teacher. It might sound a little strange for outsiders, but our profession requires that we are able to write in different disciplines" (Group 4).

In writing their assignments, the students had to interpret the signs, concepts, theories, and values introduced by the syllabus and by lecturers, through interaction with other people and tools in programme-related contexts (Linell, 1998). Otto described his reasons for engaging his students in writing as he designed it:

> I find it important to lead my students through processes of writing where they discover for themselves that writing is a way of structuring knowledge. Writing is the most important activity for structuring your own insights and your own thinking. Therefore, I think it is important to start writing from the very beginning. In my class, they receive their first assignment in their first week on campus, and I introduce them early to the distinction between description and analysis. I use this as the basis for a lecture at this early point, in which I underline the importance of applying theory to academic texts as an optical lens. I believe that writing is the most important of all student activities in higher education. Writing involves cognitive processes that enhance learning in fantastic ways.

What, then, can we learn from these students' experiences with writing, and the perceived significance of the two writing practices organised by Otto and Hege? What do these analyses tell us about student teachers' learning? What matters in using writing as a mediational tool, and what is the potential of the instructional writing practices described above to enhance students' learning trajectories and prepare them for future professional work? Some possible answers to these questions are considered below.

Discussion and conclusion

ITE seeks to prepare the student teacher for a highly complex professional competency, developing both professionally and in individual subjects. To do so, students must transform social structures and the tools embedded in programme-related practices into psychological tools (Wittek, 2014). On submitting the larger bachelor thesis in term 6,

most students involved in this study received good results, indicating perhaps that the portfolio practice effectively mediates learning about writing as well as disciplinary and professional learning. The fact that individual lecturers in different disciplines act as stakeholders for different practices of writing seems to encourage students to develop their own perceptions and to make sense of the opposing positions. The students met Otto and Hege at a very early stage in their education and described both of them as highly engaged teachers who take a personal interest in their students. As students are likely to be more impressionable in the first phase of teacher training, the sequencing of disciplines may be part of the explanation. According to Rienecker (2007), the response to a student's first assignment is the most important because it is the one the student remembers. Initial responses have a crucial impact on students' perceptions of their own capacity to become skilled writers. However, as students also take other subjects in the early phases, our analysis suggests a need for further explanation.

Implicit and explicit mediation are intertwined in learning trajectories

Writing in ITE typically includes learning to write both within and across disciplines. We found that the inevitable tensions arising from differences in writing traditions most often are implicitly mediated, and that this form of mediation seems also to nurture students' reflexive competencies in particular. In producing written texts, students have to make visible for themselves and their readers how they understand the subject matter and how they position themselves within the relevant discourse (Wittek, 2013). These exercises intertwine explicit and implicit mediation when they apply conceptual tools and structures for writing and in turn externalise their conceptualisation by for example unpacking accepted ways of arguing in an assignment written for a specific discipline (Wertsch, 2007).

The study reported here demonstrates that writing can be a significant tool in mediating complex trajectories of learning towards becoming professional teachers. This study also demonstrates that mediation in complex learning trajectories benefits from a longer time span; it takes time to unpack the complex potential embedded in the powerful tool for learning that writing represents. The students did not just *talk* about the exemplary practices of Otto and Hege; rather, they also practiced the collaboration experienced from these particular courses in groups throughout the entire four-year programme, even when this collaborative activity was not organised by the other responsible teachers. The students explained that they had experienced the benefit of a sharing culture and kept on meeting regularly to discuss both syllabus texts and their own assignment drafts.

Students *gradually* unpacked how academic texts should be written, and they gradually unpacked both disciplinary and professional knowledge. Important support in these processes came from continuously writing and rewriting drafts, discussing the syllabus, giving and receiving responses, and participating in plenary presentations and discussions. Both explicit and implicit mediation were involved, and the two types of mediation seem to nurture one another in ways that go beyond the current writing practices.

The learning potential of a culture of sharing

It has long been accepted that collaborative practices in education support learning for all students (Daniels, 2015; Edwards, 2010). The present study confirms that the collaborative practice of producing texts requires the construction of constantly changing combinations of people and resources across settings that are often widely distributed in space (Daniels, 2015; Engeström, Kajamaa, Lathinen & Sannino, 2015). The practice of

providing students with feedback is well documented (e.g., Wittek, 2014), and many studies have noted the importance of feedback from teachers for learning (Ask, 2007; Dysthe, Hertzberg, & Hoel, 2010; Hoel, 1997). However, fewer studies have investigated teachers' feedback practices in higher education (Dowden, Pittaway, Yost, & McCarthy, 2013), and we hope that the present research may encourage further investigation. The cultures of sharing reported by students in courses delivered by Otto and Hege appeared to differ, but both teachers were lauded as exemplary. Hege drew more on explicit mediation in her direct teaching of didactical models and instructions as well as in her personal feedback on students' texts. Otto applied a more implicit mediation in his indirect and "distanced" feedback, by requiring peer feedback rather than teacher feedback on assignments. As illustrated, while students appreciated teachers' responses to texts in order to learn how to write, they nevertheless acknowledged that they eventually learned the writing genre well through collaboration and peer feedback over time. Such experiences align well with the perspective that learning is understood to be distributed and situated (Littleton & Mercer, 2013). In particular, in situated cultural contexts, collaborative writing can become a significant mediational tool for learning (Thompson, 2012a, 2012b). Texts are not inert objects, complete in themselves as bearers of abstract meanings; rather, they are "emergent, multiform, negotiated in the process, meaningful in the uptake, accomplishing social acts" (Bazerman & Prior, 2004, p. 1).

Writing practices as linked to established professional and disciplinary cultures

Through active participation, collaboration, and the use of different resources within established professional and disciplinary cultures, students must identify with or resist the cultures that they are introduced to. These kinds of activities are prominent in the two writing practices reported here, and they are thus seen as critical in making writing an efficient mediational tool. Learning paths are formed as students compare and contrast possible interpretations (Linell, 2009). These processes do not unfold regardless of social context; on the contrary, the movement in students' trajectories follows the shape of more stable institutional or disciplinary cultures. The ability to become a teacher is in part about coping with established ways of thinking and acting within the profession of teaching and current disciplines (Newell, 2006). ITE teachers typically choose the tools introduced to students because of their status as core tools within the profession of teaching, often developed within a long tradition. The writing practices in which students engage cannot be separated from the processes they identify with or resist (Burgess & Ivanič, 2010). The participating students in our study confirmed how critical the ability to adopt a stance on the issue in question is to their learning trajectories. For example, in one assignment, Hege made her students explore and write about their own understanding of mathematical procedures. In the same assignment, she wanted them to reflect upon how to help pupils to understand the mathematical way of thinking, beyond the instrumental means of performing a calculation.

From our analysis, it appears to be important that ITE has a structure that cuts through different subjects and that follows the students through the entire programme. Even though the different teachers follow up the portfolio structure differently, it appears to form a core structure for the students that helps them draw lines between different social experiences—and sometimes between competing views on theories or practical implications.

However, while learning processes are always mediated by the available tools, they also include elements of *agency* and thus offer options for individual agency within a social system (Daniels, 2015). Participation is necessary for the creation of meaning at a personal level, but this does not presuppose full understanding. What is needed to begin with is no more than an ability to inhabit the current activity within which reason and concept operate. In both of the writing practices described in this paper, students are forced to discuss their preliminary drafts as newcomers to higher education. They must participate in academic activities where accepted or "typical" ways of thinking and acting are brought into play alongside a range of disciplinary and professional concepts. Otto facilitates this within the structure of electronic portfolios, where he put high demands regarding the use of academic concepts on the one hand and active use and references both to the syllabus and to peers' assignments on the other. Similarly, Hege also places high demands on her students to use mathematical and professional concepts. Student drafts are discussed in plenary, and her being present in plenary discussions is, according to the students, an important context for them to inhabit an activity within which reason and concept operate.

Writing as a structure for nurturing movements in students' learning trajectories

Students' learning trajectories are largely enhanced by structures that nurture significant movements throughout a longer time span (Wittek, 2013). Our analysis shows that writing can form such a structure. The students we interviewed demonstrated how their learning was contingent on a transformation of the mediational tools introduced in ITE through interaction with other people (an interpersonal process) into a cognitive and inward (intrapersonal) process (Vygotsky, 1978, p. 57). Thinking and learning are actively mediated and transformed through the use of signs in the explorative investigation of meaning potentials and relations between concepts. In writing an assignment, students must "try out" alternative ways of positioning themselves. Writing has as such worked as a significant tool in moving through complex trajectories of learning towards becoming professional teachers. The particular practices reported here have helped students to draw lines between knowing how to write an academic assignment, disciplinary knowledge and insights into how to apply this knowledge in a practical context.

Concluding remarks

All student informants identified the same qualities of writing activities as important. First, *response and sharing of drafts* should be part of the writing process; this appears to be considered the most important element. Other important qualities include high teacher expectations and continuous reflection (see also Wittek, in press; Solbrekke & Helstad, 2016). It is also essential that students find inspiration and motivation from these high expectations and that they perceive these expectations as manageable. An integrated ITE programme like the one reported here can certainly reveal the potential of writing as a tool for learning. We are wary that our study is restricted to only one cultural ITE context and only two subjects, but we argue that some of the examples of explicit and implicit mediation from writing may count for writing practices in a broader scope.

Moreover, our analysis indicates that the four-year portfolio structure across all subjects can be of importance in students' professional trajectories of learning. However, students must be forced to become active participants from the very beginning of the programme, using alternative ways of thinking and arguing—that is, they must become actors who continuously reflect, compare, contrast, and position themselves. Finally, the study also

shows that the potential for mediation from writing become stronger when learning trajectories allow developing over time.

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Appendix 1: Interview guide for interviews with students

The interview guide informed a typical focus group interview, in which the research defined the topics of interest (Morgan, 1996). The aim of the guide was to ensure that the main themes were covered in all interviews, even when the questions were slightly modified to adapt to how communication developed in the different groups. We used everyday language in all interviews to make students comfortable and to encourage them to talk about their writing and learning experiences. The two rounds of interviews employed more or less the same questions; however, the "past experiences" component was used only in the first round. Questions in **bold** were asked only in the first interview while those in *italics* supplemented the last round of interviews. At the end of this appendix, we have added a question asked during the final interview with only three students.

Background/Introduction

Names, disciplinary background, and group characteristics—how well they know each other, same class, etc.

- **Past experiences with writing**

- **How was the first period as student teachers? (What was easy, and what was difficult?)**

- **How were you introduced to writing assignments in the different disciplines (similarities and differences)?**

- **What do you think about the writing assignments you were given at the beginning of the study?**

- **How did you experience these assignments as compared to previous writing experiences?**

- **From what you have experienced so far, what do you think is a "typical" study/writing assignment?**

- **What have you written?**

- **What kind of feedback (product/process?) have you received (from teachers/peers)?**

Current writing experiences

- How did you feel about changing disciplines? (What was easy, and what was difficult?)

- In what ways have you worked with academic writing this semester?

- What are the requirements for written assignments this semester? (content/form/theory/method/core concepts?)

- Are there different expectations/requirements for written assignments in different disciplines?

- What kind of feedback (product/process?) have you received (from teachers/peer students?) in the discipline you are now working in?

- How has feedback been organised?

- Have you initiated the feedback you have given to peers? (difference between product/process?)

- How do you benefit from the feedback you receive on written assignments?

- As a percentage, how much time do you spend working alone or in collaboration with peers when developing texts?

- How do you make use of the feedback you receive? (Do you change the text? How?)

- Do you encounter any problems with writing when moving between different disciplines?

- What advantages have you identified when writing in different disciplines?

- *Are there any teachers in the teacher education programme who used writing as part of their teaching in a way that became significant for you? What did they do, and in what ways was this significant?*

Writing and learning

- Do you fear academic writing/writing assignments? Why?

- Do you look forward to academic writing/writing assignments? Why?

- Do you write as a student or as a future teacher?

- Does your understanding of a topic change when writing about it? (more confused/(in)secure/relieved?)

- Have you experienced writing as leading to an "AHA" (good learning) experience?

- Is it easier to talk about themes in teacher education after having written about them? Why?

- In which subject is it easiest to write? Why?

- In which subject is it most difficult to write? Why?

- Is it difficult to formulate your thoughts in written text? Why?

- You are part of a professional education programme (teacher education), qualifying for a specific profession. In what ways do you think different disciplines influence how you "form" yourself as a teacher? Why do you think that?

A forward perspective

- What advice would you give to other students starting their first assignment in the teacher education programme? (How to go about it? How to structure and develop texts, etc.?)

- **What do you think about the tasks you will encounter in the future?**

- **What kind of support would you prefer in connection with writing assignments? Why?**

- *Do you think you will draw on the experiences you have gained from writing in*

teacher education in your first job as a teacher? How?

- *Do you believe that your students will learn more through writing? How? Is this related to particular ways of writing?*

- *How do you aim to facilitate feedback on your students' texts in different subjects? Why?*

- *Will you facilitate peer feedback? Why?*

- *Will you provide feedback on students' texts? How and why?*

- *Will you specify different requirements in different subjects? Why?*

Anything else you want to tell us?

Thank you!

In the last interview (with only three students), we asked many of the same questions as listed above and also added these:

- In what ways are you working with writing this semester?

- Are there other requirements for writing this term as compared to earlier in ITE?

Reflections on ITE as a whole

- Based on the entire experience as a student teacher, what is a typical written assignment in ITE?

- What assignment was most difficult? Why?

- From which assignments did you achieve the best outcome? Why?

- What kinds of organising responses/activities have you experienced during ITE, and did these make a difference for you? Why?

A view ahead

- What advice would you give to new students who are about to write their first assignment in ITE?

- What is an exemplary assignment as you see it? Why?

- Do you think that you will apply some of your writing experiences from ITE in your own classes in school? How and why?

- Do you believe that pupils learn from writing? If yes, what matters in how the process of writing is designed?

- How will you use writing as a pedagogical tool in your class? Why?

Appendix 2: Guide for interview with two significant teachers, May 2014 (ped, mathematics)

Background information was gathered in a 2013 interview. The interview ran more like a conversation between the two teachers and the researchers (two external and one internal)

than a strictly designed structure. The interviewers nevertheless ensured that all topics were covered.

The interview started with the presentation of student texts, which the researchers asked the two teachers to read briefly through.

The interviewers then asked the teachers:

What kinds of texts are these? Are they typical for your discipline? What characterises them?

On their own relationship with writing

- How do you relate to writing? Do you like to write? Why or why not?

- Have you written any texts yourself (curriculum books, articles, other relevant discipline-based texts, other kinds of writing)?

- How do you see yourself (as a "writing teacher" or a "discipline teacher")?

Conception of discipline-oriented writing: process and product

- What (purpose) do you think writing may be used for in teacher education?

- What may writing (throughout the period of study) equip one for?

- What do you mean by "writing" in your discipline?

- What do you mean by "writing for learning" (writing as process versus product)?

- How do you as a "discipline teacher" work with writing as a process/product (phases of writing, developing ideas, drafts, responses, evaluation)? Describe how you do this; provide examples.

- Writing for exams: describe your experiences as "discipline teacher" and as examiner. What do the students struggle with (or not)? How may students' struggles originate in the teaching of writing in different disciplines (or not)?

Good writing education

- What characterises good writing education in teacher education?

- What characterises good writing education in your discipline?

- What are teacher educators good at/less good at?

- What are *your* strengths and challenges as a writing teacher in your discipline?

- What is the relationship between your students' assignments and their texts? Consider quality and relevance.

Collaboration about writing in teacher education

- Please tell us how you work (individually, in a team, etc.).

- How do you facilitate students (individually/collaboratively)?

- Why do you choose to work the way you do?