Teacher educators' perspectives on literacy

Ewa Bergh Nestlog, Jenny Uddling, and Anna Thyberg

Abstract

The purpose of this study is to deepen the understanding of literacy perspectives in teacher education by analysing how four primary teacher educators from different disciplines talk about their practice. In dialogic interviews, focal points included what types of activities regarding language and texts the participants mention using in their respective disciplines. The results reveal three main perspectives on literacy: general academic literacy, disciplinary literacy, and professional literacy. A visualization of the results in the form of a model renders visible the three main perspectives as well as overlapping combinations that relate to disciplinary literacy teaching. Thereby, this study contributes a metalanguage that can be used across disciplines by teacher educators to support pre-service teachers' disciplinary socialisation drawing on the different literacy practices. The complexity of the literacy perspectives merits further research in order to explore different discourses within and between each perspective.

Keywords: disciplinary literacy; disciplinary literacy teaching; general academic literacy; primary teacher educators; professional literacy; teacher education

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Introduction

This article concerns teacher education , and more specifically, teacher educators' talk of their teaching in their respective disciplines. It has been said that student success is closely linked to the literacy practices in which they participate (Sebolai, 2016). Research has also shown that teacher educators have great influence on the literacy practice in which they teach, and in which their students show and develop literacy (Rainey et al., 2020). Studies on literacy in academic contexts have gradually moved from regarding literacy as general, transferable skills to literacy as a social practice in a discipline, in which the way of using language and other semiotic resources (such as symbols, images and gestures) for making meaning is discipline-specific (Lea & Street, 1998; Moje, 2015; Shanahan & Shanahan, 2008). The literacy practice in a discipline is closely related to disciplinary epistemology

and identity (Shanahan & Shanahan, 2008) and to the conventions that have been developed by authorities in each discipline over time (e.g., Lemke, 1990). These authorities are experts who have influence on disciplinary knowledge and how to communicate with disciplinary credibility. New participants in a disciplinary practice need to learn how to communicate effectively by conforming to the prevailing conventions, thereby establishing their credibility. Communicating disciplinary content is intertwined with the disciplinary content itself. Thus, developing disciplinary literacy is an integral part of learning the discipline (Fang, 2012; Schleppegrell, 2004). In Sweden, where this study is conducted, university teachers express concerns about falling levels of literacy among their students (Diehl et al., 2019; Utbildningsdepartementet, 2024). The increasing number of first-generation university students calls for teacher educators who can support students' general academic skills and their disciplinary literacy in parallel with developing their content knowledge (Bell & Santamaría, 2018).

In Sweden, all teacher education is run by universities and organised in different programmes, each directed towards the various age levels in school. This study concerns the primary school programme, towards ages 6-12 (Years 4–6). The programme includes courses in the various disciplines that are related to specific school subjects. Accordingly, the disciplinary content and the pedagogical perspectives in the disciplines are adapted to the specific age groups. There are variations in whether discipline-specific courses and courses focusing on how to teach the subject are integrated or not, although the regulations emphasise that the education should include both perspectives in one way or another. The primary school programme is a four-year degree, which includes 30 European Credit Transfer and Accumulation System (ECTS) credits in Swedish (language and literature), English (language and literature) and mathematics respectively. Courses in science or social science are eligible, and if chosen, they comprise 30 ECTS credits. In addition, the students write one or two degree projects[1] (30 ECTS credits, altogether), and four terms are devoted to courses in general education (120 ECT credits). Separate courses in academic writing are given at some universities. All teacher education comprises teaching practicum done in school settings (30 ECTS credits).

In regard to disciplinary literacy, all pre-service teachers can expect to meet teacher educators that are experts in different disciplines. Primary school pre-service teachers are supposed to develop disciplinary literacy in a number of disciplines, since they will have to teach a number of school subjects and thus handle different disciplinary literacy practices. If disciplinary literacy in each discipline is obscure to them, they might experience confusion when switching

[1] In the degree project in Swedish primary school, teacher education Mathematics, Swedish, English, Sciences and Social Sciences (e.g., history) can be chosen.

between the disciplines. As stated above, each discipline in the programme also includes courses on how to teach the school subject for the targeted age group. Hence, the expectations on pre-service teachers to be able to participate in various disciplinary literacy practices over the course of the programme can be a problem; students are likely to feel confused if they are asked to conform to different conventions without understanding why what seemed to be appropriate in one discipline is inappropriate in another (Lea & Street, 1998).

With a social perspective on literacies, pre-service teachers are assumed to develop disciplinary literacy through their participation in the disciplinary social practice at the university, led by teacher educators who are experts in a specific discipline. By seeing literacy as social practice, we draw on scholars who indicate that an explicit focus on disciplinary literacy is likely to support students' learning in the discipline (e.g., Draper et al., 2012; Goldman et al., 2016; Moje, 2015; Shanahan & Shanahan, 2008). Rainey et al. (2020) reveal that teaching about disciplinary literacy in teacher education can support pre-service teachers' subsequent teaching practice. They show that some pre-service teachers in a secondary teacher education programme at a university in United States, already in their first semester, learned to support their pupils' meaning-making with subject-specific texts and disciplinary inquiry and concepts.

However, few studies have been conducted on literacies in the disciplines within teacher education programmes (Davison & Ollerhead, 2018). Previous research has primarily focused on pre-service teachers' beliefs or knowledge about literacy teaching (Scott et al., 2018). Studies show that pre-service teachers' knowledge about disciplinary literacy seems to be limited (Aalto & Tarnanen, 2017), and sometimes coupled with partial resistance towards disciplinary literacy activities (Gritter, 2010). Some studies focus on university teachers, revealing, for instance, that they do not see themselves as teachers of disciplinary literacy (Airey & Larsson, 2018), and many educators are unlikely to have experienced disciplinary literacy teaching as students themselves (Rainey et al., 2020). On the other hand, studies also show that teacher educators can benefit from learning about pre-service teachers' understanding of and attitude to disciplinary literacy (Park, 2013; Pytash, 2012).

Based on the research mentioned above, and from our own experiences of working in teacher education programmes, we present a main problem that calls for more research on disciplinary literacy in teacher education programmes. If pre-service teachers are encountering various disciplinary literacy practices without explicit attention to what the differences are and how the practices might inform their teaching, the students are likely to be confused when moving through the programme (Lea & Street, 1998). The absence of explicitness and direct instruction about discipline-specific semiotic resources, when communicating about

disciplinary content, may depend on lack of knowledge about those semiotic resourses and lack of metalanguage for communicating about them. If so, the scaffolding needs of students cannot be accommodated.

Previous research in education has shown advantages to integrating a disciplinary literacy focus on teaching (Draper et al., 2012; Goldman et al., 2016; Moje, 2015). However, empirical studies on literacy in primary teacher programmes remain scarce (cf. Lemley et al., 2019), and to the best of our knowledge, there is no research on disciplinary literacy from the perspective of primary teacher educators in a Swedish context. The present study intends to address this research gap, in addition to proposing a metalanguage to use when talking about and rendering literacy visible at an overarching level. We posit that perspectives on literacy practices as they appear in teacher educators' talk will influence their teaching in the teacher education programme.

Perspectives on literacies

In this study we see literacy as a socialisation into different epistemologies and identities (e.g., Lea & Street, 1998). Within New Literacy Studies (NLS) (e.g., Street, 1984), scholars stress that literacies are socially and culturally situated practices:

> Literacy […] is an activity, located in the space between thought and text. Literacy does not just reside in people's heads as a set of skills to be learned, and it does not just reside on paper, captured as texts to be analysed. Like all human activity, literacy is essentially social, and it is located between people. (Barton & Hamilton, 1998, p. 3)

The theory from NLS forms our base for understanding issues of literacies in education. When teacher educators and students act and use semiotic resources, they have the agency to choose the resources they find most suitable for the specific situation. Even so, their choices are unlikely to be entirely free, but rather related to disciplinary conventions and requirements used by authorities (cf. e.g., Bachtin, 1986; Gee, 2015), and therefore more or less "consistent with those of content experts" (Fang, 2012, p. 19).

Various concepts are used within literacy research. Regarding the notion of academic literacy there is no clear definition agreed upon among researchers (Li, 2022). Some definitions are language-based, mainly pointing to language competence and skills required for academic reading and writing, whereas others are socio-culturally oriented towards students becoming legitimate participants in

academic discourses (Baumann & Graves, 2010; Lea & Street, 1998; Sebolai, 2016). The term *academic literacies* (in plural) indicates that there are differences between communities within academia. Wingate (2018, p. 350), in the same vein, is arguing for the importance of requiring "knowledge of the community's epistemology, of the genres through which the community interacts, and of the conventions that regulate these interactions." Accordingly, with this approach, academic literacies direct the attention towards the disciplines and disciplinary literacies.

The term *disciplinary literacies* has been used in order to bring forth a discipline-specific perspective in contrast to a general perspective on literacy teaching, which is the case within content-area literacy studies. Shanahan & Shanahan (2008) claim that:

> [R]eading and writing instruction should become increasingly disciplinary, reinforcing and supporting student performance with the kinds of texts and interpretive standards that are needed in the various disciplines or subjects. (p. 57)

Although Shanahan (2019) states that there are "general literacy skills […] that are highly generalisable and useful no matter what the social context" (p. 4), he clarifies the relevance of disciplinary literacy already in primary school and argues that teachers and students create disciplinary literacy together by way of how they act and express themselves. We believe that students, "regardless of whether they are in primary school or higher education" (Bergh Nestlog et al., 2024), can develop their literacies from various perspectives, if they are given support for it by their teachers.

Regarding the content-area perspective on literacy, where focus is on general literacy skills, Boughey and McKenna (2016) claim that the concept of academic literacy (in singular, not plural—see above) can be used in order to "mask […] decontextualised approaches to student development" in higher education (p. 5):

> Such decontextualised approaches include generic 'academic literacy' courses which construct the ability to read and write in socially legitimated ways in the academy as simply a matter of acquiring a set of neutral, a-social, a-cultural, and a-political 'skills.' (p. 5)

Language courses such as 'English for academic purposes' and 'Academic writing' are applications in higher education of such a decontextualised perspective on literacy, a text-driven approach, rather than practice oriented (Li, 2022). A

decontextualised text-driven approach "allows disciplinary norms to remain largely opaque and beyond critique" (Boughey & McKenna, 2016, p. 1).

A potential problem that pre-service teachers experience when moving through the programme and encountering various disciplinary literacy practices is confusion; we conclude that a viable solution is explicitness and direct instruction about, not only discipline-specific content, but also relevant disciplinary semiotic resources. In order to address this potential problem, we talked to teacher educators in different disciplines to study literacy from their specific viewpoints, thereby trying to find a metalanguage that can be used for talking about overall perspectives on disciplinary literacies in the teacher education programme. Such a metalanguage could also be used to support teacher educators and pre-service teachers when talking about how literacies may differ between disciplines in the education programmes (cf. Lea & Street, 1998). Using a metalanguage for the broad and overall literacy perspectives can be seen as a first step towards preventing student confusion when moving between the disciplines in the teacher education programme.

In this study, we aim at deepening the understanding of different perspectives on literacy practices in teacher education as expressed by four primary teacher educators when talking about their own teaching practice and discipline, namely biology (science), history, mathematics and Swedish (comparative literature). Our research questions are:

- Which perspectives on literacy practices appear when the teacher educators talk about disciplinary literacy?
- Do the different perspectives on literacy practices intersect, and if so, how?

Materials and methods

The current study, which was designed as a pilot for a larger study pending external funding (grant number 2022-03329)[2], relied on convenience sampling.

Data collection

Before starting the data collection, we asked colleagues and relied on professional networks for potential participants with extensive experience of working as teacher educators in different disciplines in the teacher education programme in Sweden.[3] The overall purpose of the study was communicated to the participants orally and

[2] The funding source had no other involvements in the research project.

[3] Three of them had extensive experience from primary teacher education.

in writing as to gain knowledge of disciplinary literacy in teacher education, and more specifically to deepen the understanding of how teacher educators think and express themselves regarding the language and texts that appear in their research discipline and in their teaching. Four experienced participants gave their consent. They all teach pre-service teachers in their specific discipline, and they must also incorporate pedagogical perspectives on how to teach the corresponding school subject for the targeted age group.

Table 1 shows information about the teacher educators in relation to their postgraduate education, teacher education and experiences from being teachers at school.

Table 1 *Information about the teacher educators*

The teacher educators	Postgraduate education	Teaching degrees	Work experiences from teaching at school
The comparative literature educator (in Swedish)	A doctoral degree in comparative literature	-	-
The history educator	Doctoral studies in history education	A teaching degree in Swedish and history, upper secondary school	Several years as a school teacher in upper secondary school
The mathematics educator	A doctoral degree in mathematics education	A teaching degree in mathematics and science education, year 1–7	Several years as a school teacher in mathematics and science, reception year (K) to year 3
The science educator	A doctoral degree in science education	A teaching degree in mathematics and science education, year 7–9, biology in upper secondary	Several years as a school teacher in science, year 7–9

We carried out semi-structured interviews. The implementation of these interviews was guided by the following themes: characteristics of texts the students read and

write in the discipline; teaching about texts; challenges for students to read and write disciplinary texts; similarities and differences of the discipline-specific language and the language that is used in the teaching practice; and assessing student texts. Table 2 shows the themes and subsequent questions posed to the teacher educators.

Table 2 *Information about the themes and questions asked to the teacher educators*

Themes	Questions
Types of texts the students read and write in the discipline	What role do texts play in your discipline in teacher education? What texts do the students read in your discipline? What kind of texts do the students write in your discipline?
Teaching about texts	How do you communicate your expectations of what pre-service teachers need to be able to read and write in your discipline?
Challenges for students to read and write disciplinary texts	What obstacles have you noticed when it comes to developing students' disciplinary literacy, specifically regarding reading and writing?
Similarities and differences of the discipline-specific language and the language that is used in the teaching practice	Do you think that there is any difference between the language used in the discipline and the language used in your teaching practice? If so, what? What are your thoughts on that?
Assessing student texts	How do you assess students' texts? What do you value particularly highly? What do you want to see in the students' texts? What is challenging about doing the assessment?

The interviews, which varied from 60–85 minutes, were guided by the principles of dialogic interviewing (Way et al., 2015), aiming to be responsive and open to the teacher educators' perspectives. We conducted and recorded the interviews on Zoom. Furthermore, the study was guided by the European Code of Conduct (ALLEA, 2023). Quotations from the material have been translated from Swedish to English by the authors.

Data analysis

After having read the transcribed interviews several times, we could see that when answering our questions about teaching their disciplines in the teacher education programme, the educators talked about different perspectives on literacy. This was

a bit surprising as our questions in the interviews concerned teaching in their respective discipline. We believe that the dialogic interviewing allowed the interviews to not only concern disciplinary literacy, but also other perspectives that were highlighted by the interviewees.

We used a qualitative content analysis (Bengtsson, 2016) to thoroughly and systematically examine perspectives on literacy practices that appeared in the data. In order to answer RQ1, as a first step, we marked up relevant meaning units, i.e all instances in the transcripts when the educators talked about activities students were expected to participate in, sometimes with support from the educators, in the teaching of their disciplines. Thus, instances where the educators just mentioned texts without linking it to an activity were not included in our analysis; neither were instances when the educators talked about their own research without linking it to their teaching. The marked activities often dealt with how students would understand or use a written-based language.

As a second step, we could see that the teaching and learning activities were performed in relation to different communities of practices that the educators tried to socialize their students into. The analysis of what perspectives on literacy practices appeared in the data was first done individually by each researcher. Collaboratively building on and refining the analysis came next, so that similarities and differences were identified. We first identified four main perspectives on literacy practices. *Disciplinary literacy* was identified when the educators talked about activities that would increase the students' participation in the specific discipline, such as seeing events from different perspectives in history or performing investigations in science. Typically, when the participants talked about what makes their discipline distinct from other disciplines, they used expressions like, "as a scientist," "like scientists do," "a foundational principle in the discipline,", and "typical of the history discipline," which explicitly positioned their activities within disciplinary literacy. *Professional literacy* was identified when the educators talked about activities that would increase the students' participation in their future profession as teachers in school, such as explaining ecological concepts in a way that primary school students would be able to understand. Expressions such as "school students," "in the classroom" and "mock-lesson" were used when showing perspectives on professional literacy. *General academic literacy* was identified when the educators talked about activities that would increase their students' academic socialization in general, such as searching for peer-reviewed articles. When expressions like "academic progression," "academic writing" and "academic texts" were used by the teacher educators, the activities were categorized as general academic literacy. Other more implicit references to general academic literacy appeared, such as refuting counterclaims (the history educator) and

assuming a critical stance to the course literature (the comparative literature educator) in the collected data.

Basic literacy was identified when the educators talked about basic skills in reading and writing, such as spelling. Later, the category basic literacy was included in general academic literacy.[4] General academic literacy as well as basic literacy skills point to generic literacy competences. Some of these competencies are often more in focus in lower primary education, such as spelling, whereas some are more relevant in secondary and higher education, such as strategies for finding and referencing primary and secondary sources, or collecting data in accordance with ethical guidelines.[5]

Our knowledge and earlier experiences as researchers in the field of literacy helped us to understand these central concepts. However, we do not believe that our theoretical understandings affected the interpretation of the results in a negative way. To minimize the bias of our influence, we took an exploratory approach to the data and analyzed the transcribed interviews systematically using recurrent assessor triangulation. However, as we used our earlier experiences as teacher educators and our theoretical knowledge about literacies, our analysis process could be called abductive. The abductive research process is characterized by "alternating between (previous theory) theory and empirical data, both of which are reinterpreted vis-à-vis each other" (Alvesson & Sköldberg, 1994, p. 42).

The findings related to RQ2 are based on our interpretation of the results from RQ1. RQ2 relates to possibilities for intersections of the main perspectives on literacy practices, which did appear in the data. In the research group we have discussed the interpretations several times, in order to strengthen their credibility and dependability (Bengtsson, 2016). However, as we only used four teacher educators using convenience sampling and interviewed each for approximately 1–1.5 hours via Zoom, the data set is limited.

Results—teacher educators' expressed perspectives on literacy practices

In the following section, we present the main perspectives on literacy practices that have appeared in the data analysis, namely general academic literacy, disciplinary literacy, and professional literacy (RQ1). Thence, in the next section, we present

[4] Roz Ivanič (2004) talks about six different writing discourses. A skills discourse is one of them, and it has similarities to what is called general academic literacies in this study.

[5] Our understanding is different from Shanahan & Shanahan's (2008) reasoning about literacy progression and visual models with different levels of literacy. At that time they relate basic literacy to lower education, followed by intermediate literacy and finally disciplinary literacy in higher educational levels. Intermediate literacy is also included in our understanding of general academic literacy.

how the main perspectives on literacy practices are intersected as they appear in the educators' talk of teaching in their respective disciplines (RQ2).

Main perspectives on literacy practices

As told above, the analysis revealed three main perspectives on literacy practices. Each perspective on literacy practice is presented below with a definition followed by some illustrative examples.

General academic literacy: general academic literacy is identified when the teacher educators talk about activities that would increase their students' academic socialization at a general level, disregarding the disciplinary content. One example of this practice is the expressed requirement that teacher candidates should learn how to search for peer-reviewed articles via the library website. The science educator mentions that this is "either for an assignment that they are writing or as a task when they get to use the library's search engine so that they practice searching [for secondary sources] because we also have to prepare them for the degree project." The mathematics educator argues that searching for peer-reviewed articles is part of the academic progression. He says: "it's part of them starting to learn how to search and use the search engines. So that's part of the academic progression." General academic literacy is also expressed when the mathematics educator talks about reading. He mentions that students get more support when reading academic texts, which he later specifies as peer-reviewed articles, in comparison with texts written for pre-service teachers or teachers. According to the mathematics educator, students are instructed to read the peer-reviewed articles following a series of general steps, found in a study guide for academic studies, by first reading the text briefly and noting what they spontaneously notice and then reading the article in more detail. The science educator mentions that she has explained to the students that peer-reviewed articles are dense because peer-reviewed journals only allow a limited number of words.

Among the expression of skills that university students are expected to demonstrate on a general level, the history educator emphasizes academic writing. She says that this is not about writing one's own thoughts, but relating to other people's texts, so the students must learn how to weave together their own opinions with the references:

> The very first thing for those who are completely new, it's about writing academically, and not just writing what you think, but to relate to other people's texts. That is unfortunately the hardest part for them. […] the part about how they weave together their own opinions with the references, this I do not say anything about. But then, they have studied quite a long time

> too. In the third term, you notice that they are much more knowledgeable about how to write academic texts. (The history educator)

The history educator also emphasizes, in the excerpt above and elsewhere, that she sees a clear progression in students' academic writing in regard to referencing secondary sources. When the science educator talks about students' academic writing, she refers to independent degree projects. In her course the pre-service teachers are expected to perform teaching material analyses that could be used in their degree project, which can help the pre-service teachers understand that their degree project is a simplified version of a doctoral thesis:

> I also try to make, draw parallels between, thesis work and a degree project. It is the same thing but a light version […] this can pave the way to their own production of academic texts. What could you write about, look at, investigate? (The science educator)

The science educator highlights the analysis of teaching materials as a means to produce academic text and to make the students understand how a systematic investigation is performed.

The expression "academic texts" is used both for peer-reviewed articles (the mathematics educator) and texts written by the students themselves (the history and the science educator). Three out of four participants talk about problems in motivating students to read peer-reviewed articles or coursebooks in English, or learn the concepts in English, since they are only going to teach using the Swedish language. Nonetheless, the educators clearly articulate this as a necessary academic skill. One stated reason is that students need to learn how to read academic texts in English because otherwise they will not be able to keep up to date on current research, most of which is written in English (the mathematics educator).

The participants sometimes comment on a general set of writing skills which they express should mostly have been developed prior to entrance into university. In the academic literacy we include the teacher educators' talk about how they support the students in this basic literacy, such as spelling, grammar and syntax. This practice especially appears when the teacher educators talk about how they comment on the students' written texts, like when the history educator says: "I write like this, for example, think about *they* and *them*[6] and then I'll give some example or think about writing whole sentences." The teacher educators also comment on the lack of cohesion in student texts as well as informal language which here is exemplified by the comparative literature educator mentioning: "I say it is quite a

[6] In Swedish: *de* and *dem*. In speech these two grammatical forms are pronounced the same (*dom*), which generates difficulties when choosing the correct form in writing.

lot of informal language, you need to correct your sentence structure, but most of all [they should] write in a less convoluted way." Thus, the activities that the educators talk about in relation to basic literacy are often expressed as how they support the students.

When the four teacher educators talk about teaching in their disciplines, there are several examples of general academic literacy perspectives. This practice deals with the participants' expressed views and experiences of what university students are expected to demonstrate on a general level, disregarding the disciplinary context, and also includes basic literacy. All educators, except the comparative literature educator, use the word "academic" in relation to texts, writing and progression, in a way that points to a general academic practice.

Disciplinary literacy: disciplinary literacy is identified when the teacher educators talk about activities that would increase the students' participation in practices which are related to a specific disciplinary knowledge in their respective courses.

The educators talk about various text types and distinct disciplinary features that differ from other disciplines. In science, text genres are often highly regulated which means that students can be given templates to use for lab reports, covering such sections as "materials, procedures, hypothesis, background, and scientific explanation" (the science educator). As a contrast, in the humanities subjectivity is taken for granted. The comparative literature educator says: "in reply to questions for the exam and so on, I try to say that you have to, like, you have to start from what you've experienced," and "there is quite a lot involved in the course to reflect on oneself as a reader and one's own reading." According to him, students find text conventions confusing:

> They profess the idea that you cannot use the pronoun 'I' in a text […] they have a very strong impression of this and I don't know where they get it from, that your own personality cannot emerge from what they write and I try to dissuade them from this. (The comparative literature educator)

Thus, the disciplinary literacy appears when the teacher educators talk about how students are supposed to write in the discipline, in the excerpt above specifically in relation to subjectivity and their own earlier experiences. The participants also talk about disciplinary literacy in regard to pre-service teachers' reading. The comparative literature educator explains that the aim of comparative literature is to teach students to distinguish between different types of fiction, and that the analytical models of comparative literature help to identify what kind of text they are reading. For example, some texts are based on suspense and entirely plot-driven.

The science educator and the mathematics educator stress that as a scientist or mathematician, respectively, experts are used to reading multimodal texts and that students need to learn this practice. The mathematics educator also stresses the need for students to learn to express mathematics content in different representations:

> There is a foundational principle in the discipline, thus one of the most important competencies to aquire when you learn [mathematics] and then when you teach of course concerns multiple representations, representation competence. (The mathematics educator)

The history educator instead emphasizes, "Here [in the history course] it's about seeing events from different perspectives […]. Different perspectives are something that is, it's very typical of the history discipline." These different perspectives are related to the different materials and sources that students need to be able to handle and relate to. According to the history educator, these texts "can be texts written by hand that are quite old, but it can also be protocols that are fairly modern and written on word processor and so on." She also says that the most difficult thing is your own processing of the source material: "To get close to a material that no one else may have written about, but you should be able to [laughs] do it on your own."

When the science educator talks about what distinguishes science in general, she emphasizes the systematic investigations: "You measure a lot, because that's what scientists do when they do experiments and things like this." These investigations presuppose that students think, measure and document systematically and accurately.

In summary, when the four teacher educators talk about teaching in their disciplines there are several examples distinctive of their disciplinary literacies. The disciplinary literacy is about participating and engaging in social practices within a discipline, using the language, texts and other resources that are part of the specific disciplinary practice.

Professional literacy: in this section, we mainly bring up examples of when the teacher educators specifically address the school context in relation to literacy. Professional literacy is identified when the teacher educators talk about activities that would increase the students' participation in their future profession as teachers in school. This could refer to the teaching profession in theory or practice. When the professional literacy is focused, the content that is communicated is related to another social context, such as the school classroom, and to relevant participants, like pupils and colleagues.

One example found in the data is talk about what pre-service teachers should demonstrate in an examination task: for instance, that they can explain ecological concepts in a way that primary school students would be able to understand. The science educator says: "If we have a primary school student who will read this, in the sixth grade, then this explanation should in some way be possible to understand." Another example is mentioned by the comparative literature educator when he says: "I tell them to introduce a literary text or do a mock-lesson where the rest of us pretend to be the class and they have to make us interested in some kind of task." A third example, of how the teacher educators talk about how they teach the pre-service teachers in relation to their future profession, is taken from the history educator. She emphasizes that she sometimes talks with the students about how different words are used differently over time in history and what words nowadays are appropriate to use in the classroom in school:

> History is a subject which is complicated since certain terms have been banned nowadays but they still exist in historical texts and in that way we talk a little about language […] [Students] also think it is difficult to handle this, what words can they say and not say, and what words are allowed to use in the classroom in school? (The history educator)

The three examples above show how teacher educators model professional literacy not only enacted in behaviors but also ways of using language as anticipated requisites for future scenarios in the primary school classroom. When the four teacher educators position themselves within the professional literacy, they often refer to hands-on activities that pre-service teachers try out at university with the intention that they will later be able to implement them in their own classrooms.

4.2 Intersected perspectives on literacy practices

In this section we present the result that relates to if the perspectives on literacy practices intersect, and if so, how they intersect (RQ2). Firstly, we present a model of how the three main perspectives seem to be intersected; secondly, we exemplify how the teacher educators show signs of intersecting the main perspectives. Thence, we talk about the teacher educators' further positionings in regard to their respective disciplines.

Perspectives on literacy among disciplinary teacher educators: the model (Fig. 1) is an attempt to show our understanding of how the three perspectives on literacy practices found in our data can co-occur when the teacher educators talk about activities related to language, texts and teaching in their disciplines. Each ellipse represents a main perspective on literacy practice, and in the result above (section 3.1) clear-cut examples from each ellipse are shown. However, in the data

we also find instances where the main perspectives appear in different combinations.

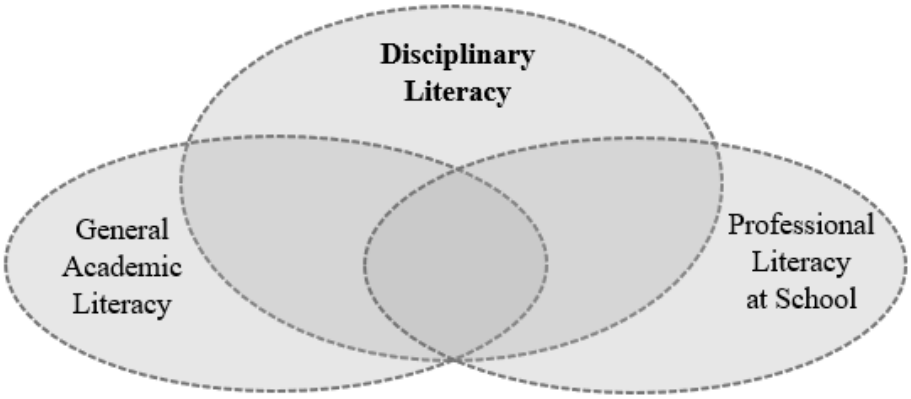

Figure 1. *A model of perspectives on literacy expressed by the teacher educators*

The overlapping fields in the center in the figure are meant to represent intersecting perspectives on literacy practices, which are based on two or on all three main perspectives in different amalgamations. The perspectives that appear in a teacher educator's talk can be seen as a sign of the educator's view on disciplinary literacy teaching. This view appears as a synthesis and can include one or more intersections in different combinations. In the section below we will give examples of intersections of perspectives on disciplinary literacy practices when they are combined in different ways.

How the main perspectives on literacy intersect: one example of intersecting the main perspectives is expressed by the science educator. She emphasizes the need for the pre-service teachers to acquire the core concepts in the field in terms of disciplinary literacy and tests this need in different ways. When talking about an examination, she says that the students should write a factual text and use 50 ecological and evolutionary biology concepts, "in a way that works for the children they are going to teach." The teacher educator here talks about how she teaches about linguistic resourses in the discipline so that the pre-service teachers themselves should be able to teach discipline-specific concepts to their own students in the future. This example demonstrates disciplinary literacy teaching, based on an intersection of disciplinary literacy and professional literacy. This teacher educator also mentions that basic skills, such as spelling, are important, which indicates an intersection of general academic literacies as well.

Another example of how disctinct perspectives intersect is expressed by the comparative literature educator. He says that students do not understand the benefits of analysing literature, which is a central part of the disciplinary literacy; they are

mainly interested in practical knowledge about how to teach. He describes this as a problem which, for instance, can mean that students fail to make the connection between theoretical knowledge, application of theory at university, and practice as in being able to rely on those abilities when designing teaching units. Regarding the connection between disciplinary literacy and the professional literacy perspectives, the comparative literature educator claims that unless pre-service teachers learn to analyze literature, they will not be able to work with it in the classroom. He seeks to delve deeply enough into disciplinary literacy teaching in the comparative literature course to provide students with the tools they will need for text selection and conducting a literary conversation with their own future students in school. Thus, according to this teacher educator, disciplinary literacy perspectives and professional literacy perspectives should intersect in the teaching practice, in a way that places disciplinary literacy on the base for disciplinary literacy teaching.

Finally, a third example of an intersection between disciplinary literacy and professional literacy is presented. Here, a more implicit expression of a professional literacy perspective appears, when the educator does not explicitly talk about teaching per se. The mathematics educator says that adequate knowledge of mathematical terms is needed in preparation for professional development initiatives over the duration of one's teaching career:

> We have to be able to use, handle and understand these [mathematical] terms because otherwise we can't, we can't develop in our profession, we can't understand these new texts, we can't take part in professional development-lectures and listen to someone if we don't have these pieces. And then there's research done in these areas. (The mathematics educator)

In the excerpt the educator also pinpoints that teachers need to learn the subject-specific terms so that they can keep up to date with the research being conducted. This example shows that theoretical disciplinary knowledge is a part of a continuing professional development, where students and teachers need to keep up with research all through the carreer in order to develop their disciplinary literacy teaching practice.

Discussion and concluding remarks

Aiming at deepening the understanding of perspectives on literacy practices in teacher education as expressed by four teacher educators when talking about literacy activities in their respective disciplines, we identified three perspectives,

namely general academic literacy, disciplinary literacy and professional literacy, and we show how they co-occur in our model (see Fig. 1). To better understand the complexity of teacher educators' teaching practice, the model can help illuminate the different perspectives on literacies expressed by teacher educators. In addition, the model can be useful when teacher educators and students talk about disciplinary literacy teaching, where the literacy perspectives overlap, and how the different literacy perspectives are related to each other.

A qualified understanding of disciplinary literacy teaching in teacher education is likely to be based on teacher educators' rich experiences and deep knowledge related to all three of the proposed perspectives on literacy. This understanding may create a coherent entity, which hopefully can also be useful for pre-service teachers both as they move between disciplines in the programme and in their future teacher profession. In teacher education, the inclusion of professional literacy into disciplinary literacy perspectives ought to be obvious, and due to epistemological and conventional aspects of disciplines, there are reasonable arguments for including general academic literacies too, since basic skills and generic competences are also of importance when communicating the disciplinary content (Lea & Street, 1998; Shanahan, 2019; Wingate, 2018). Regarding intersection with professional literacy at school, aspects of recontextualisation have to be taken into account. For instance, when reflecting on teaching the discipline at school, knowledge of the school students' age and previous experiences are crucial when choosing how to adapt the discipline into the school subject for a specific group of students. Lemley et al. (2019) argue that it is crucial that "work on discipline-specific reading and writing is undertaken in the elementary classroom"—not only work on basic skills—in order for pupils to be able to handle "the complex textual demands expected in secondary and postsecondary institutions" (p. 13). In line with their argumentation, we would like to emphasise the importance of intersecting literacy perspectives, i.e. where the three perspectives meet and are elaborated in teacher education, in order to prepare pre-service teachers for their future work as professional disciplinary literacy teachers who are expected to design qualitative disciplinary literacy teaching practices.

It is true that the three literacy perspectives might not always be captured within the same teacher educator: for example, in someone who is an expert in the discipline but not in education. If so, there are reasons to offer cooperative opportunities for teacher educators with complementary expertise in order to integrate the different literacy perspectives.

In this study disciplinary literacy is in focus. However, in regards to the proposed model, it is worth mentioning how the other literacy perspectives can be seen as separated from disciplines related to school subjects. The intersection of general academic literacy and professional literacy is relevant in relation to general

pedagogical aspects, not concerning specific teaching content at school.[7] In such a case, another discipline, e.g. pedagogy, will guide the disciplinary literacy perspective in focus. If so, the disciplinary literacy perspective is not related to pre-service teachers' future disciplinary literacy teaching, since pedagogy is not a school subject. This perspective can potentially be confusing for the students, as well as for the teacher educators, if it is not made explicit that there is no disciplinary connection to teaching at school. Whereas, when the content of a school subject is relevant in teacher education, a fusion of professional literacy and disciplinary literacy perspective comes into play. Furthermore, an intersection of only general academic literacy and disciplinary literacy will be relevant in relation to courses where no profession is in focus.

Regarding questions related to differences between and within the literacy perspectives, our results show that teacher educators are aware that students move between disciplines and encounter contradictory demands and requirements, but that it is nonetheless challenging for them to provide the necessary scaffolding for students to succeed in writing tasks. In our study the literature educator talks about students coming to his teaching practice with the idea of not being allowed to use "I" in their written texts, which is not the case in the literature literacy practice. This problem can be related to Lea & Street's (1998) concept of "course switching" and the challenges this concept entails.

Course switching is expected when courses belong to different disciplines and should not be a problem if the students understand the reasons behind differences between disciplines. It is plausible to believe that our definitions of the literacy perspectives and the proposed model can help teacher educators to identify and talk about their literacy teaching practices, both between experts within a discipline and between experts from different disciplines. In addition, the definitions could be useful when trying to understand different perspectives that seem to be conflicting within a course or in the discipline as a whole. When the comparative literature educator in our study says that students are mainly interested in how to teach, not in the discipline of comparative literature itself, there seems to be conflicting perspectives. There is reason to believe that students' engagement in the discipline is likely to increase if their interest in professional literacy is addressed in combination with a disciplinary literacy focus. This twofold focus is specific for teacher educators with a specialization in education and their double competence implies that disciplinary literacy teaching needs to be adjusted not only to the teacher profession in general, but also to the specific grades for which the pre-service teachers gain certification.

[7] This intersection of general academic literacy and professional literacy is not displayed in Figure 1, due to our focus on disciplinary literacies in relation to corresponding school subjects.

As tools for thinking and talking, the identified literacy perspectives and the model might be beneficial for teacher educators' teaching practice, not least by deciphering the complexity of disciplinary literacy teaching. The complexity is related to two different layers. Firstly, one layer concerns the teaching practice in which students are involved in developing disciplinary literacy. This layer is something teachers at school as well as teacher educators must deal with in order to support their respective students. Secondly, there is the metalevel, in which the focus is on communication about the first layer, namely, about how to design disciplinary literacy teaching practices in school. This second layer is highly relevant when teaching in pre-service education about the profession, but not when teaching at school, since teachers at school do not teach their students about the teaching profession.

In addition, there are questions regarding the impact of different university disciplines being involved in school subjects, such as in science (biology, physics, chemistry) and in Swedish (linguistics and literature). Two of the teacher educators emphasize that they have a PhD in mathematics education and science education respectively. Consequently, when the teacher educators talk about literacy in their own disciplines, they do not only talk about the disciplines of mathematics, science or history but about mathematics education, science education and history education. The science educator reports that for pre-service teachers in science education, reading peer-reviewed articles within the science disciplines (not science education) is considered too challenging: "Those require expertise in a subject that they barely have studied so that's why we mostly have articles dealing with teaching and learning." Therefore, the concept discipline is complex, especially in the context of teacher education.

It can be worth mentioning that the teachers' talk about literacies is likely to be influenced and shaped by their context, such as having to teach courses in the discipline as well as courses focusing on how to teach the subject. This can explain why the educators sometimes mentioned professional literacy perspectives when they were talking about their disciplinary literacy teaching.

To conclude, the challenge for pre-service teachers to move between courses during their education and become legitimate participants in the different disciplines is, in this study, pointed out as a potential problem. In line with previous research (e.g., Goldman et al., 2016; Schleppegrell, 2004), we can see the benefits of explicit instruction about disciplinary language and semiotic resources in the different disciplines. Explicitness would help pre-service teachers to participate in and understand the different literacy practices they need to socialise into.

We have taken a first step in order to address the above-mentioned problem, namely to deepen the understanding of different perspectives on literacy practices in teacher education programmes. The next step can be to deepen the understanding

through discourse analysis, to see what discourses each perspective contains if studying a larger number of disciplinary teacher educators and their teaching practices (cf. e.g., Goldman et al., 2016; Moje, 2015). In our study we also did not deepen the analyses to examine different discourses within each main literacy perspective. However, we believe that each of them holds a plethora of specific discourses, which we intend to outline in further research. It would also be interesting to study the complexity of how disciplinary literacy teaching discourses intersect when applied in teacher education practices. The proposed model can be used to identify different perspectives on literacy practices as a basis for further investigations of specific characteristics through questions like: What characterises disciplinary literacy and disciplinary literacy teaching in the different disciplines? How are general academic literacy and professional literacy linked to disciplinary literacy in different disciplines? What is general academic literacy if withdrawn from disciplinary literacy?

To summarize, we found three perspectives; one of them, disciplinary literacy, is specifically directed towards core knowledge for pre-service teachers as becoming experts in specific fields, and it is therefore placed in the center of our model (Fig. 1). We claim that the model and the metalanguage that goes with it are important contributions to disciplinary literacy as a research field, and that the model can be used as an overarching framework for teacher educators and researchers who want to go deeper into literacy perspectives regarding characteristics and movements within and across disciplines, thus aiming for interdisciplinarity. If the three literacy perspectives inform the teaching practices, the pre-service teachers' potential confusions regarding differences can be reduced, and the pre-service teachers are likely to develop knowledge in how to explicitly teach their future students in different school subjects (cf. Rainey et al., 2020). Finally, by using the model and the proposed metalanguage, teacher educators may hopefully support students to better navigate between the different disciplines and their respective teachers, encourage independence, and make students feel in control of both their studies and their future profession.

Author biographies

Ewa Bergh Nestlog is a professor of Swedish in Education. Her research primarily deals with linguistic perspectives on teaching practices, classroom interaction and students' texts. Her main research projects have been in the area of literacy in various school disciplines.

Jenny Uddling is a senior lecturer of Language Education with a focus on Swedish as a second language. Her research has often dealt with disciplinary literacy and the importance of interaction for learning in linguistically diverse classrooms.

Anna Thyberg is a senior lecturer of English Education. Her main area of research is in the field of literature instruction. She has published on the process of text selection and various formats of oral examination tasks in teacher education programmes.

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