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The nature of the relation between pre-service teachers' views of an ideal teacher and their positive memories of biology and geography teachers

Abstract

Literature acknowledges that pre-service teachers' memories of their past might influence how they see their future as teachers, and thus on the construction of their teacher identity. However, we know little about the nature of the relation between pre-service teachers' views of the ideal teacher and their memories of their own school teachers, particularly regarding specific subject disciplines, such as biology and geography. This study addresses the significance of this relation. Narratives from three pre-service elementary teachers reveal that positive memories of biology and geography teachers and future-oriented reflection connect their past and the ideal teacher. The findings suggest that just one positive memory can have far-reaching significance. In addition, their views of the ideal teacher were found not to be subject-specific. Finally, suggestions for teacher education are presented.

INTRODUCTION

Many earlier studies have recognized that pre-service teachers (PSTs) carry memories, experiences and beliefs formed during their time at school with them when they commence teacher education (Balli, 2011; Bryan, 2003; Feiman-Nemser & Buchmann, 1985; Knowles, Cole & Presswood, 1994; Korthagen, 2004; Lortie 1975, Lutovac & Kaasila, 2011, 2014; Pajares 1992; Wall, 2016). Memories, recollections, life histories, narratives, and experiences are often used interchangeably, and they relate and influence PSTs' views about teaching (Holt-Reynolds, 1992; Miller & Shifflet, 2016; Pajares, 1992). Based on their memories of school, PSTs have certain strongly bound views in relation to what a teacher should be like and what kind of action a teacher should take in classroom settings (Feiman-Nemser & Buchmann 1985; Jenlink, 2007; Lortie 1975; Pajares, 1992). Therefore, memories are significant resource for PSTs' views of the ideal teacher and influence the construction of PSTs' teacher identity (Beauchamp & Thomas 2010; Calderhead & Robson 1991; Holt-Reynolds, 1992; Knowles & Holt-Reynolds 1991). On the other hand, we know little about the nature of the relation between PSTs' memories of their school teachers and their views of the ideal teacher, particularly regarding specific subject disciplines, such as biology and geography. Based on the literature review, we identified a lack of studies specifically addressing memories of school biology teachers. Also little research has been done about PSTs' views of the ideal biology and geography teacher. Furthermore, the nature of the relation between these views and their memories of school teachers has rarely been explored, particularly in specific subject settings.

Studies concerning views of an ideal, effective or good teacher have previously been carried out e.g. from the perspectives of beliefs, attitudes, practices, perceptions and professional identity (Arnon & Reichel, 2007; Helterbran, 2008; Korthagen, 2004; Minor, Onwuegbuzie, Witcher & James 2002; Miller & Shifflet, 2015; Watkins & Zhang, 2006). Often, the ideal teacher has been portrayed through different kinds of descriptive qualities, such as being empathetic or a good leader (for more, see Arnon & Reichel, 2007), or being a competent instructor, student-centred and knowledgeable about the subject (Minor et al., 2002). Moreover, Cruickshank and Haefele (2001) acknowledge the characteristics of good teacher as being analytical, dutiful, competent, expert, reflective, diversity-responsive and respected. In contrast, Korthagen (2004) suggests that good teacher should be seen through different levels of change (environment, behaviour, competencies, beliefs, identity, mission) that can be seen as different perspectives of how teachers function. Since we are interested in PSTs' views of the ideal teacher they wish to become, we agree with Helterbran (2008) that it is essential for the ideal teacher to be capable of recognizing elements of effectiveness and weakness and to take steps to correct or strengthen them.

We see teacher education as a multidimensional and complex effort to guide PSTs' process of learning to teach and to try to change PSTs' perspective from being a learner to being a teacher (Beauchamp & Thomas, 2009; Furlong, 2013). In line with earlier literature, we agree that it is rather challenging to affect or change PSTs' views about teaching, which are often tightly bound to their own school experiences (Chang-Kredl & Kingsley, 2014; Feiman-Nemser & Buchmann, 1985; Furlong, 2013; Lortie, 1975). As beliefs, arguably, also memories of school time often remain tacit and pre-service teachers are not aware of the link between their school time experiences and their thinking and actions. In this sense, it is particularly important to provide them with opportunities to consciously recall the past experiences and become aware of at least some of the beliefs that might shape their teacher identities and guide their future actions (e.g. Walkington, 2005). When the relation between PSTs' views of the ideal teacher and their memories of school teachers are not explicitly addressed it might result in a situation where PSTs' go through their teacher education studies unaware of the influence and significance that memories bear to their teacher identity. Also teacher educators should be aware of those relations and how they are formulated in order to help their students to use their memories as a resource upon which to build their teacher identity. For these reasons, we are interested in understanding the aspects that influence PSTs' views of the ideal teacher. In addition, there is little research into PSTs' views of the ideal biology and geography teacher, and the nature of the relation between

their memories of their school teachers and their views of the ideal teacher, particularly in specific subject settings.

Therefore, in this study, we take a closer look at pre-service elementary teachers' positive memories of their school biology and geography teachers, their views of the ideal teacher and the relation between the two aspects. We chose to focus on positive memories of school teachers, as we believe they are more tightly related to views of the ideal teacher. Conversely, negative memories of their school teachers might be more associated with PSTs' views of the kind of teacher they aim to avoid becoming (Lutovac & Kaasila, 2011, 2014). Arguably, there is a need for knowledge about the nature of the relation between PSTs' positive memories of their school biology and geography teachers and their views of an ideal teacher because of its importance for teacher education and the ways teacher educators could assist PSTs in their identity development. Consequently, the guiding questions for this study are the following: What kind of positive memories do pre-service elementary teachers' narratives reveal about their school time biology and geography teachers? How are these memories related to pre-service elementary teachers' views of the ideal biology or geography teacher?

THEORETICAL FRAMEWORK

Pre-service teachers' memories of their time at school

There is a considerable amount of research concerning PSTs' memories prior to beginning their teacher education studies (Calderhead & Robson, 1991; Knowles et al., 1994; Lutovac & Kaasila, 2011, 2014; Mahijos & Maxson, 1995; Wilson, 1990). Memories of school have great significance for PSTs' views (Doyle & Carter, 2003; Fajet, Bello, Leftwich, Mesler & Shaver, 2005; Knowles et al., 1994; Trotman & Kerr, 2001), attitudes, future behaviours (Hamman, Gosselin, Romano & Bunuan, 2010) and teacher identity (Chang-Kredl & Kingsley, 2014; Korthagen, 2004). Knowles (1991) describes memories as private mental constructions and recalls that memories of school and teachers often form the basis of PSTs' thinking about teaching. In contrast, Rothenberg (1994) argues that memories are not necessarily accurate or objective; rather, they help individuals to make sense of current situations. Additionally, the permanence of memories of school was noted in research from Turunen (2012), who found out that, even decades later, both negative and positive memories of starting school remained. Also, Chang-Kredl and Kingsley (2014) brought out that PSTs' described their memories of school by evaluating them as either positive or negative, and that it is memories with strong emotional backgrounds that PSTs' draw on to understand aspects of themselves as teachers. Furthermore, Van Hook (2002) found out that PSTs' positive memories of school teachers can be divided into three groups: positive guidance strategies, teachers demonstrating warmth and empathy, and teachers planning special events and activities. According to Van Hook (2002), the first and second groups included teacher-student interaction, both disciplinary and caring measures, and the latter included the effort that the teachers had expended on the students' behalf.

Studies of memories of specific subjects in the school context have also been conducted (e.g. Carney & Chedzoy, 1998; Virta, 2002; Guyver & Nichol, 2004; Morgan & Hansen, 2008; Cook, 2009), including memories of geography. For example, McPartland (1996) discovered different types of memories related to experiences of learning geography in school and recorded them as subject-, teacher- or self-oriented memories. Like Tulving (1972), McPartland also used categorization into semantic and episodic memories, in which semantic memories are general experiences, whereas episodic memories relate to personal recollections of specific events in the past. Furthermore, Catling, Greenwood, Martin and Owens (2010) categorized primary geography educators' formal educational experiences of geography into teacher influences (both positive and negative memories), fieldwork (positive memories) and being good at geography (positive memories). Studies from Waldron, Pike, Varley, Murphy and Greenwood (2007) and also from Dolan, Waldron, Pike and Greenwood (2014) both

revealed that the majority of PSTs' memories related to geography were positive. Dolan et al. (2014) discovered three main categories in their study of prior experiences of learning geography: teaching and learning environments (teaching approaches and classroom environment), teacher characteristics (personal and professional qualities of teachers) and perceptions of the subject (subject-specific comments). According to Dolan et al. (2014), PSTs' positive memories regarding geography teachers included them being enthusiastic, interesting and motivating, accompanied by active and participatory teaching methods.

However, PSTs' memories of school in the context of biology have been examined to a much lesser extent. Therefore, the following example includes a broader overview to the PSTs' memories of natural science subjects, which generally include biology. A study conducted by Hudson, Usak, Fančovičová Erdoğan and Prokop (2010) showed that the teacher having an enthusiastic nature and a positive attitude towards science were regarded as highly memorable. Additionally, explaining abstract concepts well and guiding the students' conceptual development with practical science activities were considered memorable secondary science teaching strategies (Hudson et al., 2010).

Pre-service teachers' views of the ideal teacher

Several studies regarding primary and secondary school students, PSTs' and in-service teachers' views of good, effective or ideal teachers have been conducted over the years (Darling-Hammond & Youngs, 2002; Evans, 2002; Fraser, 2010; Korthagen, 2004; Miller & Shifflet, 2015; Minor et al., 2002; Watkins & Zhang, 2006). PSTs' see the ideal teacher as student-centred, enthusiastic about teaching, ethical, good at classroom and behavioural management, good at teaching methodology and knowledgeable about the subject (Minor, Onwuegbuzie & Witcher, 2000; Minor et al., 2002). Studies by Minor et al. (2000, 2002) also revealed also that the term 'student-centred teacher' included concepts of optimism, supportiveness and patience (see also Murphy, Delli & Edwards 2004, 87); 'a competent instructor' included being open to new teaching styles and able to spark children's interest; and lastly, 'enthusiastic about teaching' included a love of the subject, a passion for teaching, and dedication. Furthermore, PSTs have progressive beliefs regarding an effective teacher, relating to being a modern and experimental teacher, and the teacher as a facilitator, guide and motivator of learning (Minor et al. 2002). Likewise, Doyle (1997) and Helterbran (2008) call this developmental perspective in PSTs' views a shift from teachers giving information to teachers as facilitators of learning.

Correspondingly, Helterbran (2008) found themes in PSTs' views of the characteristics of the ideal teacher and themed them as 'knowledge' and the ability to convey that knowledge; 'personal qualities' such as enthusiasm and a passion for teaching, approachability, availability for discussion (see also, Forrester-Jones, 2003) and good interpersonal skills; and finally, 'instructional qualities', such as seamless teaching, clear objectives and meaningful assignments. These themes and characteristics of the ideal teacher are probably presented most explicitly in Arnon and Reichel's (2007) categorization. They simply produced two categories for the ideal teacher: 'the personality of a teacher' and 'the teacher as possessing professional knowledge'. The first category includes the following sub-categories: general personal qualities, an empathetic and attentive teacher, the teacher as a leader, attitude towards the profession, and wide-ranging general knowledge. The second category includes knowledge of the subject being taught and didactic knowledge – both educational methodology and acknowledgement of individual pupils (Arnon & Reichel, 2007).

Research concerning PST' views of the ideal biology or geography teacher is limited. Nevertheless, findings from Mohan (2009) about views of the ideal geography teacher reflect very similar themes than views of the ideal teacher generally: 'engaging students' interest and building relationships' and 'teacher knowledge, interest and preparation'. These themes were included in the PST's answers, such as: 'Teachers who perk a student's interest. Students begin to ask "why" and "what if" types of ques-

tions.' and 'Students who learn to think out geographical ideas/concepts beyond just knowing facts ... the how/why/what if.' (Mohan, 2009). PSTs' views of the ideal biology teacher have not previously been reported, whereas research regarding the ideal science teacher reveal some insight into PSTs' views related to specific subjects. According to Mensah (2011), the ideal science teacher is again viewed as 'enthusiastic, approachable' and 'able to use versatile methods' (see also Dolan et al. 2014). However, Mensah (2011) concludes that PSTs view the ideal science teacher as 'questioning, teaching about the world around them, using tools of science', and 'talking and doing science' outside of the classroom as well. In all, we view it as important to address PSTs' views of the ideal teacher, as the earlier research acknowledged that when PSTs' reflect on the ideal teacher, they do so with a future-oriented aspect of their ideal self in mind (Jenlink, 2007; Lauriala & Kukkonen, 2005; Lutovac & Kaasila, 2014; Sfard & Prusak 2005). In this sense, these views might reveal their possible teacher selves (Hamman et al., 2010; Lee & Schallert, 2016; Lutovac & Kaasila, 2011, 2014; Miller & Shifflet, 2016).

METHODS

Data collection

Participants in this study were pre-service elementary teachers in one Finnish university. Entering the five-year master's degree teacher education programme required them to go through an admission procedure, and approximately 10% of applicants were finally admitted to teacher education studies. After completing their degree programme, they are qualified elementary teachers' for classes 1–6 (ages 7–12) teaching also biology and geography as part of environmental studies. In Finnish basic education, environmental studies including biology and geography have traditionally been on the responsibility of the class teacher.

During their first year of teacher training PSTs in our study completed the Environmental Studies I -course, which was part of the compulsory multidisciplinary studies in their programme. Since data was collected during the first year of their studies, the participants had not gone through their teaching practicum yet. We chose to focus on first year PSTs' as their professional identity is still in the early phase of development. The objectives of the Environmental Studies I -course fulfill the needs of research-based teacher education and inquiry-based learning requirements in didactics of biology and geography. The first author of this article is the responsible lecturer on the course, therefore we have an insider's view into the data and the context in which it was created.

The participants ($n = 41$) were asked to complete a self-reflective assignment by writing narratives about their memories from school time, specifically concerning memories of biology and geography studies. From these 41 narratives we chose for further interviews 11 PSTs who had the most positive ($n=5$), the most negative ($n=4$) and neutral ($n=2$) memories of their school biology and geography teachers. The focus on the most positive, negative and neutral memories was chosen as we wanted diverse range of beginning PSTs' memories. In addition, these PSTs narratives were particularly well elaborated, with a lot of detail in reported experiences as well as vivid expression. In the interviews, we asked PST to reflect on their memories of biology and geography at school and their views of the ideal biology and geography teacher.

In this paper, we address only the positive cases since the positive memories were more explicated and detailed, as well as more meaningful with respect to PSTs descriptions of the ideal teacher. Although all the PST with positive memories displayed the relation between the two categories in question, here we analyse in more detail three female cases: Kaarina, Kristiina and Elli. We chose to disregard from this analysis the two remaining positive cases as one involved out-of-school experiences and the other one was already qualified as a subject teacher and was therefore not in the beginning phase.

Data analysis

We apply Lieblich, Tuval-Mashiach and Zilber's (1998) narrative approach to data analysis (see also Kaasila, 2007). First, we read through the three interviews several times, in order to get a better understanding of the cases. This holistic reading helped us form a preliminary view of the nature of the possible relation between the positive memories of their school teachers and PSTs views of the ideal biology and/or geography teacher. In the next step, we applied a categorical approach. We looked closely at each case and extracted from the entire dataset the data pertaining to the two categories, i.e. positive memories of school teachers and views of the ideal teacher. We were especially focused on the data that displayed the relation between the two categories. We compared and contrasted the three cases in terms of these two categories. The comparison yield the nature of the relation between positive memories and view of an ideal teacher. In addition, although this paper does not deal with the concept of attitude, we also observed that, interestingly, the three cases – Kaarina, Kristiina and Elli – had different backgrounds with respect to their attitude towards biology and/or geography. Kaarina had a very positive attitude towards biology, whereas Kristiina had a positive attitude towards geography. Elli, however, had a reluctant attitude towards both subjects. However, despite their differing attitudes, they all had positive memories. We have provided extensive data excerpts for readers to be able to evaluate the validity of our interpretations.

RESULTS

Here we present the cases of Kaarina, Kristiina and Elli. In each case, we first present an excerpt of that PST's positive memories of school, which is then followed by an excerpt representing her view of the ideal teacher. The excerpts pertaining to the two categories, i.e. positive memories and views of the ideal teacher, are accompanied by our interpretations in which we disclose the nature of the relation between the two categories.

Kaarina

Kaarina's memory of a school biology teacher

I had the same biology teacher in lower and upper secondary school, and I liked her so much! She was such a good and memorable teacher. I have always compared other teachers to her and wondered why they didn't show the same passion as our biology teacher did. She was always very excited when she came into class and said everything in a very enthusiastic way. She even brought specimens for preparation and took us to the lakeside to study aquatic plants. She didn't need to do that, but she wanted us to try something different. So she really went to some trouble for us. I remember that every time someone asked her something [that she didn't know the answer to], she would say that she would check that for the next lesson. And she really did get back to it, and she had found out the answer. She didn't forget about it, and she thought that it was important to really clear things up and feed the thirst for knowledge. And she used to be fair to everyone. If someone asked something, she used to explain it equally well to the trouble-makers and the good students. She was nice to everyone.'

Of Kaarina's positive memories, the most significant are the ones that are connected to the teacher's enthusiasm and inspiration. In her narrative, she emphasizes this significance by comparing her biology teacher to other teachers' she had, but without finding any correspondence. In her positive memories, Kaarina also gives value to the effort the teacher was willing to expend on the students' behalf. She understands that it was uncommon and unexpected for a teacher. For instance, Kaarina's positive memories of her teacher's willingness to find out and clear things up and feed the students' thirst for knowledge are told in a way that brings out her gratitude and respect. In addition, Kaarina's positive memories of her teacher's equal, fair and kind attitude towards everyone reveal that Kaarina's biology teacher was obviously accessible, which is, again, treated with gratitude in Kaarina's narrative.

Kaarina's view of the ideal teacher

'I think that it does not matter what you teach. Whether it is mathematics or biology or geography, the most important thing is to have a passion for teaching, be enthusiastic and enjoy teaching, because it always comes across if you enjoy doing something. It depends so much about the attitude you have. If I think of myself as a future teacher, I want to be like my biology teacher: everyone could sense that she enjoyed teaching, and she always came to class full of energy. Being so enthusiastic and being able to uphold that excitement, I mean she had been doing that already for some time and yet she was full of enthusiasm. That kind of enthusiasm is catching, and it works better than being very strict. You don't want to be mean or troublesome to an encouraging and enthusiastic teacher; you want to please her and participate during the lesson.'

There is a clear connection between Kaarina's view of the ideal teacher and her positive memories of her biology teacher. This is evident, since she believes that the ideal teacher should *'have a passion for teaching, be enthusiastic and enjoy teaching'*, just like she described her teacher. Additionally, Kaarina first explains her view of the ideal teacher in general rather than only an ideal teacher of biology or geography. This shows that she expands her positive memories to cover not only ideal biology and geography teacher but ideal teacher in general. Secondly, Kaarina makes an explicit relation between her ideal and her biology teacher in the utterance: *'If I think of myself as a future teacher, I want to be like my biology teacher.'* Intriguingly, she sees the importance of teachers being enthusiastic by contrasting it with strict teachers. She concludes that enthusiasm is better, since it encourages students to participate during classes. Altogether, Kaarina's views of ideal teacher are bound to her memories of her biology teacher's enthusiasm and it is distinct that this one single memory is the most prominent when she considers the view of ideal teacher.

Kristiina

Kristiina's memory of a school biology and geography teacher

'In lower secondary school we had the most memorable biology and geography teacher ever. We did mostly inquiry-based learning there. He would just give us a European country, and then we were allowed to find out anything we could, such as its demography or vegetation. We drew maps of topography and the biggest lakes and so on, and we made big reports out of it. We had a free hand in the manner of our presentations, too. I liked it a lot, and our whole class liked it a lot because we got to decide and make it entirely by ourselves, and our teacher was so broad-minded with it. It felt really important and significant that your own areas of interest were recognized. His classes were not only about memorizing certain facts and things prioritized by the teacher – you could decide for yourself. I wish I could use that kind of method by myself someday. During my last year in upper secondary school, my geography teacher was also very good, she had a dialogic touch to her teaching. And she used to start conversations by asking questions like, 'why does the Middle East have a certain kind of culture?' We would spend the whole lesson just discussing it. And then we got to make presentations about different cultures and our own experiences. She was more of a facilitator than a teacher in those conversations, which was really good.'

Kristiina remembers being able to choose and make decisions as the most meaningful part of her time at school. Evidently, she values the sense of freedom which her teacher was willing to give. She describes various occasions where the teacher allowed her and the whole class to choose and decide for themselves. She justifies her point of view by explaining that the whole class had a similar view of the teacher's methods. Moreover, Kristiina values the teacher's way of appreciating and acknowledging students' interests by stating that it felt *'important and significant'*. This shows that Kristiina values the teacher's willingness to give students freedom – and through that also responsibility – rather than just *'memorizing certain facts and things prioritized by the teacher'*. Furthermore, Kristiina's talk of her memories of upper secondary school teacher reveal that these conversations were meaningful for

her. Consequently, she sees her teacher as a facilitator rather than a teacher dispensing information. In all, Kristiina's positive memories are bound to having freedom, which can also be seen in her appreciation of long-lasting conversations where teacher and students were equals.

Kristiina's view of the ideal teacher

I want to be inspiring teacher whose lessons are nice to come to. I would like to make myself invisible – to get the children enthusiastic, and then silently disappear so that they would get enough inspiration to continue by themselves and wouldn't need a teacher for the learning process anymore. I would also like to be able to recognize the children's interests and support and give recognition to them. I want to increase their thirst for knowledge and inquiry so that I could be only a supporter and a facilitator afterwards. I think the most important thing in being a biology, geography and environmental studies teacher is to be able to recognize children's own interests and recognize them, and somehow connect them to national core curriculum content. I think it gives children a feeling of being important with questions about and interest in nature.'

In Kristiina's case the most distinctive was the relation between her memory of having freedom in own schooltime and her ideal, which would be allowing students to '*continue by themselves*' and even '*they wouldn't need a teacher for the learning process anymore*'. This directly relates with her memory '*...and then we were allowed to find out anything we could...*' and reveals that she is willing to give students the freedom to learn and reach understanding by themselves, as did her biology and geography teacher in school. Moreover, Kristiina believes that the ideal teacher should be able to recognize students' areas of interest and be inspiring to feed students' thirst for knowledge and inquiry, which again echoes the way she remembers her schooltime teacher. In all, Kristiina believes that the ideal teacher should strongly believe in self-directed learning, and thus, teachers should be – or become – facilitators of the learning process.

Elli

Elli's memory of a school biology and geography teacher

'Our biology and geography teacher in lower secondary school had some kind of magic to make those lessons truly interesting and alive. For example, when we were dealing with the process of blood coagulating, we made a skin surface out of the desks and then we pretended that someone was a knife and was cutting the skin. And then other students were fibrins, red blood cells and white blood cells, and we performed how the wound heals. I can still remember it very well. I guess it was learning by doing – where you really feel what is happening – that has been a significant point of understanding for me. And I think that the coolest thing was that even though we were teenagers, we started to play along, when we could have just said that it was too childish for us. And it was so nice! But that teacher had some kind of magic, and he could perform it in a way that we would just play along. And he used to try to encourage us to find out new information by bringing newspaper articles to lessons and telling us that we should also read them because there are so many new interesting studies. He had so much [to offer], and he is one of my examples or ideals for the teacher that I want to be.'

The memory above describes the most notable teaching methods Elli's teacher used. She sees those teaching methods as magical, because they made the lessons lively and captured the teenage students' attention. Furthermore, she gives full recognition to her teacher for being able to persuade teenagers to play along. In addition to his having '*magic*', Elli believes that her teacher's methods were also '*so nice*', which indicates that Elli values the friendly and positive atmosphere that the teacher was able to create. In conclusion, Elli sees how meaningful it was for her to realize that she learns better if she is actively doing and feeling. Additionally, Elli values the efforts that the teacher made to awaken his students' interest in new sources of information, such as newspapers.

Elli's view of the ideal teacher

'I would like to be broad-minded, understanding, tolerant, encouraging and enthusiastic. I would like to be able to awaken children's interest in the surrounding world so that they would understand the link between their school books and the surrounding world. I want to be in a good mood and a good role model and pass that message on through my own example – being fair and just. The most important thing is to be enthusiastic and broad-minded, and through that to also pass on that broad-minded attitude to the students.'

Elli describes her ideal teacher to be capable of '*awaken children's interest in the surrounding world*' in order to link school teaching to the real world. This reveals the relation between her memory of her teacher having '*some kind of magic to make those lessons truly interesting and alive*' and her view of an ideal teacher. Additionally, since Elli values her teacher's efforts to awaken the students' interest, she sees that the ideal teacher would consider understanding the surrounding world as an important objective of teaching biology and geography. Furthermore, Elli sees that the ideal teacher can '*be in a good mood ... and pass that message on*', which again relates to her view of an ideal biology and geography teacher who is able to convey a good atmosphere and enthusiasm. In all, we see that the relation between Elli's positive memories and her ideal teacher is visible mostly with respect to the teacher's approach to teaching and the ability to sustain good atmosphere.

DISCUSSION

In this study, we have examined the relation between PSTs' views of an ideal teacher and their positive memories of school biology and geography teachers. We applied narrative inquiry by analyzing three PSTs' narratives. The findings of our study indicate that there is a significant relation between positive memories of school teachers and PSTs' views of an ideal teacher. Moreover, we were able to identify different ways of reflecting upon positive memories, such as focusing on many different characteristics of teachers versus focusing on only one, suggesting that the nature of the relation between the memories of school teachers and PSTs' views of an ideal teacher may lack versatility.

Our findings reveal that it is the semantic, more general memories, which relate to PSTs' views of an ideal teacher rather than the episodic memories, related to specific events. In line with previous studies, we found that positive memories were connected to either the teacher's characteristics or teaching approaches (Arnon & Reichel, 2007; Dolan et al., 2014; Helterbran, 2008; Hudson, 2010; McPartland, 1996; Minor et al., 2002; Tulving 1972). We acknowledge, that Kaarina's memories related to her teacher's enthusiasm were the most memorable and far-reaching for her (Dolan et al., 2014; Hudson, 2010). Whereas, for Kristiina, the most significant memories included teaching approach applied by her teacher, which allowed her to freely choose topics that truly interested her. Lastly, Elli's memories described the '*magic*' teaching methods and the capability to engage students, particularly teenagers. By trying to explain and make sense of what was happening in the class, Elli repeatedly refers to the teacher's '*magic*'. In doing so, she is trying to explain what that magic was in order to apply it in her future as a teacher. In our view, Elli's understanding of the meaning of her memories were still unclear. In all, we note that for all three PST, it was their school teachers personal and professional characteristics that were meaningful to them (Dolan et al., 2014; Hudson, 2010).

Our results also reveal that regardless of the kind of memories PSTs' had, they considered them significant and related them to their view of the ideal teacher. This is in line with previous studies (Beauchamp & Thomas, 2010; Chang-Kredl & Kingsley, 2014; Fajet et al., 2005; Holt-Reynolds, 1992). The most explicit relation between positive memories and ideal teacher was displayed in the case of Kaarina. She expands on the reflections of her biology teacher's enthusiasm to cover her view of ideal teacher in general (see e.g., Helterbran, 2008; Minor et al. 2000, 2002; Mensah, 2011). Similarly to the findings of Minor et al. (2000, 2002) and more recently, Balli (2011), Kaarina concludes that a

teacher's enthusiasm can promote good behaviour in class. However, since this one positive memory is so substantial for her, it seems to overshadow all the other positive memories from her reflections on the ideal teacher. This result is significant as it suggests that PSTs' views of the ideal teacher can be based on a single positive teacher figure from their years at school. While it is an optimistic finding that even a single positive role model is enough to influence PSTs' development to such an extent, it, however, displays a perhaps too narrow and one-sided reflection upon future. Fixating solely on one positive role model's characteristics and practices can limit PSTs in understanding that there is a variety of possible good teaching practices and what it means to be a good biology and geography teacher. This finding demands more attention in teacher education since it can help us broaden the PSTs' views of an ideal teacher.

We found more diverse reflections on the ideal teacher in Kristiina's and Elli's memories. Kristiina is reflecting on her memory of the freedom her teacher provided and using that memory to build up her future-oriented ideal self (Jenlink, 2007; Lauriala & Kukkonen, 2005; Lutovac & Kaasila, 2014; Sfarid & Prusak 2005). Interestingly, Elli related her view of an ideal teacher with a few episodic memories. She described the magic she witnessed in her memories of her school teacher, but could not quite understand what it was and how she could apply similar magic in her own teaching. Based on our findings, we therefore conclude that there is a strong relation between PSTs' positive memories and their views of what the ideal teacher is like, but there is a gap between seeing oneself as being able to reach that ideal and knowing how to (see also: Hamman et al., 2010; Lee & Schallert, 2016; Lutovac & Kaasila, 2011, 2014; Miller & Shifflet, 2016).

Our findings highlight the significance of a single memory for a PST when reflecting upon their memories and future-oriented ideal teacher. Therefore, it is our concern that when PSTs connect their positive memories to their views of the ideal teacher, they do not focus enough on the diversity of their memories; nor are they encouraged in teacher education to do so. Moreover, our findings add to the discussion on the relevance of subject-discipline for the reflection upon future. We were surprised to find out that PSTs' views of the ideal teacher were usually not related to the subjects of biology and geography. PST connected their memories of their biology and geography teachers at school to a more general view of the ideal teacher. This suggests that, contrary to some studies of memories of mathematics at school (e.g., Palmer, 2009; Lutovac & Kaasila, 2011; Drake, Spillane & Hufferd-Ackles, 2001), biology and geography are quite neutral among the subjects. Therefore, memories connected to them bring up more general views of the ideal teacher. Furthermore, we were studying positive memories, which can be more associated with views of what PSTs are aiming to become rather than trying to avoid becoming (Lutovac & Kaasila, 2011, 2014).

In this study, we have addressed only three participants and their positive memories of their school teachers, therefore we do not attempt to generalize our findings. Nonetheless, we offer the following recommendations regarding biology and geography teacher education. Teacher educators should address the school time memories and acknowledge them as important factors in conscious engagement in identity work (see also Lutovac & Kaasila, 2014). Additionally, teacher educators should understand those memories that PSTs on their courses have in order to be able to encourage PSTs' self-development and professional growth (Furlong, 2013). Responsibility of memories of school should also be directed to PSTs themselves by making them aware of the importance for their future teacher identity of conscious reflection on their memories of school. Future research on PSTs' memories of their time at school in the context of biology and geography should include a wider number of participants to broaden the range of memories collected for analysis. To widen the collection of narratives about memories in the context of these two subjects, pre-service subject teachers' perspectives could also be explored. Furthermore, we believe that teacher educators' conceptions of the importance of addressing the PSTs' memories of school should be studied.

REFERENCES

- Balli, S. J. (2011). Pre-service teachers' episodic memories of classroom management. *Teaching and Teacher Education*, 27(2), 245-251. doi: 10.1016/j.tate.2010.08.004
- Beauchamp, C., & Thomas, L. (2009). Understanding teacher identity: An overview of issues in the literature and implications for teacher education. *Cambridge Journal of Education*, 39(2), 175-89. doi: 10.1080/03057640902902252
- Beauchamp, C., & Thomas, L. (2010). Reflecting on an ideal: Student teachers envision a future identity. *Reflective Practice*, 11(5), 631-643. doi: 10.1080/14623943.2010.516975
- Calderhead, J., & Robson, M. (1991). Images of teaching: Student teachers' early conceptions of classroom practice. *Teaching and Teacher Education*, 7(1), 1-8. doi: 10.1016/0742-051X(91)90053-R
- Carney, C., & Chedzoy, S. (1998). Primary Student Teacher Prior Experiences and Their Relationship to Estimated Competence to Teach the National Curriculum for Physical Education. *Sport, Education and Society*, 3(1), 19-36. doi: 10.1080/1357332980030102
- Catling, S., & Morley, E. (2013). Enquiring into primary teachers' geographical knowledge. *Education 3-13*, 41(4), 425-442. doi: 10.1080/03004279.2013.819617
- Chang-Kredl, S., & Kingsley, S. (2014). Identity expectations in early childhood teacher education: Pre-service teachers' memories of prior experiences and reasons for entry into the profession. *Teaching and Teacher Education*, 43, 27-36. doi: 10.1016/j.tate.2014.05.005
- Cook, J. S. (2009). "Coming into my own as a teacher": Identity, disequilibrium, and the first year of teaching. *The New Educator*, 5(4), 274-292. doi: 10.1080/1547688X.2009.10399580
- Cruikshank, D. R., & Haefele, D. (2001). Good teachers, plural. *Educational Leadership*, 58(5), 26-30.
- Darling-Hammond, L., & Youngs, P. (2002). Defining "highly qualified teachers": What does "scientifically-based research" actually tell us? *Educational researcher*, 31(9), 13-25. doi: 10.3102/0013189X031009013
- Dolan, A. M., Waldron, F., Pike, S., & Greenwood, R. (2014). Student teachers' reflections on prior experiences of learning geography. *International Research in Geographical and Environmental Education*, 23(4), 314-330. doi: 10.1080/10382046.2014.946324
- Doyle, W., & Carter, K. (2003). Narrative and learning to teach: Implications for teacher-education curriculum. *Journal of Curriculum Studies*, 35(2), 129-137. doi: 10.1080/0022027022000023053
- Doyle, M. (1997). Beyond life history as a student: Preservice teachers' beliefs about teaching and learning. *College Student Journal*, 31(4), 519-531.
- Drake, C., Spillane, J. P., & Hufferd-Ackles, K. (2001). Storied identities: Teacher learning and subject-matter context. *Journal of Curriculum Studies*, 33(1), 1-23.
- Evans, J. F. (2002). Effective teachers: An investigation from the perspectives of elementary school students. *Action in Teacher Education*, 24(3), 51-62. doi: 10.1080/01626620.2002.10734431
- Fajet, W., Bello, M., Leftwich, S. A., Mesler, J. L., & Shaver, A. N. (2005). Pre-service teachers' perceptions in beginning education classes. *Teaching and Teacher Education*, 21(6), 717-727. doi: 10.1016/j.tate.2005.05.002
- Feiman-Nemser, S., & Buchmann, M. (1985). Pitfalls of Experience in Teacher Preparation. *Teachers College Record*, 87(1), 53-65.
- Forrester-Jones, R. (2003). Students' perceptions of teaching: The research is alive and well. *Assessment & Evaluation in Higher Education*, 28(1), 59-69. doi: 10.1080/02602930301688
- Fraser, C. A. (2010). Continuing professional development and learning in primary science classrooms. *Teacher Development*, 14(1), 85-106. doi: 10.1080/13664531003696626
- Furlong, C. (2013). The teacher I wish to be: Exploring the influence of life histories on student teacher idealised identities. *European Journal of Teacher Education*, 36(1), 68-83. doi: 10.1080/13664531003696626
- Hamman, D., Gosselin, K., Romano, J., & Bunuan, R. (2010). Using possible-selves' theory to understand the identity development of new teachers. *Teaching and Teacher Education*, 26, 1349-1361. doi: 10.1016/j.tate.2010.03.005

- Helterbran, V. R. (2008). The ideal professor: student perceptions of effective instructor practices, attitudes, and skills. *Education*, 129(1), 125-138.
- Hudson, P., Usak, M., Fančovičová, J., Erdoğan, M., & Prokop, P. (2010). Preservice teachers' memories of their secondary science education experiences. *Journal of Science Education and Technology*, 19(6), 546-552. doi: 10.1007/s10956-010-9221-z
- Holt-Reynolds, D. (1992). Personal history-based beliefs as relevant prior knowledge in course work. *American educational research journal*, 29(2), 325-349. doi: 10.3102/00028312029002325
- Van Hook, C. W. (2002). Preservice teachers reflect on memories from early childhood. *Journal of Early Childhood Teacher Education*, 23(2), 143-155. doi: 10.1080/1090102020230206
- Jenlink, P. M. (2007). Editorial: Learning Our Identity as Teacher—Teacher Identity as Palimpsest. *Teacher Education and Practice*, 19(2), 118-130.
- Kaasila, R. (2007). Using narrative inquiry for investigating the becoming of a mathematics teacher. *ZDM*, 39(3), 205-213. doi: 10.1007/s11858-007-0023-6
- Knowles, J. G. (1991). Life-history accounts as mirrors: A practical avenue for the conceptualization of reflection in teacher education. In J. Calderhead & P. Gates (Eds.), *Conceptualizing Reflection in Teacher Development* (pp. 70-92). London: The Falmer Press.
- Knowles, J. G., & Holt-Reynolds, D. (1991). Shaping pedagogies through personal histories in preservice teacher education. *Teachers College Record*, 93(1), 87-113.
- Knowles, J.G., Cole, A. L., & Presswood, C. L. (1994). *Through preservice teachers' eyes: exploring field experiences through narrative and inquiry*. New York: Macmillan.
- Korthagen, F. A. (2004). In search of the essence of a good teacher: Towards a more holistic approach in teacher education. *Teaching and teacher education*, 20(1), 77-97. doi: 10.1016/j.tate.2003.10.002
- Lauriala, A., & Kukkonen, M. (2005). Teacher and student identities as situated cognitions. *Connecting policy and practice: Challenges for teaching and learning in schools and universities*, 199-208. doi: 10.4324/9780203012529
- Lee, S., & Schallert, D. L. (2016). Becoming a teacher: coordinating past, present, and future selves with perspectival understandings about teaching. *Teaching and Teacher Education*, 56, 72-83. doi: 10.1016/j.tate.2016.02.004
- Lieblich, A., Tuval-Mashiach, R., & Zilber, T. (1998). *Narrative research: Reading, analysis, and interpretation* (Vol. 47). Sage. doi: 10.4135/9781412985253
- Lortie, D. C., & Clement, D. (1975). *Schoolteacher: A sociological study* (pp. 12-29). Chicago: University of Chicago Press.
- Lutovac, S., & Kaasila, R. (2011). Beginning a pre-service teacher's mathematical identity work through narrative rehabilitation and bibliotherapy. *Teaching in Higher Education*, 16(2), 225-236. doi: 10.1080/13562517.2010.515025
- Lutovac, S., & Kaasila, R. (2014). Pre-service teachers' future-oriented mathematical identity work. *Educational Studies in Mathematics*, 85(1), 129-142. doi: 10.1007/s10649-013-9500-8
- Mahijos, M., & Maxson, M. (1995). Capturing preservice teachers' beliefs about schooling, life, and childhood. *Journal of Teacher Education*, 46(3), 192-199.
- Martin, F. (2008). Knowledge bases for effective teaching: Beginning teachers' development as teachers of primary geography. *International Research in Geographical and Environmental Education*, 17(1), 13-39. doi: 10.2167/irgee226.o
- McPartland, M. (1996). Walking in our own footsteps: Autobiographical memories and the teaching of geography. *International Research in Geographical and Environmental Education*, 5(1), 57-62. doi: 10.1080/10382046.1996.9964989
- Mensah, F. M. (2011). The DESTIN: Preservice teachers' drawings of the ideal elementary science teacher. *School Science and Mathematics*, 111(8), 379-388. doi: 10.1111/j.1949-8594.2011.00103.x
- Miller, K., & Shifflet, R. (2016). How memories of school inform preservice teachers' feared and desired selves as teachers. *Teaching and Teacher Education*, 53, 20-29. doi: 10.1016/j.tate.2015.10.002

- Minor, L. C., Onwuegbuzie, A. J., & Witcher, A. E. (2000). *Preservice teachers' perceptions of characteristics of effective teachers: A multi-stage mixed methods analysis*. Retrieved March 24, 2017 from ERIC, Institute of Education Sciences Web site: <http://files.eric.ed.gov/fulltext/ED450079.pdf>
- Minor, L. C., Onwuegbuzie, A. J., Witcher, A. E., & James, T. L. (2002). Preservice teachers' educational beliefs and their perceptions of characteristics of effective teachers. *The Journal of Educational Research*, 96(2), 116-127. doi: 10.1080/00220670209598798
- Mohan, A. M. (2009). *Teacher efficacy in geography: A mixed methods study of formal and informal teacher education* (Doctoral dissertation). Texas State University-San Marcos. Web site: <https://search.proquest.com/docview/743052288?accountid=13031>
- Morgan, P. J., & Hansen, V. (2008). Classroom teachers' perceptions of the impact of barriers to teaching physical education on the quality of physical education programs. *Research quarterly for exercise and sport*, 79(4), 506-516. doi: 10.1080/02701367.2008.10599517
- Murphy, P. K., Delli, L. A. M., & Edwards, M. N. (2004). The good teacher and good teaching: Comparing beliefs of second-grade students, preservice teachers, and inservice teachers. *The Journal of Experimental Education*, 72(2), 69-92. doi: 10.3200/JEXE.72.2.69-92
- Pajares, M. F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of educational research*, 62(3), 307-332. doi: 10.3102/00346543062003307
- Palmer, A. (2009). "I'm not a "maths-person"! Reconstituting mathematical subjectivities in aesthetic teaching practices. *Gender and Education*, 21(4), 387-404. doi: 10.1080/09540250802467950
- Rothenberg, J. J. (1994). Memories of schooling. *Teaching and Teacher Education*, 10(4), 369-379. doi: 10.1016/0742-051X(94)90019-1
- Sfard, A., & Prusak, A. (2005). Telling identities: In search of an analytic tool for investigating learning as a culturally shaped activity. *Educational researcher*, 34(4), 14-22. doi: 10.3102/0013189X034004014
- Stuart, C., & Thurlow, C. (2000). Making it on their own: Preservice teachers' experiences, beliefs and classroom practices. *Journal of Teacher Education*, 51, 113-121. doi: 10.1177/002248710005100205
- Trotman, J., & Kerr, T. (2001). Making the personal professional: Pre-service teacher education and personal histories. *Teachers and Teaching: theory and practice*, 7(2), 157-171. doi: 10.1080/13540600120054955
- Tulving, E. (1972). Episodic and semantic memory. In E. Tulving & W. Donaldson (Eds.), *Organization of memory*. New York: Academic Press.
- Virta, A. (2002). Becoming a history teacher: Observations on the beliefs and growth of student teachers. *Teaching and Teacher Education*, 18(6), 687-698. doi: 10.1016/S0742-051X(02)00028-8
- Waldron, F., Pike, S., Varley, J., Murphy, C., & Greenwood, R. (2007). Student teachers' prior experiences of history, geography and science: Initial findings of an all-Ireland survey 1. *Irish Educational Studies*, 26(2), 177-194. doi: 10.1080/03323310701296086
- Walkington, J. (2005). Becoming a teacher: encouraging development of teacher identity through reflective practice. *Asia-Pacific Journal of Teacher Education*, 33(1), 53-64. doi: 10.1080/1359866052000341124
- Wall, C. R. G. (2016). From student to teacher: changes in preservice teacher educational beliefs throughout the learning-to-teach journey. *Teacher Development*, 20(3), 364-379. doi: 10.1080/13664530.2016.1149509
- Watkins, D., & Zhang, Q. (2006). The good teacher. *Effective Schools*, 6, 185-204.