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ABSTRACT

The aim of this phenomenographic research was to examine health education student teachers' (n=20) conceptions of health education as a school subject, and of its teaching and learning, and to detect the development and alignment of these conceptions during teacher training and after the initial years of work as regular teachers. Qualitative data (semi-structured interviews, written essays) were collected at three points in time during the research process. Data were analysed using phenomenographic analysis techniques and statistical tests.

The qualitative analysis produced three hierarchical outcome spaces reflecting the understanding of health education as a school subject and of its teaching and learning. The hierarchy was revealed through themes of expanding awareness which grouped together critical differences between the categories of description. The understanding of health education could be grouped into five categories which varied from seeing health education as a context for disseminating formal or theoretical knowledge to seeing it as a means for developing responsible behaviour in society. The conceptions of teaching could also be grouped into five categories ranging from seeing teaching as transferring knowledge and skills, to seeing it as building a learning community with the students. The analysis of ways of experiencing the learning of health education produced six categories varying from seeing learning as the reproduction of acquired health knowledge to seeing learning as collective meaning-making. Three approaches to health education combining three outcome spaces could be developed, namely a *facts and skills approach*, an *independent thinking approach,* and a *personal growth and responsibility approach* to health education.

An examination of the development of the three target phenomena suggested that health education student teachers' conceptions of the subject and its learning did not develop over time, but that the conceptions of teaching did show some development. Moreover, Friedman's test indicated that participant's conceptions of the subject, and its teaching and learning tended to be aligned with each other, even if less than half of the students showed total alignment of all three phenomena. One methodologically important finding was that in the interviews the participants tended to express more complex conceptions than in their written essays.

The qualitative findings can serve as a pedagogical tool for teacher educators, helping them to develop an understanding of health education and of its teaching and learning among their students. The three approaches to health education outlined in the study may serve this purpose.

Keywords: health education, conceptions, student teachers, teacher training, phenomenography, teaching and learning

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LIST OF PUBLICATIONS

This thesis is based on the following papers, referred to in the text by the Roman numerals I-IV:

I   Paakkari, L., Tynjälä, P. & Kannas, L. 2010. Student teachers' ways of experiencing the objective of health education as a school subject: A phenomenographic research. Teaching and Teacher Education 26 (4), 941-948.

II   Paakkari, L., Tynjälä, P. & Kannas, L. 2010. Student teachers' ways of experiencing the teaching of health education. Studies in Higher Education 35 (8), 905-920.

III   Paakkari, L., Tynjälä, P. & Kannas, L. 2011. Critical aspects of student teachers' conceptions of learning. Learning and Instruction 21 (6), 705-714.

IV   Paakkari, L., Tynjälä, P., Villberg, J. & Kannas, L. 2011. The development and alignment of pedagogical conceptions of health education. (submitted for publication).

1   INTRODUCTION

1.1   Setting the scene

The aim of this phenomenographic research was to examine the conceptions of health education student teachers regarding three phenomena – referred to throughout this study as "target phenomena" – namely *health education as a school subject*, its *teaching*, and its *learning*. I also wished to detect the development and the alignment of these conceptions during teacher training, and after the initial years of working as teachers. The broader purpose of the study was to gain an insight into how student teachers can be helped to expand their understanding of the target phenomena. The research was carried out in the context of health education teacher training in the University of Jyväskylä, Finland.

In Finland, teacher training in health education began a decade ago, after the Finnish Government ratified a law prescribing health education as an independent and obligatory subject within the Finnish school system. The ratification of the law saw Finland affiliated to those countries (i.e. Ireland and Iceland) in which there is a school subject focusing on health issues (see Aira et al. 2009). In adopting this law, Finland responded to the challenge issued by the World Health Organization (1997, 1999), urging that health-related knowledge, skills, and attitudes should be part of children's education, thus providing a foundation for pupils' health and well-being throughout their entire lifespan. In Finland, it was recognized that it would not be sufficient to include the teaching of health issues within other school subjects, whether integrated with another subject or comprising a distinct content entity (Hallituksen esitys 2000). In line with this, the educational reforms of the early 2000s sought to promote health teaching and learning through classroom-based health education rather than through a whole-school approach (cf. Benham-Deal & Hodges n.d.).

It is widely acknowledged that the training of teachers to carry out teaching in health matters is one of the most crucial factors in putting health issues across to pupils (St Leger 1998; Jourdan et al. 2008; Marks 2009).

Moreover, student teachers and teachers have themselves expressed a need for training in health education (see Wood 1996; Speller et al. 2010), and pupils, too, have highlighted a need for qualified teachers to teach health issues (Begoray et al. 2009).

The current situation regarding teacher training in health promotion and health education shows wide variations (Aldinger & Whitman 2005), not merely between countries but also within individual countries (see Wood 1996; Speller et al. 2010). Thus, Wood (1996) – referring to the National Association of State Directors of Teacher Education Certification (1994) – reflects on the fact that there are only a few states in the USA that require training in health education for student teachers for the purposes of teacher certification, resulting in a situation where there are fewer teachers with than without such training. Moreover, there are differences in education suppliers: in some countries it is the task of the universities to offer teacher training in health education (or teacher training in general), whereas in some countries it is the task of a considerable range of organizations and institutions. Similarly, the training may be provided either within pre-service or in-service education. In Finland the training takes place mainly at university level, within both pre- and in-service education (with both of these contributing to teacher certification). However, there also exists in-service education that does not contribute to teacher certification. In this case, the education tends to focus on narrow themes or fields of content rather than on the kind of wide-ranging content/themes that would build a coherent view of the subject, along with its learning objectives.

In the University of Jyväskylä, the content of the health education teacher training program has been based on the nature and aims of the school subject, the literature on teacher education and on teachers' core competencies in general, and the idea of research-based teacher education (e.g. Kansanen 2003). However, the main focus has been on the competencies regarded as essential for health education teachers.

In parallel with our endeavours to develop the key competencies of health education teachers, we as teacher educators became interested in how our student teachers understand various phenomena relevant to teachers, and in particular the nature of the subject to be taught and its teaching and learning. It was considered that the study of these phenomena would be a good starting point in the development of the subject's distinct pedagogical identity and in strengthening the educational basis for teacher education overall; after all, these aspects form the central elements in the teaching-learning situation. Moreover, the current ideology in teacher education highlights the importance of focusing on the development of student teachers' understanding, apart from and in addition to the development of the core competencies seen as important for teachers (see Korthagen 2004). Our thinking involved speculation as to how the teaching and learning of health education would be seen in relation to other subjects, and in the context of general discussion concerning ways of seeing teaching and learning. The need to study these educational phenomena became

all the more evident due to fact that health education teacher training takes place at the intersection of health sciences and education.

The need for the research on students' understanding was confirmed by the fact that such research has been rare among health education student teachers. Moreover, in various educational contexts there have been calls for research on this particular area. This was something that I came to see in a new light as I became increasingly familiar with the literature on *phenomenography*. As I delved more deeply into the matter, phenomenography appeared to me to be a valuable approach in studying students' conceptions, and also in developing tools for teacher educators, helping them to develop the understanding of their students in a more sophisticated direction. In Finland, there has not so far been much phenomenographic research on conceptions of a school subject, its teaching, or its learning. The few exceptions include Cantell's (2001) study on student teachers' conceptions of the objectives of geography and of its teaching and learning, Kiiveri's (2006) study on pupils' conceptions of reading (including also conceptions of its teaching and learning), and Hella's (2007) study on the conceptions of pupils and their teachers concerning Lutheranism in the context of Evangelical Lutheran Religion (considered as a school subject).

Although the phenomenographic research reported here serves mainly to provide information on the educational context that the sample was drawn from (Bowden 2000a), the findings may contribute to other educational contexts in which the aim is to develop student teachers' and teachers' understanding of the teaching and learning of health issues in schools. It was with such considerations in mind that my research evolved.

1.2   Health education as a new and independent school subject within the Finnish school system

1.2.1   The evolution of the subject in Finland

The teaching of health issues has always played an important role in Finnish basic education. Korhonen (2007) has noted that health topics were taught in schools even before 1913, when health education or "hygiene and temperance education" officially began to be taught in schools. However, health education did not have the status of an independent school subject; instead, it was taught as part of another subject (physical education), though it formed a separate entity in terms of content. In addition, health topics were integrated with other school subjects such as civic education, home economics, and biology (Korhonen 1998, 35).

One decade ago, in 2001, health education became a new school subject in basic and upper secondary schools, following ratification of the Act on Basic Education (435/2001) and the Act on the Upper Secondary School (454/2001).

The need for this educational reform was explained as due to the alarming changes that had been observed in pupils' health behaviour and health; it was recognized that there should be a subject in which pupils would gain knowledge and skills on how to take care of their own health (Hallituksen esitys 2000). It was reported that there had been an increase in pupils' ailments and disorders, including neck and shoulder pain, headaches, back pain, sleeping disorders, and daytime sleepiness (Tynjälä & Kannas 2004; Välimaa 2004; Luopa et al. 2008). At the same time it was noted that there were not sufficient means for pupils to acquire the skills to take care of their health. A Government Paper (Hallituksen esitys 2000) presented the view that health education, security skills[1], and general competencies for life management and citizenship had not been sufficiently emphasized. It also stated that the integration of these themes with other school subjects had not been successful, and that this was a serious defect. The Paper further argued that since the school as an educational institution can reach nearly all children at their most impressionable ages, it could exert influence on general public health; this would also have the effect of combating the emergence of health inequalities.

Kannas (2005) has considered the importance of health education from a more philosophical perspective. He raises questions of what is to be regarded as important knowledge or competence, and why. He argues that it is ethically questionable not to teach health issues, since everyone has the right to know about health, illness, and issues related to them, such as how to promote one's own health and that of others, and how to prevent and cure illness. He also raises questions of the kind of society and living environment we wish to have, and the kinds of human resources that allow societal goods to be created. Kannas (2005) takes the view that the purpose of health education is to build a democratic, active, and constantly developing welfare society, in which people can get help and treatment when they need it. Well-being is created when there exists a healthy and able people, and it requires a health-promoting environment (Kannas 2005).

In August 2004 the schools at basic level were able to introduce the new curriculum for basic education, in which health education was included as an independent school subject. It was stated that curriculum had to be introduced at all levels no later than 1st August 2006 (Finnish National Board of Education 2004a, 5).

In a broader development, parallel with the introduction of health education as a new subject, the entire Finnish national curriculum for basic education and the upper secondary school was revised. One of the main ideas behind changing the national core curriculum for basic education was to abolish the previous division between the upper and lower levels of basic education (Lindström 2004; Peltonen 2005). A similar notion of coherence applies to the teaching of health education. In fact, it has been explicitly stated that "instruction must be planned so that a pupil gets a comprehensive picture

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[1]   These would include, for example, first-aid skills, preventing or responding to risk situations, and fire-safety.

of health education throughout basic education" (Finnish National Board of Education 2004a, 196). Such an endeavour requires cooperation among various subject teachers and also with welfare personnel (Finnish National Board of Education 2004a). In Finland, during grades 1–6, health issues are integrated with other subjects (grades 1–4: environmental and nature studies subject groups; grades 5–6: biology/geography and physics/chemistry), while from grade 7 health education is introduced as an independent subject. There are three courses (each of 38 hours) in health education within grades 7–9 (Peltonen 2005). In general upper secondary education there is one obligatory course and two elective courses in health education, while in vocational upper secondary education and training there are 0–4 elective credits (ECTS), in addition to one obligatory course. Since the autumn of 2007, students have been able to take the subject as part of their matriculation examination, and health education has regularly been one of the subjects with the largest number of candidates.

In the context of reforming the national curriculum and of including health education as a statutory subject in schools, health has also been specified as a cross-curricular theme, one that should be taken into account in every subject. These themes represent "central emphases in educational and teaching work" (Finnish National Board of Education 2004a, 36). Here we may see similarities with countries such as South Korea, another country which (in its core curriculum for schools) emphasizes health education as a theme running through all subjects (Vitikka & Hurmerinta 2011). In Finland, health contents fall within various cross-curricular themes, including (in basic education) "growth as a person" and "responsibility for the environment, well-being, and a sustainable future" (Finnish National Board of Education 2004a, 36, 39-40); also (in general upper secondary education) the theme of "safety and well-being"' (Finnish National Board of Education 2004b, 26).

Health education is grounded on a multidisciplinary foundation covering aspects from various disciplines, including health sciences, education, psychology, and sociology. According to the national health education curriculum, *the purpose of health education* is to "promote pupils' competence regarding health, well-being, and safety" (Finnish National Board of Education 2004a, 196). The objective is a health-literate pupil. Within the framework of the school and of learning, health literacy has not been defined to any greater extent, despite (1) wide recognition of the importance of school as a context for developing pupils' health literacy (e.g. St Leger 2001; Begoray et al. 2009; Borzekowski 2009; Schmidt et al. 2010; Wu et al. 2010; Benham-Deal & Hodges n. d.), and (2) the fact that the evaluation of pupils' health literacy involves different kinds of evaluation from assessments applied to older people (Nutbeam 2008). One of the most frequently used definitions is that of Ratzan and Parker (2000, vi), who defined health literacy as "the degree to which individuals have the capacity to obtain, process and understand basic health information and the services needed to make appropriate health decisions" within a health care setting. One of the few definitions given for health literacy as a *learning outcome* in schools – together with suggestions for the constituent

parts of such literacy – is that proposed by Paakkari and Paakkari (2012), as follows:

> Health literacy comprises a broad range of knowledge and competencies that people seek to encompass, evaluate, construct, and use. Through health literacy competencies people become able to understand themselves, others and the world in a way that will enable them to make sound health decisions, and to work on and change the factors that constitute their own and others' health chances.

This definition implies that pupils should become literate about themselves, others, and the broader context they are part of. Thus, Paakkari and Paakkari (2012) argue that health literacy consists of five core components: (1) theoretical knowledge, (2) practical knowledge, (3) critical thinking, (4) self-awareness, and (5) citizenship (cf. Joint Committee on National Health Education Standards 1997; Nutbeam 2000; Kickbusch 2001; St Leger 2001; Kannas 2002, 2005). These components can be regarded as the competencies of individuals to act in a health-promoting manner. Hence, the question is not one of health behaviour as a set of particular actions; rather, it is a step to be taken on the way to healthy behaviour, as Begoray et al. (2009) suggest. Kannas (2005) argues that beyond health literacy, existing as a wider goal of health education, are health habits, and through these one's own health and that of the community. In a similar vein, Kickbusch (2008) takes the view that the level of health literacy of pupils is not just a matter of their own well-being, but also a wider economic issue. Health habits and levels of well-being serve as a mission: they encompass a goal that health education can move towards (Kannas 2005).

To become health literate, pupils have to play an active and participatory role in their own learning process, and hence the mere passive receiving of information is not enough (Finnish National Board of Education 2004a; Kickbusch et al. 2005; Paakkari & Paakkari 2012). This is in line with the current conception of learning highlighted by the Finnish National Board of Education (2011), which emphasizes a student-oriented and active learning conception – one that highlights students' activity and interaction with all the persons in the classroom (including the teacher).

The essential *content of health education* is based on pupils' growth and development, their daily living, and the human lifespan. What matters is what is topical from the point of view of the pupil, the local community, and the school (Finnish National Board of Education 2004a; see also Rimpelä 2000). In the national curriculum for basic education for grades 7–9, the core contents are divided into four broader topics: *growth and development, health in choices in daily living, resources and coping skills*, and *health, society, and culture*. In general upper secondary education the themes move from *factors influencing health and diseases* and *the development of self-care skills* (these belonging to a compulsory course), to more comprehensive knowledge of the following topics: the health resources needed in everyday life, health habits and means of coping, responsible adulthood and parenthood (specialization courses) (National Board of Education 2004b). Similarly, at general secondary level, the teaching content reflects more clearly than in basic education the importance of examining health

phenomena via scientific/empirical knowledge and values, and of moving from individual to social/communal aspects.

The emphasis on wider content themes reflects the extent to which the new curriculum was built around such broad themes, rather than round more specific content areas. In fact, before health education entered the Finnish curriculum as a specific entity, the National Health Education Standards Document (see Joint Committee on National Health Education Standards 1997) with its list of health content areas had influenced and guided the views of teachers, teacher educators, and researchers concerning what should be taught in schools (cf. Korhonen 1998).

1.2.2   The evolution of teacher training in health education

The new school subject imposed new demands on teachers. It was decreed that by the beginning of August 2012, teachers of health education must have the teaching qualifications required for a subject teacher (i.e. a teacher specializing in and teaching the content of one particular school subject) (Valtionneuvoston asetus 2001). However, during the transitional phase (lasting until 31st July 2012) teachers of biology, home economics, physical education, social studies, and psychology would be regarded as qualified for teaching health education at the basic education level.

Teacher training in health education began in August 2002. It consists of basic level (25 ETCS) and intermediate-level (35 ECTS) multidisciplinary studies in health education. To be qualified as a teacher in health education, both basic and intermediate levels must be taken. Teacher training is provided within both pre-service and in-service education. Moreover, not just universities but also open universities[2] offer health education teacher training leading to health education teacher certification. The contents of the various teacher training programs are fairly similar. Nevertheless, differences exist between the education suppliers, with (for example) some universities focusing more on content knowledge and others on both content and pedagogical content knowledge. Since my research was carried out at the University of Jyväskylä, which could be said to be the main context for health education teacher training in Finland, I shall here describe that education in more detail.

In the University of Jyväskylä the main group of students doing teacher training in health education is composed of students of physical education. In

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[2]   An open university can be defined thus, according to the Open University of the University of Jyväskylä (Jyväskylän yliopiston avoin yliopisto 2011):
Open universities form part of the Finnish adult education system. A total of 19 Finnish universities provide open university education in order to promote educational and regional equality. […] The education is founded on research and complies with the undergraduate curricula of Finnish universities. Open university education is open to all residents in Finland, regardless of age or educational background. […] Open university education is arranged in cooperation with university departments. Its objectives and requirements correspond to those of degree studies. Open universities cannot award degrees, but credits are transferable and can be incorporated into a university degree.

fact, physical education teachers comprise the main group of teachers who teach health education (as their second teaching subject) in schools. This may be due to historical factors – since health education has traditionally been taught within physical education – or else due to nature of the subject (since both subjects focus on health matters). During the years 2006–2009 it was possible to take health education as a major subject, and each year 5–10 students entered this program. However, due to uncertainties concerning teacher recruitment – i.e. how far there will in future be a national need for teachers with health education as their main teaching subject – this type of admission has been put on hold for the time being.

The teacher training in operation has been built around the core competencies for health education teachers, which are (1) the teacher's grasp of research (or "investigative touch"; see Rautajoki 2009), (2) content knowledge, (3) pedagogical content knowledge and interactive skills, (4) ethical awareness, (5) knowledge of the pupils as learners, (6) the teacher's self-knowledge, and (7) knowledge of the school as an operational environment. These competencies have been regarded as the core competencies in terms of the nature and the aims of the school subject, the literature on teacher education, and teachers' core competencies in general. The aim has been to form a coherent program that will emphasize the linkage between educational and health phenomena, rather than presenting an "atomistic" view that would tend to blur the connection between education and health – as has been reported to be the case in England (Speller et al. 2010).

At the time when this research began (academic year 2004–2005), *basic studies* covered themes such as the life course of children and young people, special issues in school health education, health education content knowledge (tobacco and drugs, mental health, sexual health, traffic and safety), pedagogical content knowledge, and health-enhancing physical activity. In addition, *intermediate level* teacher training consisted of courses covering mainly the following areas: health education content knowledge (e.g. nutrition and physical exercise, health gerontology, the environment and well-being), pedagogical content knowledge, teaching materials for health education, research on health promotion among children and young people, and the school as a context for health promotion. Since then, the curriculum for intermediate level studies has been revised twice. Currently the program consists of courses covering the following themes: the expertise of health education teachers, pedagogical content knowledge (including also teaching materials), and health education content knowledge (i.e. nutrition and physical exercise, health gerontology, the environment and well-being, sexual health, mental health, rest and sleep). At the present time there is also a separate teaching practicum component within the studies.

1.3 Education aimed at developing university students' thinking

It is widely accepted that an important role of education is to help students to gain the ability to deal with the changing and largely unpredictable situations that may arise in the future (e.g. Combs 1981; Bowden & Marton 1998, 6; Barnett 2004). Education developers have tended to focus on the kinds of skills that students will need when they enter working life, and have aimed to build education on these skills. Teacher education has generally accepted the need for these endeavours. The list of skills that student teachers should gain during their teacher education has often been linked to the question of "what makes a good teacher" (see Korthagen 2004).

Korthagen (2004) has reviewed the historical route of teacher training, and noted that in the middle of the 20th century performance-based (i.e. competency-based) models became popular; a need was seen for explicit and measurable behavioural criteria in the teaching of student teachers. However, this approach did not escape criticism. It was argued that the long list of all the possible skills to be taught and measured led to a fragmented view of the role of the teacher, and that it did not take into account other qualities that teachers should possess. In this context, it is reasonable to ask whether we are truly able to predict the needs of working life and to define the kinds of skills that will be needed to perform competently (see Bowden & Marton 1998, 105). After all, the world we are living in is not just complex, but supercomplex, as argued by Barnett (2009) – meaning that the world is not merely overwhelmed with knowledge, but crammed with knowledge that is susceptible to multiple interpretations.

Later, around the 1970s, teacher education adopted a more humanistic approach, focusing on the process of becoming a teacher and on the teacher as a person (Korthagen 2004; see Watts 1978). This approach, too, was criticized. One critical voice was that of Watts (1978), who commented on Combs's (1978) view that perceptual-humanistic psychology should serve as a framework in constructing guidelines for teacher education. Watts discussed the notion of "therapy" in teacher education, and argued that humanistic psychology should not have a predominant role. As he saw it, "its emphasis on process rather than outcome has encouraged the graduation of students with limited knowledge, skills, and abilities", leading to problems later on. He took the view that teacher education should "identify the knowledge, skills, and abilities necessary for effective teaching, then structure the program to specifically develop those objectives"; furthermore, teaching certificates should be awarded on the basis of competency-based evaluations (Watts 1978, 90).

Despite such reservations, the humanistic turn in teacher education was an important step in shifting the emphasis onto student teachers' reflective skills and their professional identity (see Korthagen 2004); thus terms such as "reflection-on-action"(Schön 1983) and "inquiry-oriented-teacher education" (e.g. Zeichner 1982) became more popular in discussions on teacher education.

Learning to inquire (i.e. critical thinking) was expected to help teachers to cope with problems in their work (Zeichner 1982) and to look at the world from various perspectives (including that of their pupils), using that understanding in such a way as to develop their teaching to meet the needs of the pupils (Darling-Hammond 2000). Hence, in conjunction with reflection and open inquiry, Darling-Hammond (2000) mentions the enlargement of perspectives and the crossing of boundaries.

Even at the present time one can identify the classical controversy between the performance-based view and the humanistic view (Korthagen 2004). But Korthagen also warns against limiting the discussion to these two lines of thinking, bearing in mind that the teacher's role, teaching, and teacher education are more than these. One of the important elements to be taken into account (but too often ignored) is student teachers' ways of understanding learning and teaching; after all it is largely these ways of understanding that determine teachers' actions (see Kortahagen 2004). Bowden and Marton (1998, 7) share Korthagen's opinion; they point out that since we are not able to list all the possible skills that students will need in the future, we should support students in discerning the aspects that are most critical for handling different types of situation. For student teachers, this would mean helping them to differentiate, within a particular teaching-learning event, the aspects that will help the pupils to learn. Thus, the role of the teacher educator is to prepare the teacher trainees to discern those aspects in future teaching situations. What is at stake here is preparation for the unknown, since we cannot know how teaching-learning situations will unfold.

Similarly, it has been suggested that when one is evaluating students' learning in higher education, the emphasis should be on measuring changes in understanding rather than measuring merely performance (Micari et al. 2007). As the evaluation of learning shifts to assessing learning as *a change in or widening of one's ways of experiencing the object of learning*, the focus moves away from assessing learning in terms of *what* students know, towards *how* they know (see van Rossum & Hamer 2010, 573). As a research tradition, *phenomenography* is of real value for the purposes of educational evaluation, since it makes it possible to examine and describe the variation in students' qualitatively varying ways of experiencing the object of learning, and to study the development in these ways of experiencing (see Micari et al. 2007).

1.4 Phenomenography as a tool for evaluating student teachers' understanding

1.4.1 A non-dualistic and relational perspective on the object of research

Phenomenography as a research tradition aims to capture the qualitatively varying conceptions held by a group of people about one particular phenomenon. It was first used as a term for this purpose by Ference Marton (1981), when he described the research approach that he had developed with his research group in Sweden during the 1970s (Hella 2003). As a term, phenomenography derives from the Greek words *phaimenon* (appearance) and *graphein* (description); hence the interest of phenomenography is in "the descriptions of things as they appear to us" (Pang 2003).

Phenomenography is founded on a non-dualistic relational understanding. According to the non-dualistic ontological perspective there is no objective world *per se*, separated from the subjective world (Marton 2000). In other words, the phenomenon (the world) cannot be viewed nor examined as an object without someone being the viewer or examiner of that phenomenon. The way the world or the phenomenon appears is always influenced by the person, and vice versa. This being so, as Hella (2008, 345) points out, "the question of knowledge constitution is based on changes in this internal relationship" and "reality is seen in terms of the totality of all the possible ways of experiencing it". People gain knowledge of various phenomena through their own experiences of those phenomena, and by relating their experiences to other people's experiences of the same phenomena (Hella 2008). Thus, it could be said that there is only "one world" – although that world is experienced differently by different people. Moreover, in line with the non-dualistic perspective, the different ways of experiencing the same thing are seen as internally related through that same experienced object (Åkerlind 2003). By contrast, one could say that the dualistic view, or dualism, conceives the existence of an outer world separated from the individual and his or her inner world (Bowden & Green 2010a).

In phenomenography, the central notion is a conception or way of experiencing, understanding, or seeing something (Marton 1981; Marton & Booth 1997, 111). Seen in this light, the objective of research is to identify and describe the variation in ways of understanding by the subjects (Marton & Booth 1997, 111; Pang 2003), the "understanders". In other words, the aim is to examine the qualitatively varying ways of experiencing the target phenomenon and to describe the relationships between them (Marton & Booth 1997, 124; Hella 2003). It is assumed that there exist only a limited number of ways of experiencing something, and that (since these qualitatively varying conceptions describe the same phenomenon) these ways are logically related to each other. The entity within which these different kinds of conceptions are organized in a logical and often hierarchical manner is called the *outcome space*. More precisely,

one could say that the outcome space is constituted from the structured set of the categories of descriptions formulated in relation to each other; and furthermore, that these categories of descriptions should capture as faithfully as possible the qualitatively varying ways of seeing something (Marton & Booth 1997, 125; Bowden 2000a). Svensson (1997, 168) puts the matter as follows:

> The category is a description of what is the common meaning of the meanings of a phenomena grouped together. The categories are based on comparison and grouping of data representing expressions of conceptions. The categories are not general characterizations of the conceptions but forms of expressing the conceptions.

The outcome space describes the collective understanding of something by a group of people, at a certain point in time, and in a certain context (see Marton 1981). We can say that phenomenography takes a *second order perspective,* in that it aims at understanding *the way a group of individuals perceive the target phenomenon* and not the phenomenon *per se* (which would represent the first-order perspective). In other words, the object of the research is the relation between the subjects and the phenomenon (Marton 1986), as aptly indicated by Bowden (2005) in Figure 1. In this context, relationality means "the variation in meaning of a phenomenon across people, time, process, and situation" (Bowden & Green 2010a, 110).


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                          RESEARCHER


        Relation            Object          Relation
       between the            of           between the
      researcher and        study        researcher and
       the subjects                       the phenomenon



   SUBJECTS  <------------------------------------>  PHENOMENON
          Relation between the subjects and the phenomenon
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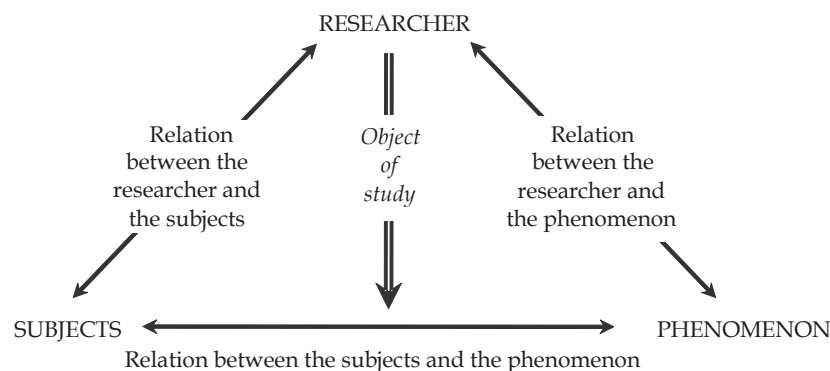
FIGURE 1   Phenomenographic relationality (Bowden 2005)

1.4.2   "Old" and "new" phenomenography

In recent years a distinction has been made between "old" and "new" phenomenography (e.g. Pang 2003). The division highlights developments that have taken place in the discipline. "Old" phenomenography refers mainly to the research described above, in other words, research focusing on the question, "What are the different ways of experiencing the phenomenon?" (Pang 2003).

The ultimate aim is to develop full descriptions of the variety of ways of experiencing the target phenomenon (Bowden 2000a). However, the "new" phenomenography (also called *variation theory* or *theory of variation*) moves on from this. It shifts the questions to "What is a way of experiencing something?" and "What is the actual difference between two ways of experiencing the same thing?" (Pang 2003). At the same time, according to Tan (2009), the emphasis changes from a merely methodological and descriptive orientation towards a theoretical, analytical, and pedagogical approach.

Theoretical direction. The *theoretical aspect* of the "new" phenomenography aims at answering the first question, regarding *what is a way of experiencing something* (Tan 2009). A way of experiencing something involves identifying that something, and discerning it from its context. Marton and Booth (1997, 86) give as an example a deer in the woods. To be able to see or experience a deer *as* a deer, one has to be able to differentiate it from other animals, that is, to assign to it a particular meaning. Further, to see the deer one has to discern it from the bushes and trees that surround it, and to see where it begins and where it ends (its contours). Besides being able to discern something (a whole) from its context, one should be able to discern the constituent parts of it (the deer's body, head, antlers, etc.), and see how the parts relate to each other and to the whole. In other words, a person's way of experiencing an entity involves *being aware* of that particular entity. A person's way of experiencing or a conception of something is built on the aspects that the person is able to discern simultaneously, that is, on the aspects that are focal in her or his awareness at a particular point in time. As Marton (1996) argues, discernment and the simultaneous awareness of certain aspects constitute the *structural* aspect of the conceptions or ways of experiencing, whereas the *referential* aspect is the meaning of what is discerned and seen. Thus, it can be said that the structural and referential aspect of the conceptions are intertwined, occurring at the same time as a person experiences something (Marton & Booth 1997, 87).

Analytic direction. In phenomenographic literature, awareness is often understood and described as Gurwitsch (1964) describes it (see Marton & Booth 1997; Marton 2000; Cope 2002). It is the structure of the awareness that can be used as *an analytical framework* for answering the second question of the "new" phenomenography, namely, *What is the actual difference between two ways of experiencing the same thing?*

In referring to and interpreting Gurwitch, Cope (2002) envisages awareness as made up of three nested layers, namely *margin, thematic field,* and *theme*. In a particular situation and context, a person will be aware, for example, of learning in a certain way, and the group of aspects that she or he relates to the learning is called the *thematic field*. However, when one asks the person how she or he understands learning, only some of the aspects from the thematic field will emerge or come to mind at that particular moment, thus emerging as more critical than the other aspects in the thematic field (see Tan 2009). These aspects of learning that are within focal awareness constitute the *theme*. Another time and another place might cause other aspects to emerge from the thematic field

into focal awareness, resulting in a different theme. Moreover, a situation during which a person ponders his/her learning may also include aspects that do not relate to the object of reflection, but aspects of which the person is nevertheless distantly aware. Thus, he or she may be aware of surrounding scents, or may hear a hum of voices in the environment. These aspects which are part of the context but which are not related to the object of reflection constitute the *margin*.

As mentioned previously, phenomenographic research produces an outcome space where the categories of description are hierarchically ordered. This means that the categories lower in a hierarchy represent a less complex, advanced, powerful or sophisticated way of experiencing something, whereas the categories higher in a hierarchy represent more complex, advanced, powerful, or sophisticated ways of experiencing the same thing (see Marton & Booth 1997, 107). According to Cope and Prosser (2005), the categories that are higher in a hierarchy represent increasing focal awareness: they include more aspects related to understanding the target phenomenon, and/or more (or better described) links between the aspects, and/or a deeper conceptualization of one individual aspect. Thus, the conceptions *do not form a continuum* (but cf. Kember 1997), being rather a nested, hierarchical organization encompassing the breadth in awareness of the target phenomenon (Åkerlind 2003). Marton and Booth (1997, 125) go further, arguing as follows:

> The different ways of experiencing the phenomenon can even be seen as different layers of individual experiences. People as a rule are not consciously aware of layers of experience of earlier date, but we can assume that they are present as tacit components of more advanced ways of experiencing a phenomenon. […] Curiously enough, this implies that we can understand the anatomy of an individual's awareness by looking at others', less complex, awareness.

However, it should be noted that it is the researcher who, through the data analysis, defines what ways of understanding are more advanced and what are less advanced (see Marton & Booth 1997, 107).

Pedagogical direction. *The pedagogical aspect* of the "new" phenomenography refers to the notion that in phenomenography, the interest is not in all the possible aspects, but only in those aspects that are critical in describing the differences between various ways of experiencing the same thing. These aspects, called *educationally critical aspects*, reveal what is needed to gain a more complex, complete, or advanced way of understanding (Marton & Booth 1997, 111; Runesson 2006), and, therefore, they are well adapted to pedagogical purposes. For Marton and Booth (1997, 111), the changes involved in these critical aspects are what they take to be "the most important kind of learning". If the teacher is able, on the one hand, to take into account the students' prevailing conceptions and experiences, and on the other hand, to discern the critical aspects differentiating the various ways of experiencing, there is great potential for bringing about purposeful learning among the students (Lo et al. 2004). Moreover, it is important that teachers should see the variety that exists in the ways of understanding the teaching of the subject, and understand the

critical differences between their current understanding and the capability that is desired (cf. Dall'Alba 2000; McKenzie 2002; Lo et al. 2004).

Within the research literature one can observe differences in how the critical aspects have been understood and applied. Here, I think, we come to the point that I would regard as critical in understanding research following the path of the "new" phenomenography – hence critical also in relation to my own way of conducting research, as written up in this thesis. In fact, in my opinion, it is in the way of understanding a critical aspect that one can identify a divergence between two ways of doing the "new" phenomenography.

The first way of seeing a critical aspect is to view it as a critical feature of a certain type of disciplinary knowledge or target understanding (Cope & Prosser 2005; cf. Entwistle & Smith 2002). The target understanding derives from the curriculum specific to a particular discipline, though it will be interpreted by the teacher in the manner in which he or she presents it to the students (Entwistle & Smith 2002). As an example, Marton and Pang (2008) argue that in the discipline of economics, learning about price includes the critical features "demand" and "supply"; thus economics as a discipline defines those features as critical for students to know (i.e. to discern and to focus on). These kinds of critical features are part of the teacher's (subject matter) content knowledge (see Marton & Pang 2008) – in other words the teacher's subject-specific knowledge about (i) what he or she regards as important for students to know, and for what reasons, and (ii) how this domain-specific understanding is related to other issues both within and outside the discipline (Shulman 1986). Recently, critical aspects (in terms of disciplinary knowledge or target understanding) have been related to discussion of *threshold concepts*. Indeed, Cope and Prosser (2005) argue that a threshold concept appears to be "equivalent to the educationally critical aspects of a target understanding of a phenomenon" (p. 353). According to Land et al. (2010, ix) threshold concepts cover the idea that

> there are certain concepts, or certain learning experiences, which resemble passing through a portal, from which a new perspective opens up, allowing things formerly not perceived to come into view.

The second way of interpreting and applying critical aspects is to regard them as critical differences between students' qualitatively varying ways of understanding something; thus they can reveal an increasing breadth of awareness (see Åkerlind 2004, 2005a). In this context, the notion of "critical" means the variation that differentiates one way of seeing from another, qualitatively different way of seeing. By contrast, "non"-critical variation describes a variation that exists within one particular way of seeing, but not between a set of qualitatively varying ways of seeing (Åkerlind et al. 2005). These kinds of critical aspects evolve from the students' personal knowledge of the object of learning (cf. Entwistle & Smith 2002), and cannot be defined in advance by the teacher, using only the curriculum. Viewed in this way, critical aspects relate to and contribute to the teacher's pedagogical content knowledge (Marton & Pang 2008), which involves both (i) subject-specific knowledge and

(ii) an understanding of ways of teaching the particular content matter (Shulman 1986, 1987) to a particular group of students. The interest, then, is in what the teacher has to take into account when he/she is aiming to develop students' understanding of the object of learning in the direction of increasing complexity (see Marton & Pang 2008). Here, I find similarities with Bowden's (2000a) developmental phenomenography, which is in fact rooted in variation theory (Green 2005a). Whereas the ultimate aim of the "old" phenomenography was to give a full description of ways of experiencing something, developmental phenomenography continues from here, aiming to apply the outcomes of research in order to help students (the subjects of the research) to learn, and to expand their thinking (Bowden 2000a).

The present research follows the "new" phenomenography, seeing the critical aspects as *critical differences between qualitatively varying ways of experiencing (i) health education, (ii) its teaching, and (iii) its learning*. The overall interest is in obtaining findings that might help health education teacher educators to support the development of their student teachers' understanding of these three phenomena. Learning in this sense means coming to see health education and its teaching and learning in a more complex way, shifting from a less complex understanding towards a more complex understanding (cf. Booth 1997; Marton & Booth 1997). The hierarchical structure of the findings involving the critical aspects provides a basis for the teacher educator in planning for learning conditions that will support the expansion of students' awareness (see Bowden 2000b). In addition, as mentioned previously, the findings may help students to become aware of their current way of seeing the object of learning; aware, too, of the differences between their understanding, that of others, and the capability that is desired. Similarly, the focus of the education moves from being merely on skills towards being also on understanding.

The focus on supporting the expansion of students' awareness of the object of learning calls for a shift from assessing *what* students know, towards *how* they know (see van Rossum & Hamer 2010, 573), and more importantly, from measuring merely performance to measuring changes in understanding (Micari et al. 2007). What should be noted here is that in the phenomenographic research tradition, conceptual change is *not* understood as a *replacement* of one conception by another, but rather as an expansion of one's understanding (cf. Åkerlind 2008). In fact, Åkerlind (2008) would not refer to the conceptual *change* approach in phenomenography, but rather to the conceptual *expansion* approach. Marton and Pang (2008) do not make such a differentiation between the two approaches, though they agree that a conceptual change in phenomenography is not about a change in what a person has, or about something that can be replaced, changed, or added to. It involves a change in the world experienced by the person, with the person becoming able to see the same thing in another, more qualitatively advanced, powerful, or complex way (Marton & Pang 2008).

1.5   Why should we study student teachers' conceptions?

The need for research focusing on identifying and describing ways of experiencing something has often argued in terms of the contextual nature of conceptions (e.g. Gao & Watkins 2002). For his part, Trigwell (2000) notes that understanding various ways of seeing the object of learning and/or research is fundamental in itself. However, there are also other perspectives on the need to study conceptions.

Devlin (2006) has suggested that the arguments behind the need to study teaching conceptions with a view to developing one's teaching fall under three main assumptions concerning the conceptions: (i) there is a clear causal relationship between teaching conceptions and teaching practices, (ii) the development of one's teaching depends on the existence of student-focused teaching conceptions, and (iii) there are limitations in the skills-based approach when one is aiming to develop teaching. Though Devlin's focus on teaching conceptions occurred mainly in the context of developing academics' teaching, we may consider these assumptions to hold good in the context of teacher education as well. Thus, in the end, the aim of teacher education would be to develop the kinds of capabilities that result in "powerful ways of acting" in the classroom; moreover, these "powerful ways of acting derive from powerful ways of seeing, and the way something is seen or experienced is a fundamental feature of learning" (Marton et al. 2004, 8). However, I wish to expand the discussion to include also the importance of studying conceptions of learning and of the subject matter, since the individual's conceptions have, in general, been thought to be associated with his or her actual ways of behaving (Marton & Booth 1997). Moreover, I shall add one further assumption for a profitable examination of the conceptions (constituting the fourth assumption), namely that *the students' qualitatively varying conceptions of the object of learning form an important part of the educator's pedagogical content knowledge.* What follows is a more detailed analysis of these four assumptions. For logical reasons, I shall present the assumptions in a different order from the one given above, and introduce some modifications.

1.5.1   1st assumption: there is a clear causal relationship between the teacher's conceptions and his or her teaching practices, and ultimately between the teacher's conceptions and the students' learning

As indicated above, Marton and Booth (1997, 111; see also Marton 1996) argue that a person's capability to act in a certain way is intertwined with his/her capability to experience something in a certain way, since "you cannot act other than in relation to the world as you experience it". Ways of seeing, understanding, and experiencing the world, i.e. conceptions, are like lenses through which a person reads, interprets, and make assumptions about the world (see Pratt 1992). Moreover, as Shulman (1987, 7) argues, "teaching necessarily begins with a teacher's understanding of what is to be learned and

how is it to be taught". Thus, it can be assumed that the teacher's ways of understanding the subject matter, its teaching, and its learning will influence the way she or he approaches a particular subject, and the learning she or he aims to support and achieve among the students.

Studies on the link between the teaching conceptions and teaching practice can be divided into two major groups: (i) studies on the relationship between *reported* teaching practices (often referred as *espoused theories in action*) and teaching and/or learning conceptions (e.g. Trigwell & Prosser 1996; Kember & Kwan 2000; Kember et al. 2001; Lam & Kember 2006; Laksov et al. 2008), and (ii) studies on the relationship between *observed* teaching practices (often referred as *theories-in-use*) and teaching and/or learning conceptions (e.g. Meyer et al. 1999; Water-Adams 2006; Markley et al. 2009). Often, critical views on the link between conceptions and practice have been directed at the former branch of research (see Kane et al. 2002; Eley 2006). For instance, Kane et al. (2002) are sceptical of studies that make assumptions about teachers' practice (which they refer to as "theories-in-use") based on reported beliefs (which they refer to as "espoused theories of action"); they claim that such studies do no more than reveal these espoused theories – in other words the ideas, intentions, and aims that teachers express about teaching – and thus tell only half of the story. Argyris (1980, 296) sees a need to be clearer about the terms "espoused theory" and "theories-in-use", claiming that "the difference between espoused theory and theory-in-use is *not* a difference between what people say and how they behave", as Kane et al. (2002) have presented the matter. For Argyris (1980), theories-in-use are real and distinctive entities, though they may not actually be articulated. As theories, they may guide and produce the actions observed. However, they are only theories, and are thus not identical with the actions themselves. Thus, the difference between what one says and how one behaves is more properly to be seen as reflecting the difference between *espoused theory* on the one hand and *practice* on the other (Argyris 1980).

Studies on the link between the teacher's approaches to teaching and the students' approaches to learning and eventually to outcomes are rare. One of the few studies to be conducted was that of Trigwell et al. (1999); the researchers built their study on earlier findings which had shown an association between teachers' conceptions and practices, and an association between students' learning approaches and their learning outcomes. Their own study was on the teacher's *reported* approach to teaching and the students' *reported* approach to learning. Trigwell et al. (1999) found that a transmission/teacher-focused approach to teaching was more likely to be linked with the students' adoption of a surface approach to learning. In addition, a similar though less strong link was identified between the teaching staff's report of a conceptual change/student-focused approach to teaching and students' reported adoption of a deeper approach to learning. Given that a link has been found between students' approaches to learning and the quality of their learning outcomes (e.g. Zeegers 2001; Bernardo 2003), an assumption can be made concerning the

existence of a link between teachers' conceptions and students' learning outcomes.

The critical point is how to understand what teachers' descriptions of their own teaching (i.e. reported practices) represent in research of this kind: whether they are merely ideal descriptions of what one might do, or genuine descriptions of something that really happened, hence capturing actual teaching practices. One could think that asking student teachers (people with no or only limited teaching experience) to describe "their teaching" would, in fact, reveal their *espoused theories*, in other words, their intentions and aims in conducting their teaching. One might also think that because the *theories-in-use* that have been thought to guide actual teaching practice are *tacit* in nature (Argyris & Schön 1976, 10-11), student teachers (with teaching experience) or teachers may not necessarily be able to bring them into their focal awareness when research interviews are conducted. This could mean that they are mainly able to describe only what they would *like* their teaching to be, with the implication that it is only the *espoused* theories are revealed. Nevertheless, one could equally take the view that the interview – i.e. the discussion between the researcher and the student teacher or the teacher – may help the interviewees to reflect on the (often implicit or tacit) *theories-in-use* that they hold, and to make them explicit. Thus, interviews may enable student teachers or teachers to reflect on what lies directly behind their actual behaviour – assuming, in line with Argyris (1980), that theories-in-use exist, that they are strongly linked to what people actually do, and that they are manifested by their behaviour (Argyris & Schön 1976, 9). However, it remains possible that in interviews they may not be able to verbally express all the aspects of their practice; hence what they say in an interview may tell only half of the story.

In general, research on the relationship between teachers' ways of understanding and their actual practice seems to show mixed results. While some researchers argue that there is a substantial contradiction between teaching conceptions and teaching practices (Laksov et al. 2008; Markley et al. 2009), others support the view that there is a fairly clear relationship between teaching conceptions and actual teaching practices (Trigwell & Prosser 1996; Kember & Kwan 2000; Kember et al. 2001; Lam & Kember 2006; Waters-Adams 2006).

Laksov et al. (2008) found a fairly clear discrepancy between (reported) practices and learning conceptions. They suggested that this may be due to the context in which teaching takes place: if the context prefers teaching based on the transmission of knowledge, this may overrule the teacher's own preference to use other kinds of teaching strategies. On the other hand, Meyer et al. (1999) found that among student teachers, the contradiction between the observed practice and students' conceptions may appear also in such a way that the observed teaching may reflect a *more* advanced understanding of teaching than the conceptions the student teachers express concerning teaching. The researchers also found that this discrepancy became less obvious when the student teachers became more aware of their own teaching.

On reading about studies reporting a link between practice and conceptions, one may observe nuances in claims concerning the strength of the link. Kember and Kwan (2000) referred to a "direction of causality" (p. 486), though they also used softer expressions, suggesting that the approaches are "strongly influenced by the lecturer's conception of teaching" (p. 489). Others have made claims in terms of conceptions (i) shaping teaching practice (Kember et al. 2001), or (ii) having a statistically significant (Trigwell & Prosser 1996) or logical (Lam & Kember 2006) relationship with the teaching approaches used in the classroom.

The overall findings of previous research indicate that causal relationships between the teacher's conceptions and his/her actual behaviour have been difficult to establish, and that in fact there is no clear-cut association. Nevertheless, one might reasonably assume that they are intertwined with each other, as Marton and Booth (1997) suggest. Here one should note the important difference between Devlin's (2006) *interpretation* of (mainly phenomenographic) research on the link between conceptions and practice and the (phenomenographic) literature on the topic; Devlin (2006) argues that many researchers tend to argue for a direct causal relationship between teaching conceptions and teaching practice, though in fact theory- and empirically-driven arguments tend to support an association involving something other than direct causality.

1.5.2 2nd assumption: the students' qualitatively varying conceptions concerning the object of learning form an important part of the educator's pedagogical content knowledge.

The second assumption highlights the fact that that understanding students' various ways of experiencing the object of learning and the critical differences between them constitutes an essential part of the knowledge base that educators should possess. Shulman (1986, 9), whose work on teachers' subject knowledge and pedagogy has been an indisputable starting point in the field (see Banks et al. 1999), has suggested that the conceptions of the students should be regarded as part of the teacher's *pedagogical content knowledge*, which for its part is a kind of content knowledge that expands "knowledge of the subject *per se* to the dimension of subject matter knowledge *for teaching*". Thus, the dimensions of the teacher's knowledge base are constituted by pedagogical content knowledge in conjunction with content knowledge, general pedagogical knowledge, curricular knowledge, knowledge of the learners and their characteristics, knowledge of the educational context, and knowledge of educational aims, purposes, and values (Shulman 1987).

Shulman (1986) argues that as part of pedagogical content knowledge teachers should understand what makes the object of learning easy or difficult for students; in other words, a teacher should understand the conceptions that students hold about a particular topic. He mentions the importance of research that can highlight students' *mis*conceptions and achieve an understanding of how to transform these conceptions. In one of his most cited essays (entitled

Those who understand: Knowledge growth in teaching), Shulman (1986, 10) argues that "such research based knowledge, an important component of the pedagogical understanding of subject matter, should be included at the heart of our definition of needed pedagogical knowledge".

Phenomenographic research on conceptions of the object of learning serves as a tool to reveal not just misconceptions but also qualitatively varying ways of understanding a particular topic. Moreover, the critical aspects (viewed as critical differences between various conceptions) describe what teachers (in the present case teacher educators) should focus on in supporting a transformation or expansion of thinking concerning a particular topic. I would argue that knowledge about these varying ways of understanding the object of learning and the critical aspects belongs at the very heart of our understanding of what constitutes pedagogical knowledge.

Thus, we can in fact suggest that pedagogical content knowledge – considered as an understanding of how the particular content of a subject should be taught – covers an understanding of how students see the content to be taught, and also of the critical aspects differentiating the various ways of seeing that content (Marton & Pang 2008). Similarly, teachers should gain an understanding of what their students are *not* able to discern and focus on; after all, pedagogical content knowledge is always formulated in the context of the curriculum of the subject, and there are certain issues that students are expected to learn.

As mentioned previously, the educationally critical aspects (i) enable educators to understand how to deepen or expand students' understanding in a more sophisticated or complex direction, and (ii) enable students to see the variety that exists in the ways of understanding the objectives of the learning (meaning in the present case the understanding of learning and teaching that takes place in health education); and also to understand the critical differences between their current understanding and the capability that is desired (cf. Dall'Alba 2000; McKenzie 2002; Lo et al. 2004). Hence, from the pedagogical perspective, studying conceptions as part of pedagogical content knowledge is crucial. This is something that has not previously been done in the field of health education.

1.5.3 3rd assumption: the development of teaching depends on the existence of student-focused conceptions among teachers

It has been argued that there are a limited number of ways of seeing various phenomena (Marton 1981; Lo et al. 2004) such as teaching and learning, and that they can be organized into a hierarchical order in which the conceptions lower in a hierarchy represent less advanced ways of seeing, and similarly, the conceptions higher in a hierarchy represent more advanced ways of seeing. One of the papers on teaching conceptions most referred to is that of Kember (1997), who described the teaching conceptions of academics. He found that the teaching conceptions reported in various papers could be grouped into five categories: *imparting information, transmitting structured knowledge, student-teacher*

interaction/apprenticeship, facilitating understanding, and *conceptual change/intellectual development.* These five categories can be organized into two broad orientations, with the first two categories representing teacher-centred/content-oriented conceptions of teaching, and the last two categories representing student-centred/learning-oriented conceptions. A third category, a "transitional" or "intermediate" conception, serves as a link between the two orientations. Several later studies have reported similar findings, with the same two broad orientations emerging (Samuelowicz & Bain 2001; Chan & Elliott 2004; Chan et al. 2007), though doubts have been expressed concerning the transitional category (Samuelowicz & Bain 2001; see also Prosser et al. 2005).

Kember (1997) has argued that the two orientations form a continuum. This might suggest that if a person is holding one kind of conception she or he will not show awareness of the other kinds of conceptions, because she/he can only "stand" at one particular point in a continuum at any given time. However, this is not seen as true within the phenomenographic research orientation. The various conceptions or ways of understanding teaching are seen as relational and organized within a hierarchy (Åkerlind 2003), from which it follows that "student-focused" conceptions can actually be seen as more advanced, more complex, and more sophisticated, and by contrast that some "teacher-focused" (in the sense of content-focused) conceptions can be seen as less advanced, less complex, or less sophisticated. Thus, people holding a student-centred understanding of teaching may also encompass a teacher-centred understanding.

Devlin (2006) summarized and interpreted earlier literature on teaching conceptions. She noted that the development of teaching and the creation of high-quality learning outcomes are generally thought to require teachers to hold student/learner-centred conceptions of teaching rather than teacher/content-centred conceptions. However, Devlin (2006, 114) also wondered whether a focus on students' high-quality learning outcomes would truly require the teacher to hold a student/learning-focused conception of teaching, asking: "Is it necessary for a teacher to hold a student/learning-centred conceptions of teaching in order to be an excellent teacher?" She framed the question thus:

> But does such a *focus* [on student learning] necessarily mean they must hold a student-centered *conception* of teaching, and do so from the beginning? In terms of teaching and learning outcomes, is it possible that being aware of and/or focused on students and their learning could be equivalent to holding such a conception?

She suggested that these two orientations, as Kember (1997) calls them, should be seen as two independent dimensions rather than two endpoints on a single dimension. This way of seeing would make it possible to focus on developing both orientations "rather than assuming that one must necessarily precede the other" (Devlin 2006, 115).

In reality, it seems unnecessary to say that the focus on teaching and the focus on learning should be seen as separate dimensions, as proposed by Devlin (2006); rather, they could be seen as nested and inclusive – as

phenomenographic findings often are. Similarly, in response to Devlin's question concerning whether a person's awareness of students and their learning is equivalent to holding a learning-/student-focused conception, the answer from a phenomenographic perspective is "yes": having a conception of something is indeed the same as being aware of something (Marton 1994).

One important aspect to consider here is whether one should distinguish between teacher-focused and student-focused conceptions, or between transmissive and facilitative conceptions, or between knowledge/content-focused and learning-focused conceptions. All these categories have slightly different connotations; the first highlights *who* is in the central place during the teaching-learning situation, the second highlights *the act* of a teacher, and the third highlights *the centre of attention* of the teaching. I would prefer to use the third option since it is only then that learning-centred conceptions can contain the view of the teacher as a learner, and only then that the understanding of teaching can expand to focus on not only on the students' learning but also on the teacher's learning during the teaching-learning event. Hoveid and Hoveid (2008, 131) put the matter thus:

> If the event [of teaching and learning] is about knowledge, and the teacher is one who possesses some of the knowledge the learner needs, there is a strong inclination towards giving knowledge a value that relates it mainly to *possession*. On the other hand, if the event is about learning and its consequences, the quality of learning becomes as important as the function of teaching, if not more important. […] The teacher has to appropriate the event of teaching and learning less as a simple transmission and more as a complex event of exchange between teaching and learning. Likewise his own participation in these events is comprehended as a learning teacher's participation. The teacher has to teach himself to be a questioning learner.

Teachers' conceptions of teaching have been found to be fairly consistent with their conceptions of learning (e.g. Bruce & Gerber 1995; Koballa et al. 2000; Boulton-Lewis et al. 2001a) and of the subject (e.g. Prosser et al. 2005), though total alignment has not been found. In fact, Trigwell and Prosser (1996) argue that conceptions of teaching and learning are constituted in relation to each other, and Otting et al. (2010, 753) note that these conceptions "are often presented as logically locked together, as a kind of one-to-one relationship". Van Rossum and Hamer (2010) even use the integrated term *teaching-learning conceptions*.

This type of consistency in conceptions would mean that teacher-/content-focused and transmissive conceptions of teaching would be parallel with learning conceptions that focus merely on reproducing knowledge that the teacher has transmitted to students. Learning conceptions like these can be characterized as *quantitative* (Marton et al. 1993), since they concentrate on acquiring an increasing quantity of information (Boulton-Lewis et al. 2008). Similarly, student-/learning-focused or facilitative conceptions of teaching would be parallel with learning conceptions that emphasize the importance of students' own active meaning-making and change as a person. These conceptions of learning, for their part, can be characterized as *qualitative*

(Marton et al. 1993); they concentrate on understanding and integrating knowledge (Boulton-Lewis et al. 2008). Van Rossum and Hamer (2010, 31) argue that there is in fact a watershed when teaching-learning conceptions move from "taking in ready-made things (facts, procedures) existing out there" towards "actively constructing meaning" (see also Marton et al. 1993).

In a similar vein, Prosser et al. (2005) found that teachers' more holistic and integrated views on the subject matter they were teaching were linked to more advanced or more complex views concerning their students' learning and their own teaching; they went so far as to wonder whether a less holistic picture of the subject might actually *restrict* ways of understanding teaching and learning to a teacher-focused perspective. They, thus, highlighted the importance of focusing on teachers' understanding of the subject matter in attempts to develop approaches to teaching.

Since the findings described above represent a hierarchical structure, moving from more knowledge-/content-focused conceptions towards more learning-focused conceptions, we may assume that students who hold the highest (learning-focused) conceptions are also aware of the aspects corresponding to the lowest (content-focused) conceptions. Moreover, as Entwistle and Walker (2000, 352) argue, a higher-level or more sophisticated conception "leads to an expanded awareness – seeing additional goals for teaching and learning which were originally not perceived explicitly at all". Thus, we may argue that the *development* of thinking and practising implies that the students will be able to expand their understanding towards greater complexity, that is, towards learning-focused conceptions. This is especially the case if we believe that the teacher's ways of experiencing teaching and learning are associated with their actual teaching practices.

However, the notion of development by definition requires an understanding of the direction in which we wish to develop. The curriculum for a subject (which reflects not only disciplinary knowledge but also the values and preferences of society) often describes the kinds of teaching and learning that are regarded as fitting the nature of the subject to be taught. At the present time, there is a fairly general tendency to prefer teaching that supports pupils' active participation and critical thinking (e.g. Pithers & Soden 2000; ten Dam & Volman 2004) and also the teacher's own learning during the teacher-learning event (e.g. Hoveid & Hoveid 2008), and health education is no exception. Thus, given this background (the nested nature of the conceptions, and modern thinking about teaching and learning), we may say that the development of teaching (among both student teachers and regular teachers) requires awareness of aspects corresponding to learning-focused conceptions. However, the assumption that the development of teaching *depends on* these conceptions should always be verified for particular contexts.

1.5.4 4th assumption: a skills-based approach has limitations when one is aiming to develop teaching

This assumption has been discussed to some extent in Section 1.3. (in which I examined the role of teacher education in supporting the development of student teachers' skills, thinking, and awareness). I shall here take the discussion a little further.

Devlin's (2006) puts forward a nuanced argument that is at least partly consistent with this assumption, involving the notion that in aiming to improve teaching and learning, the development of skills is needed along with the development of conceptions. She adopts a critical view towards "*neglecting* [my italics] the skills-based approach to teaching development" (p. 115), and asks rhetorically whether "aiming at improving teaching skills is not a valuable objective for teaching developers" (p. 116; here, she refers to discussion about whether conceptions should be developed before skills). Devlin's considerations capture different arguments on the topic. My own position would be that if we are seeking to support the development of teaching, a focus solely on skills (to the exclusion of other aspects) has only limited potential (as manifested, arguably, in the way teacher education has developed during the 20th century). I would further argue that there is a need to focus also on students' and teachers' ways of understanding. After all, a focus purely (or even mainly) on skills entails the problem that the skills that are regarded as important for the student teacher "are always addressed to known situations, and cannot be addressed to unforeseen (and unforeseeable) situations" (Barnett 2009, 439).

Although studying teaching-, learning-, and subject-related conceptions can be seen as essential in helping student teachers and teachers to develop their teaching in more sophisticated and more powerful ways, the development should entail the skills needed within actual teaching-learning situations (cf. Shulman & Shulman 2004). In fact, this requirement is never underestimated in the literature focusing on conceptions. The purpose of research and discussion in the field has been to emphasize the importance of the teacher's thinking and the teacher's awareness of the object of learning *in addition to the acquisition of skills*. After all, as its best, an expansion of awareness concerning teaching, learning, and the subject matter happens in conjunction with gaining and reflecting on the experience of teaching the subject in question (cf. Devlin 2006; Shulman & Shulman 2004). Van Rossum and Hamer (2010) take the view that the question is not one with either/or answers, in other words of the development of teaching having to focus on *either* skills *or* conceptions. The question for them is a matter of "all-three/and/and: you need to learn the *skills* to implement a particular *practice* or technique, but you need the right type of *conceptions* about teaching and learning to pull it off" (van Rossum & Hamer 2010, 565).

Nevertheless, though it has been argued that teacher education should develop student teachers' and teachers' reflective skills, it has not been clear "*what* teachers are supposed to reflect *on* when wishing to become better

teachers" (Korthagen 2004, 78). In 2004 Korthagen proposed an "onion" model, which posits various "layers" in people that can be influenced and which should thus be addressed: the environment (outer), behaviour, competencies, beliefs, identity, and mission (inner).

In the same context, Korthagen suggested that there should be a shift in teacher education, from focusing on the components of good teaching (such as skills) towards focusing on teacher identity. Moreover, as Wideen et al. (1998, 141) point out, "the story of how beginning teachers experience programs of teacher education begins with who they are and what beliefs they bring to pre-service education". This means that in supporting student teachers to develop as teachers through reflection on their teaching, the emphasis should be moved from focusing merely on what happened during the lesson towards why teaching proceeded as it did – in other words to questions such as, "How do I see teaching, learning, and the subject matter?" (conceptions), "How do I see my role as a teacher?" (identity), and "What is my calling and how is it related to my work as a teacher?" (mission) (cf. Korthagen 2004). However, change or development in one's teaching can proceed via a change in actual behaviour towards a change in conceptions, identity, and mission, or the change can be vice versa (Korthagen 2004). Hence, the question of which come first, the conceptions or the skills, becomes a chicken-and-egg question – a point made also by Devlin (2006).

2   AIMS OF THE STUDY

The purpose of the present study was first of all, to explore three target phenomena, namely health education student teachers' ways of experiencing *health education* (as a school subject), plus their ways of experiencing its *teaching* and its *learning*. Secondly, the purpose was to discern the aspects that are educationally critical for expanding an understanding of the target phenomena in a more complex and complete direction. Thirdly, the aim was to examine the alignment of and the change in student teachers' conceptions concerning health education, its teaching, and its learning, during teacher training and after a few years of working experience.

The following specific research questions were set:
1. How do student teachers understand health education (the school subject), and the teaching and learning of this subject? (I, II, III)
2. What are the educationally critical aspects that differentiate between qualitatively varying ways of understanding the subject, its teaching, and its learning? (I, II, III)
3. How do the conceptions develop during health education teacher training, and after gaining some teaching experience as a health education teacher in schools? (IV)
4. How are the ways of experiencing the subject, its teaching, and its learning aligned with each other? (IV)

This research also examined the alignment of conceptions between the written essays and the interviews conducted for the study. This aspect emerged as a salient issue as a result of the data analysis conducted on the development of the conceptions. It was not one of the original research questions *per se*, but it proved to be an interesting methodological question, showing some unexpected results, and meriting further examination.

3 METHODOLOGY

3.1 Educational context of the study

The study took place in the University of Jyväskylä, Faculty of Sport and Health Sciences, where it is a possible to study to be a teacher of health education in a school. Health education teacher training, which is conducted at university level, consists of courses at the level of basic studies (25 ECTS) and intermediate studies (35 ECTS). To become a qualified teacher, both courses must be taken.

All students who wish to take the intermediate level studies have to take an entrance examination. Only students who have completed their basic studies with the grade of 3 (= good; scale 1–5) are eligible to apply for intermediate level studies. At present, most of the students who qualify as health education teachers are students studying health education as their second teaching subject, with physical education as a main teaching subject. During their studies the students take pedagogical studies, carry out a teaching practicum (a period of time as a teacher in a classroom), and take other courses relating to teaching and learning in the context of their main teaching subject. The present research began in the academic year 2004–2005. The content of the basic and intermediate level studies at that time is described in Section 1.2.2.

3.2 The sample

Purposeful sampling was used to select information-rich cases, that is, the participants from whom I could expect to gain knowledge pertaining to the objectives of the research (see Patton 2002, 230). More specifically, the aim was to select persons who could describe the target phenomena in a maximum of qualitatively varying ways (Green 2005b); hence, the sampling could be called maximum variation sampling (Patton 2002, 234–235). The sample consisted of 20 physical education student teachers (9 females, 11 males, age range 22–31

years) specializing in health education. The persons initially invited to participate consisted of all the student teachers (n=30) who were chosen for intermediate studies in health education for the academic year 2004–2005, and who had no practicum experience[3]. Out of these 30 students, 20 volunteered, which seemed sufficient to guarantee adequate variation in ways of experiencing the target phenomena, but at the same time a small enough number to keep the sample size manageable for the purposes of data analysis (see Bowden 2005). All the students who were invited were informed about the main purpose of the study, the general nature of the research, and the option to withdraw from the study at any time during the research process (cf. Kvale 1996, 112). Later, for the purposes of studying the *development* of conceptions, an added criterion for selection was 1–4 years of health education teaching experience in a school. Eleven out of the 20 (former) student teachers fulfilled this criterion (of having 1–4 years of working experience in a school) or could be contacted.

During the academic year 2004–2005, nine of the students did their teaching practicum in physical education, and during that practicum they were able to teach a few hours of health education within a school. Since only those students who had undergone basic level studies in health education were regarded as qualified to apply for intermediate level studies, the participants had already taken some studies in health education.

3.3   Data collection methods

Semi-structured interviews and written essays were chosen as methods for the data collection. In the phenomenographic research tradition, individual open or semi-structured interviews constitute the dominant data collection method (e.g. Marton 1994). Individual interviews encourage the interviewee to reflect on issues that are often implicit, and in that way the issues may be brought into focal awareness (Marton 1994, Marton & Booth 1997). According to Marton (1994, 4427), the more one can do this, "the more fully can awareness to be explored". Moreover, the interview can help the interviewee to keep within the focus, if the interviewer elaborates the questions from different angles by posing alternative questions (see Marton & Booth 1997, 130).

The semi-structured interview format was also chosen on the grounds that the research theme had not been studied before in the context of health education, and I therefore wished to cover some particular themes with each of the participants. For this purpose, an interview guide was drawn up (Appendix 1). It served as a framework for all the interviews. However, despite the pre-planning of themes to be covered, the questions were prepared in such a way as

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[3]   The practicum for the main subject, physical education, often includes teaching in health education, and at this point my plan – later modified – was to detect the development of changes in relation to gaining practicum experience.

to allow an open (but focused) discussion flow. In this regard I followed Booth's (1997) perspective on the nature of the "open" interview – open in the sense that the interviewee can be allowed to lead the discussion towards unexpected lines of reasoning; these can open up new and interesting reflections on the target phenomenon, even if the structure of the interview is planned in advance. The role of the interviewer is to lead the discussion to the particular themes to be covered with each participant, but the interviewee is the one who decides what aspects he or she will bring to the discussion (Kvale & Brinkmann 2009). Moreover, the interview can proceed in whatever way the interviewee decides to bring the topics into the discussion. Consequently, the detailed ordering of the predefined interview topics differed according to the individual course of each discussion (Hirsjärvi & Hurme 2000). If the interviewee had already mentioned something that I had planned to ask later, I tried to avoid covering the same point again.

The written essays were set up in order to approach the research questions through another kind of data. The aim in this was to complement the data obtained by means of the interviews, and to secure a deeper understanding of the object of research. The use of written essays *before the interviews* enabled the participants to explore their awareness of the topics by themselves. In writing the essay, the participants were able to mention only those aspects of the research topic that they wished to mention, without prompting. In addition, they could read over their thoughts, delete phrases, or deepen their perspectives before actually finishing the task. The participants were able to choose the time and place for writing, and to finish or restart the writing, as they wished.

The use of the essays before the interviews allowed the researcher to become familiar with the participants' ways of experiencing the target phenomenon before the interview situation. In addition, as indicated above, the written essays served as additional data for studying the phenomena in question.

The essays and semi-structured interviews were carried out three times: at the start of the intermediate level studies in teacher training (Time 1, autumn 2004), at the end of these studies (Time 2, spring 2005), and after some 1–4 years of working experience as a health education teacher in a school (Time 3, years 2008–2010) (Figure 2). All the initial 20 students participated in the Time 1 and Time 2 data collection, but at the Time 3 data collection point, only 11 teachers (former student teachers) either fulfilled the selection criteria (some 1–4 years of working experience as a health education teacher in a school) or could be reached. Altogether the data collection produced 51 interviews and 51 essays. The same researcher (the author) conducted all the interviews, and this made it possible to maximize the "consistency in terms of questioning and the use of prompts, thereby minimizing researcher impact on the data" (Green 2005b).

TIME 1 At the beginning of intermediate level teacher training Autumn 2004	• n=20 • Interviews and essays
TIME 2 At the end of intermediate level teacher training Spring 2005	• n=20 • Interviews and essays
TIME 3 After early years of working experience Years 2008--2010	• n=11 • Interviews and essays
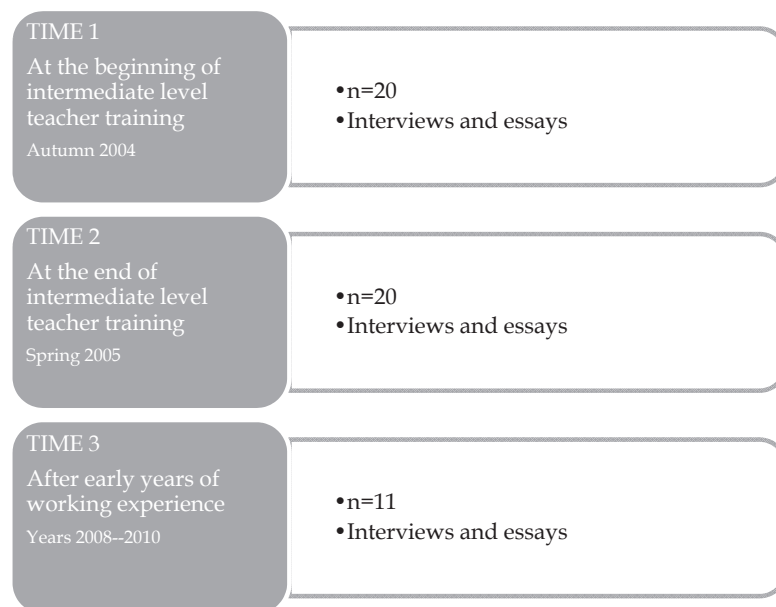
FIGURE 2   Data collection during the research process

First of all, at each of the three points of time, the participants wrote an essay on the topic "If a teacher other than a teacher in health education were to ask you to describe health education as a school subject, how would you describe the subject itself, its learning, and its teaching?" The length of the essays varied from half a page to three pages. The essays were read carefully before the subsequent interviews, so that the interviewer could ask for clarifications if need be.

The Time 1 and Time 2 interviews were conducted at the Faculty of Sport and Health Sciences. This location was chosen by the researcher as a place where the participants were studying and where I as a researcher was working. Thus, it was a convenient place for the interviews, and a familiar and comfortable place for the participants. The time 3 interview took place wherever the teachers felt comfortable about having a discussion. At the time of the third interview, five of the teachers were interviewed at their work, three at the University of Jyväskylä, two in their homes, and one over the phone. The interviews lasted about 70 minutes on average and were conducted by the author of this thesis alone. The participants were asked, for example, to describe health education as a subject (in general) together with its teaching and learning, and also how the teaching and learning in health education differed from the teaching and learning in other school subjects (Appendix 2). Through questions such as: "Could you describe it/explain it a little further?", "Could you give an example of it?", "Why do you consider it to be important?" I tried to avoid introducing aspects to the interviewees that they had not brought up themselves; in other words, I tried not to introduce material that was not in the

foreground of *their* awareness at the time of the interview (see Green 2005b, 36). The interviews were tape-recorded and transcribed verbatim. Most of the interviews were transcribed by a professional transcriber, but as a researcher I carefully checked the consistency of the transcriptions and the interviews, in order to ensure that the transcriptions were "loyal to the interviewee's oral statements" (Kvale & Brinkman 2009, 63). To ensure anonymity and confidentiality, I allotted a code for every participant (cf. Kvale 1996, 114). Hence, the essays, tapes and transcripts were marked with a letter-number combination, and this coding was used throughout the research. In addition, all the data were stored in a locked cabinet to further protect confidentiality (see Kvale & Brinkman 2009, 186-187).

3.4 Data analysis

The research aims and questions were approached using various analytical methods. Table 1 summarizes the methods used for each of the research tasks and the data used in the analysis.

TABLE 1   Data and analytical methods used to answer the research questions

Research questions	Aim	Data	Data analysis
1	To explore and describe the conceptions	Student teachers' interview transcripts and written essays (Time 1 and Time 2)	Phenomenographic data analysis
2	To identify the critical aspects	Student teachers' interview transcripts and written essays (Time 1 and Time 2)	Phenomenographic data analysis
3	To detect changes in the conceptions over time	Student teachers' and teachers' interview transcripts and written essays (Time 1, Time 2, and Time 3)	Qualitative comparison Friedman's test Percentages
4	To examine the parallel of the conceptions	Student teachers' and teachers' interview transcripts and written essays (Time 1, Time 2, and Time 3)	Friedman's test Percentages

3.4.1 Exploration and description of the conceptions, and identification of the critical aspects

As stated previously, *phenomenography* is a qualitative research approach whose aim is to determine subjects' understanding of a phenomenon of interest (Marton 1981; Marton & Pong 2005). Although phenomenographic studies are based on the analysis of individuals' descriptions of the phenomenon in question, the ultimate goal is to create a description of the *collective* view. In other words, the analysis will produce an outcome space, which represents a collective human experience (Marton 1981, 1994).

When the aim was to explore and describe the conceptions of the three target phenomena and to identify the critical aspects between qualitatively varying conceptions, the Time 1 and Time 2 data (essays and interviews) were analysed together. The Time 3 data were analysed later when the aim was to examine the development of the conceptions. Thus, the data consisted of 40 interview transcriptions and 40 written essays, analysed as a single data set. In order to manage the large amount of data I picked out 23 interviews and all the essays for the preliminary analysis (see Åkerlind 2005b). However, the remaining 17 interviews were integrated with the preliminary data set and intensively consulted (see Åkerlind 2005a) before I finalized the analysis. I analysed one phenomenon at a time.

In the first phase of the analysis, the focus was on identifying and describing the ways of experiencing the target phenomena in general terms (i.e. the meaning aspect of the conceptions as distinct from the structural aspect; see Marton 1996). I was looking for the focus: where the emphasis falls when informants describe the target phenomena, and what they relate to them. The first question that I had to consider was how to proceed with reading the material and examining the meaning: whether to read the transcripts as a whole or use smaller extracts from the transcripts, and proceed with the analysis using these smaller pieces of text. As a novice researcher doing phenomenographic analysis for the first time I started by taking smaller extracts from the transcripts and trying to organize them according to their differences and similarities. This was my way of trying to cope with the extensive data. When I went back to the complete transcripts after some time I noticed that I had misunderstood the "real meaning" that emerged in the wider context (cf. Bowden 2005). At the same time, I realized that instead of understanding and concentrating on the foci of the expressions, I had merely picked out all the possible aspects that the respondents had related to the subject of health education in general; thus I had (un)successfully ended up with preliminary categories that were not closely related to each other. I had focused on picking out "things" rather than on uncovering the "ways on experiencing the same thing" (see Marton 1996). To some extent my way of proceeding contained elements of content analysis. This being the case, I decided to change the plan and use larger chunks or entire transcripts and entire essays when analysing the data.

I read the essays and transcripts forward and backward as a whole, several times, with a particular aim in view, as recommended by Bowden (2005); thus, the use of the entire transcript, or of large chunks of each transcript (rather than smaller excerpts) had the purpose of increasing accuracy in interpreting the data (see Åkerlind et al. 2005) and ensuring that the utterances were read in their context – a procedure that undoubtedly helps the reader to understand the meaning (Bowden 2000a). I wrote notes on each of the transcriptions, listing the key sentences that I considered to reflect the focus or foci of that particular stretch of the transcription, including the aspects related to that particular focus. However, I considered it important to go back to the original texts after some time, and check what the respondents had said *around* that key sentence (the context of the focus) (see Bowden 2005, 28). I followed Bowden's (2005, 27) advice to avoid giving labels to the meanings too early, since such labelling can lead the researcher's awareness in a certain direction and thus "limit the further development of the category of description" that is starting to evolve. During the repeated readings I looked for both differences and similarities between what was included, in order to form a draft set of descriptive categories for the collective meaning. In addition, I looked for complementarity in the expressions, since different expressions may represent different parts of a single conception (Marton et al. 1993). During the repetitive readings of the data I was aware that one interview transcript or essay or even one sentence might contain more than one way of understanding learning in health education. This was important, since the main aim of phenomenographic studies is to reach what can be described as a collective understanding rather than an individual state of mind (Marton & Booth 1997, 114).

In the next phase of the analysis, I analysed the structure of the outcome space, i.e. the ways of experiencing the target phenomena in terms of the aspects that appeared to be most important for both grouping together and distinguishing the varying ways of understanding (cf. Åkerlind 2004, 2005b). The focus was not on all the aspects of variation, but rather on the critical ones, since the aim of the phenomenographic approach used in this research was to reveal what is required so that a student teacher can move from one way of seeing a phenomenon to another, more complex one (cf. Marton & Booth 1997, 111; Åkerlind 2004, 2005b; Runesson 2006).

I read carefully through the note pages, the larger chunks of the transcripts, and those comments within the essays that could be considered to belong to one particular category of description, and listed all the aspects that were related to the meaning corresponding to that category of description. Thereafter, I looked to see whether these aspects actually highlighted the differences between the qualitatively distinct categories and could be grouped into themes of expanding awareness running through the categories (Åkerlind 2005a). If I noticed that some group of aspects, reflecting one designated theme, were related to some categories, but not all, I pondered whether these aspects actually represented critical differences or not. I may have had close to ten

themes that emerged as "candidates" for each of the phenomena, but as the analysis proceeded they were reduced to a smaller number.

Åkerlind (2005a) has pointed out that in order to be regarded as a theme of expanding awareness highlighting *critical* differences, the theme has to occur in *all* the categories. However, I was ready to make an exception, if the lack of it (or, in actual fact, the lack of aspects corresponding to a particular theme) in a lower category and the presence of it in a higher category was in line with the nature of a given category, and if this lack *per se* revealed critical qualitative differences between the categories. The themes of expanding awareness indeed revealed the hierarchical and inclusive ordering of the categories, and the ordering was in line with Åkerlind (2003, 380), in so far as it "sometimes originated from logical argument and sometimes from the content of transcripts" and essays. However, empirical evidence was required to confirm the hierarchy. Here it should be noted that since the question is one of the *collective* understanding of the target phenomena, it was enough if some of the essays and transcripts highlighting the meaning of the categories higher in a hierarchy showed some indication of an expansion of thinking – in other words, if they included some aspects from lower in a hierarchy (bearing in mind here that lower categories cannot include aspects of higher ones, due to the hierarchical nature of the categories) (Marton 1994; see also Åkerlind 2003). Given the hierarchical and inclusive nature of the categories, some conceptions can be regarded as more complete and more complex than others (Åkerlind 2005a, 2008). Thus, they would indicate that the respondents were able to discern more aspects and/or more (or better described) links between the aspects, and/or a deeper conceptualization of one individual aspect of a particular phenomenon (Cope & Prosser 2005).

To some extent, the two phases of the analysis proceeded at the same time; hence, while I was looking for the meanings, the structure of the outcome space began to take shape. During the analysis I often went back to the original data to confirm the results that were starting to be structured, the aim being to minimize the influence of my own perspectives on the outcomes (see Bowden 2005). Moreover, while the categories of description were beginning to emerge, I discussed the findings with my co-authors. We critically tested all the category candidates and their critical aspects by debating and carefully reading the extracts (within their wider interview/essay contexts) corresponding to each category. Hence, the analysis had some elements of the group process emphasized by Bowden (e.g. 2000b). The steps described above were important in ensuring the trustworthiness of the findings (see Green 2005b).

The main outcome reached through the analysis was a structured set of categories of description called an "outcome space" (Marton 1994). The outcome space "shows the relationships among the various categories of descriptions according to their logical complexity and inclusiveness and describes the variation in the possible ways in which a phenomenon is experienced" (Marton & Pang 2008, 536). Marton and Booth (1997, 125-126) emphasize that the categories of description should meet three quality criteria:

(i) each category should describe something clear and distinct about the ways of experiencing the target phenomena, (ii) the categories should stand in a clear and logical relationship with other categories, revealing an inclusive hierarchy between the categories, and (iii) there should be only a limited (parsimonious) number of categories, which should nevertheless be able to capture the critical variation in the data. In the final phase of the analysis I made sure that these criteria were met in our outcome space by re-checking the differences behind the categories, in terms of themes of expanding awareness.

3.4.2   Detecting changes in conceptions over time

The detection of *changes in* or *the development of* the conceptions was based on the outcome spaces that were formulated while exploring the conceptions of the three target phenomena (i.e. health education as a *subject*, its *teaching*, and its *learning*). The three outcome spaces worked as frameworks and baselines for studying how the student teachers' understanding of these phenomena developed over time – i.e. during their intermediate-level studies in the health education teacher training program and after some (early) years of working as a health education teacher in a school (cf. Brownlee et al. 2003). Hence, the baseline consisted of the findings obtained through analysis of all the essays and interviews collected at the beginning (Time 1) and at the end (Time 2) of the intermediate level studies. The examination of the development of the conceptions made use of both qualitative and quantitative analytical practices. However, the quantitative methods (inferential and descriptive statistics) played a greater role. Phenomenographic findings (qualitative categories of description) laid the foundation for the statistical tests that were used to detect the changes in conceptions over time (see Micari et al. 2007).

In this context, it should be noted that there are varying opinions as to whether quantitative approaches should be included within a study conducted in the qualitative tradition (see Dey 1993; Sandelowski 2001; Fisher & Stenner 2011). To present my own opinion, I believe that the discussion should take as its starting point the phenomenon under study. When the aim is (i) to study the development of or change in conceptions over three points in time (or the alignment of two or more phenomena) (cf. Micari et al. 2007) and/or (ii) to detect the extent to which the change occurs among the participants as a group, I would argue that the use of statistical tests, or the use of numbers in general, can serve these purposes. Thus, I would agree with Dey (1993), who takes the view that aspects of meaning and number can be intertwined. This is especially the case when the intention is to define proportions, and when one is seeking to avoid over- or under-weighting (Sandelowski 2001). Sandelowski (2001, 233) argues that the numerical presentation of findings makes it possible to show "patterns more clearly, or at very least, generate new questions or new lines of analysis" and "sharpen the focus on a key finding". Moreover, it has been argued that (inferential) statistics are needed to draw conclusions from findings relating to the population of interest and to make informed decisions (see e.g. Pett 1997, 17, 20; Marshall & Jonker, 2011).

In phenomenographic studies the expressions such as "all of the students" and "half of the students" (Boulton-Lewis et al. 2004), "most students" and "fewer students" (Boulton-Lewis et al. 2001b), and "the reduction in the number of students" and "the changing proportion of student teachers" (Wood 2000) appear to reflect concepts of (descriptive) statistics, even though the studies in question make no explicit mention of statistical tests that may have been used. This notion is consistent with the argument that among qualitative researchers "counting is often unconscious", even when they "strive to emphasize something more than the numbered nature and meaning of events and experiences" (Sandelowski 2001, 231).

The analysis of the development proceeded through the following steps:

1. Qualitative comparison of Time 3 data against Time 1 and Time 2 data

The examination of the development of the conceptions began by looking at whether the Time 3 data (11 essays and 11 interviews) brought new insights to the outcome spaces (i.e. to the categories of description and their relationships with each other) that were formulated from the data collected during the intermediate studies. The analysis of the Time 3 data could be described as involving a *qualitative comparison* of the new data with the observations made previously. In reading, rereading, and analysing the Time 3 data, I took into consideration the possibility that if necessary, the existing outcome spaces would have to be revised.

2. Allocation of the participants according to their highest-level expressions within interviews and essays

I examined change or development in terms of categorical shifts, that is, as changes in a less or more complex direction. I did this through an examination of the change in the students teachers' highest conception, as expressed over three points in time. Note that the participants thus had to be allocated to their *highest* level of understanding (Marton et al. 1993; Wood 2000; Boulton-Lewis et al. 2004; Bradbeer et al. 2004), since they could have expressed qualitatively varying conceptions within the same essay or interview (Marton et al. 1993). Note also that the highest conception expressed by each participant had to be identified *both* from their essays and interviews, based on the fact that I could not be certain if the two different data collection methods would produce similar results.

However, it should be borne in mind that there are differences in ways of studying the development in conceptions (in terms of categorical shifts). So and Watkins (2005) studied the change in the participants' dominant view of learning; thus the participants were allocated according to their *predominant view*, in other words, the view that was expressed in *more than half* of the responses of a given respondent. By contrast, Boulton-Lewis et al. (2001b) examined the change with respect to the *core conception*, by which they meant a

kind of holistic expression. The idea in this case is that the core conception is something that is not dissonant with other expressions related to learning; rather it is "supported by what they [the learners] say overall about learning" (Boulton-Lewis et al. 2001b, 331).

One can agree that there may be some concerns if the students are allocated according to the highest category, especially if the highest conception expressed is something that the participant actually disagrees with, though is able to discern. If our main aim is to study the link between teaching conceptions and actual teaching practices, this concern should be taken into consideration. However, if our prime concern is rather the students' ability to become more *aware* of the subject, its teaching, and its learning, it seems more logical to evaluate the development in thinking in terms of the highest conceptions expressed.

Due to nature of the data (a small sample size, ordinal scale variables, no normal distribution) nonparametric statistical tests (Friedman's test and the Wilcoxon Matched-Pairs Signed Ranks Test) were used to measure the difference between the groups of paired data, i.e. the conceptions expressed in the essays and in the interviews. Further analysis was conducted using only the data within which the respondents expressed conceptions indicating a more complex understanding (i.e. the interview data), in order to simplify the analysis process. Here it should be borne in mind that interview transcripts are often regarded as the main data in phenomenographic research (e.g. Marton 1994).

3. Recategorization of the findings into three main categories

Due to the small sample size, the low frequencies per individual category (i.e. the small number of participants expressing conceptions corresponding to one particular category), and the need to summarize the information for the changes over three points of time, I felt it necessary to consider whether I could recategorize the outcome spaces that had been identified earlier (based on the similarities and differences in the content). I was looking for the major themes that ran through the three different outcome spaces, aiming to group together and sum up the main critical aspects within and between the outcome spaces. Since I was aware that every recategorization loses some information, I looked carefully at the critical aspects that seemed to highlight the *main* differences between the categories within and between the three target phenomena. This required a thorough examination of the categories of description and the critical aspects between the categories, in the course of exploring whether I could find enough similarities between certain groups of categories.

4. Inferential and descriptive statistics used to measure the development of the conceptions

Percentages and Friedman's test were used to describe changes over time. Friedman's test (a nonparametric, inferential test) was used because it was suitable for the data, which showed a skewed distribution curve, had a small sample size, and corresponded to ordinal level data. Moreover, Friedman's test was regarded as a meaningful test because it can be used to detect changes across multiple time periods and within subjects or blocks (Pett 1997, 145) – here in three related samples (three data collection phases/three points of time). The present data can be regarded as related, since an individual's repeated measures are dependent on the person himself/herself. However, the blocks (various individuals) have to be mutually independent, meaning that (in the present case) the responses of one student teacher cannot influence the responses of another (see Pett 1997, 136). Since the data were obtained using individual interviews and individual written essays (as compared to e.g. focus group interviews or group written assignments), it seems reasonable to accept this assumption. Moreover, as the statistical test was based on the allocation of expressions to the highest level category within a hierarchical system, the data can be assumed to be ordinal.

3.4.3 The examination of the alignment of the conceptions

The examination of whether the conceptions of the health education, its teaching, and learning are aligned (proceed in parallel) was based on a re-categorization of the outcome spaces. As in the case of detecting the changes in the conceptions, Friedman's test was used to detect the differences between the conceptions of the three target phenomena. In addition, I adopted Tsai's (2002) way of exploring the alignment of the conceptions: I looked to see whether the conceptions of the three target phenomena were *nested* (all three conceptions parallel), *related* (two of the conceptions parallel), or *divergent* (none of the conceptions parallel). In this context, percentages were calculated for each of the possibilities.

4 RESULTS

4.1 Conceptions of health education as a *subject* (I)

When student teachers were asked about the ways in which they experienced health education (as a school subject), they reflected on the target phenomenon through its objectives – what health education aims to achieve. Thus, the analysis produced five hierarchically ordered categories describing the objectives of health education: health education as (1) a context for disseminating formal or theoretical knowledge, (2) a channel for providing pupils with practical knowledge and skills to help them make health-related choices, (3) a means to promote pupils' self-regulative knowledge and independent thinking, (4) a context for personal growth, and (5) a means for developing responsible behaviour in society (Table 2). The categories were arrived at through six themes of expanding awareness, taking account of the critical aspects between the categories, which were as follows: prerequisites for reaching the objective, the perspective on the issues, the nature of the knowledge in question, the concept of health, the representation of the concept of health, and the atmosphere.

The first two categories concentrate on enhancing pupils' theoretical and practical knowledge capital (these being the only prerequisites for a pupil to reach the objective). Knowledge is seen first as factual and then as practical, and as something that will not be questioned or made problematic. Thus, in the first two categories knowledge can be described as mainly non-complex or non-problematic. This non-complex nature was also related to the concept of health (the main concept in health education), with nothing more than the multidimensional nature of health being included. Here, the student teachers usually referred to the World Health Organization definition, which states that health is constituted from three dimensions, i.e. physical, social, and mental dimensions (World Health Organization 1946). In addition, health was thought of as merely content to be handled during the lessons.

In contrast, the last three categories describe the objectives of health education, which focus on dealing with knowledge that could be described as complex or problematic. First of all, in the context of support for the pupils' independent and reflective thinking (category 3) the knowledge was described as evaluative and personal, and later as tacit and relational. In the same context, the prerequisites expand to cover independent and reflective thinking skills, the courage to be oneself, and eventually, respect and the ability to act in an ethically responsible way. The understanding of knowledge as complex was related to seeing the concept of health *per se* as complex, and not merely as multi-dimensional (as in the first two categories). Seeing the concept of health as complex is related to the notion that one can approach health from various perspectives: as perceived/diagnostic and as positive/negative (category 3), as a personal matter or personal resource (category 4), and as a collective matter or collective resource (category 5). Focusing on complex knowledge and on a complex concept of health during the lessons calls for a safe and tolerant atmosphere, an aspect which the student teachers saw as contained in no category before category 3. In the same context the students manifested the notion that health is in fact something that pupils *live through* during the lessons, identifiable in the ways in which the teacher recognizes the pupils, hears their opinions, and organizes the teaching-learning situations (methods, atmosphere); also in the ways in which the pupils recognize each other. Thus, health is not seen merely as a content to be taught and learned.

TABLE 2 Categories of understanding health education, described in terms of themes of expanding awareness and critical aspects

THEMES OF EXPANDING AWARENESS	CATEGORIES				
	1 Health education as a context for delivering theoretical knowledge	**2** Health education as a channel for providing pupils with practical knowledge and skills to contribute to their health-related choices	**3** Health education as a means to promote pupils' self-regulative knowledge and independent thinking	**4** Health education as a context for personal growth	**5** Health education as a means for developing responsible behaviour in society
Prerequisites	Knowledge capital	As above; Abilities to apply knowledge	As above; Self-reflective and metacognitive skills; Independent thinking skills	As above; Courage to be oneself	As above; Respect for and recognition of others; Tolerance; Sense of responsibility
Knowledge	Objective facts	As above; Practical and concrete	As above; Evaluative and personal	As above; Tacit and relational	As above
Concept of health	Multidimensional	As above	As above; Perceived and diagnostic; Positive and negative	As above; Balance; Personal resource	As above; A personal and societal matter; Value; Resource for others
Representation of the concept of health	Separately taught content entities	Perspectives on other content	As above; The way the teacher looks at the students; Teaching methods	As above; Strengthening self-esteem; Atmosphere; Finding positive sides of oneself;	Evaluation of health matters from the perspective of society and the individual; Acting as a participant in a group
Atmosphere	-	-	Acceptance; Feeling of safety; Trust and sensitivity	As above; Genuine caring; Sensitivity; Humanity; Encouragement	As above; Tolerance; Reciprocity

4.2   Conceptions of the *teaching* of health education (II)

The teaching conceptions could be grouped into five qualitatively distinct categories: teaching as (1) transferring knowledge and skills, (2) supporting the active processing of knowledge, (3) supporting the transformation of conceptions, (4) supporting holistic human growth, and (5) building a learning community with the students. The analysis revealed that the expressions concerning the teaching could be organized within the following themes running through the categories: the nature and source of knowledge, the role of the teacher and pupil, and the direction of interaction (Table 3).

TABLE 3   Ways of experiencing the teaching of health education: five categories, described in terms of themes of expanding awareness and critical aspects

THEMES OF EXPANDING AWARENESS	CATEGORIES 1 Transferring knowledge and skills	2 Supporting active processing of knowledge	3 Supporting the transformation of conceptions	4 Supporting holistic personal growth	5 Building a learning community with the pupils
Nature of knowledge	Non-problematic	Non-problematic	Problematic	Problematic	Problematic
Source of knowledge:					
Teacher	Curriculum	Curriculum	Curriculum	Curriculum	Curriculum; Conceptions; Experiences
Pupil		Curriculum; Conceptions; Experiences	Curriculum; Conceptions; Experiences	Curriculum; Conceptions; Experiences	Curriculum; Conceptions; Experiences
Teacher's role	Knowledge deliverer; Expert	Inspirer; Tutor	Facilitator; Guide	Creator of safe and accepting atmosphere	Reflective fellow-learner; Genuine participant
Pupil's role	Knowledge recipient	Active participant	Reflective inquirer	Supportive fellow-learner	Responsible member
Direction of interaction	Teacher → pupil	Teacher → pupil; Pupil ↔ pupil	Teacher ↔ pupil; Pupil ↔ pupil	Teacher ↔ pupil; Pupil ↔ pupil	Teacher ↔ pupil; Pupil ↔ pupil

The first two categories can be described as more or less teacher-centred; the teacher as an expert (category 1) and inspirer (category 2) means that the teacher is the one who brings or chooses the content for the teaching-learning sessions. A teacher may ask pupils to express their perspectives, but they are not handled further, and thus the perspectives serve merely as activating

material. The pupils could be described either as knowledge recipients (category 1) or as active participants (category 2). However, at this point the pupils are seen as active only to the extent that they search for knowledge that falls within the framework defined by the teacher, or else they may relate their perspectives and experiences in a way that serves the purpose of activation, without these functioning as a focus for reflection. Thus, the nature of knowledge could well be described as non-complex or non-problematic.

By contrast, the three last categories focus first on the pupils and later on the class as a learning community, with problematic knowledge being dealt with in both cases. Now, teaching genuinely aims to relate the content to be taught to the pupils' personal conceptions and experiences; in fact, these experiences serve as an important part of the knowledge base that will be handled during the lessons.

In the same context, the pupil's role is one of a reflective inquirer (category 3), and also that of a supportive fellow-learner (category 4), and of a responsible member of the learning community (category 5). In other words, the role of the pupil opens up not only towards content, but also towards the self and to others. In tandem with the expansion of the pupil's role, the teacher's role expands to cover the aspects of the teacher as a guide/instructor (category 3), as the creator of an accepting atmosphere (category 4), and finally as a reflective learner (category 5). The teacher as a reflective learner himself/herself is related to seeing teaching as building a learning community, one in which there is a two-way interaction between *all* the participants in the class, and in which the teacher's conceptions and experiences also become elements of the knowledge base during the lessons.

4.3 Conceptions of the *learning* of health education (III)

The analysis of student teachers' and teachers' ways of experiencing learning in health education produced six different but related categories (Table 4). Learning was seen as (1) the reproduction of acquired health knowledge, (2) the application of health knowledge, (3) the development of personal meanings concerning health matters, (4) the transformation of individual thinking, (5) personal growth, and (6) collective meaning-making. These qualitatively distinct categories were reflected through three themes, comprising the educationally critical aspects for advancing to a higher level in the understanding of learning, namely: the nature of the knowledge involved, the nature of the reflection involved, and the role of the social environment.

TABLE 4   Categories of understanding learning in health education, described in terms of themes of expanding awareness and critical aspects

THEMES OF EXPANDING AWARENESS	CATEGORIES 1 Reproduction of acquired health knowledge	2 Application of health knowledge	3 Developing personal meanings on health matters	4 Transformation of individual thinking	5 Personal growth	6 Collective meaning-making
The nature of knowledge	Non-problematic	Non-problematic	Problematic	Problematic	Problematic	Problematic
The nature of reflection	None	None	Descriptive	Critical	Ethical	Collective
The role of the social environment	None	A context for practising skills	A context for becoming aware of one's health thinking and health behaviour, and that of others	The context for expanding one's perspectives	A supportive context for personal growth	A context for dialogue

Again, we could detect how student teachers' and teachers' understanding varied from seeing learning as something that focuses more or less on handling non-problematic or non-complex knowledge (categories 1 and 2) to seeing learning as something that focuses on problematic or complex knowledge (categories 3–6). In the first two categories the role of reflection in learning is not regarded as essential, but in the latter four categories reflection (in its different forms) has a central place in learning.

The complex nature of knowledge and the relevance of reflection in learning were related to seeing the role of the social environment as a context in which the perspectives of others are crucial elements in becoming aware of oneself and others (category 3), and in expanding one's way of thinking (category 4). In addition, the social context was seen as providing a supportive context for pupils' personal growth (category 5) and for dialogue among all those in the classroom (category 6).

4.4   Changes in student teachers' ways of experiencing the three target phenomena (IV)

A qualitative comparison of the new data with the observations made previously did not produce any major category-level changes within any of the three target phenomena. Moreover, Friedman's test did not detect any statistically significant differences between the three points of time with respect to student teachers' conceptions of the objectives of health education or of

learning in health education (Figure 3). The only statistically significant change detected was in the *teaching* conceptions ($\chi^2(2) = 10.4$, p = .003), and more specifically, between Time 2 and Time 3 ($\chi^2(1) = 8.0$, p = .008). Thus, our hypothesis that the conceptions become more complex over time was confirmed with respect to a change between the end of teacher training and after early years of working experience, but not with respect to other times.
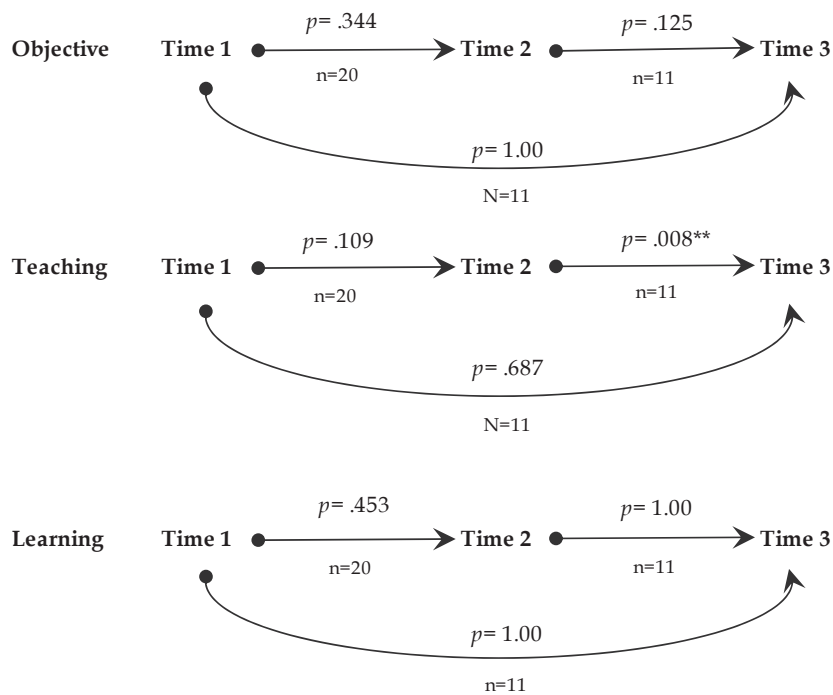
FIGURE 3   Development of conceptions during health education teacher training and after early years of working experience

I also examined the change in conceptions by calculating the percentages for the categories corresponding to the conceptions expressed with regard to the subject, its teaching, and its learning over the three points of time. I found first of all that the proportion for category 3 (highest in the hierarchy) within each of the target phenomena is highest both at the beginning of teacher training and after gaining work experience; however, it decreases *during* teacher training (Figure 4). Secondly, category 2 (mid-position in the hierarchy) is the dominant category expressed at the end of teacher training with respect to each of the target phenomena. Thirdly, after gaining some work experience, category 1 (lowest in the hierarchy) disappears.
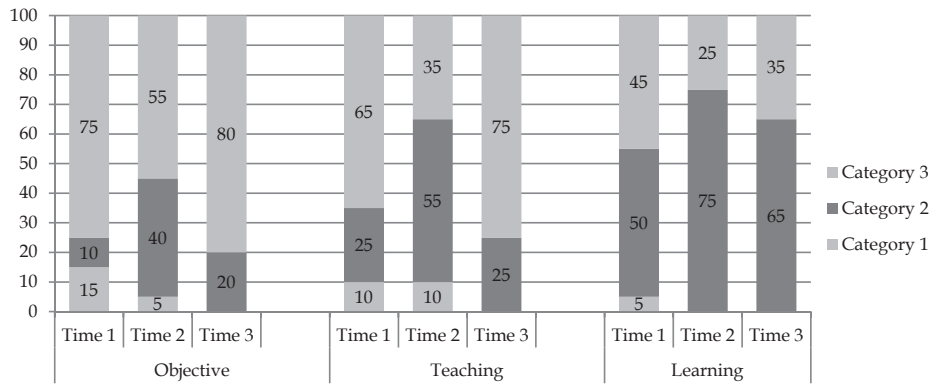
FIGURE 4   The proportions of the highest conception expressed (for each of three points of time and for each of the three target phenomena)

4.5   Alignment of the conceptions (IV)

An examination of the percentages representing the extent to which the student teachers' conceptions were nested, related, or divergent, revealed that at each of the data collection points, half or more than half of the participants expressed conceptions defined as "related" — i.e. with two of the target phenomena conceptions being aligned with each other — and less that half of the participants expressed conceptions in such a way that all were aligned with each other (Figure 5).
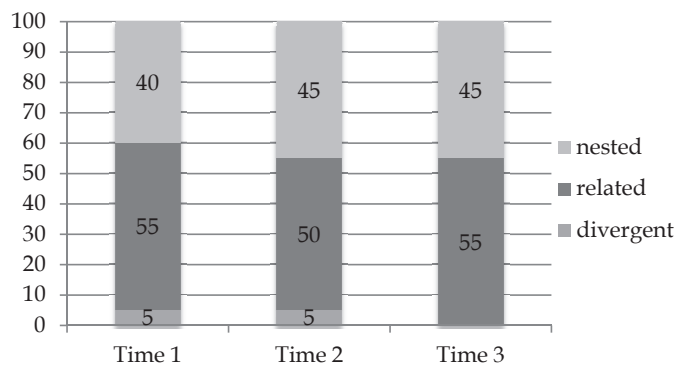
FIGURE 5   The proportions of nested, related, and divergent conceptions at three points of time

Despite this, Friedman's test did not reveal any statistically significant differences across the conceptions of the subject, its teaching, and its learning at Time 1 ($p = .500$), Time 2 ($p = .193$), or Time 3 ($p = .058$); thus the conceptions can reasonably be regarded as aligned with each other over each of the data collection points.

4.6 Alignment of the conceptions expressed in the essays and in the interviews (IV)

In the context of studying the development and alignment of the conceptions, one interesting finding (not envisaged in the research questions) could be observed when Friedman's test was used to measure the alignment of the phenomenographic classifications between the essay data and the interview data. The analysis of the alignment between the essays and interviews was seen as relevant in the decision to choose data that could shed further light on the examination of the development and alignment of the conceptions.

The analysis for this purpose was conducted using the original (non-recategorized) categorization. With regard to the teaching and learning conceptions, statistically significant differences were detected, indicating that during the interviews the respondents expressed conceptions corresponding to higher level categories than those observable in their written essays. However, no statistically significant differences were found regarding conceptions of the objectives of health education.

TABLE 5 Comparison of the highest-level conceptions expressed in the essays and in the interviews at three points of time, in relation to the three target phenomena (Subject, Teaching, Learning); Friedman's test applied

	Objective						Teaching						Learning					
	Time 1		Time 2		Time 3		Time 1		Time 2		Time 3		Time 1		Time 2		Time 3	
	I	E	I	E	I	E	I	E	I	E	I	E	I	E	I	E	I	E
Female																		
n1	4	3	5	3	3	3	4	4	5	3	5	3	4	3	5	3	4	3
n2	5	3	4	3			4	4	5	3			5	3	5	4		
n3	5	2	4	4			5	2	4	4			6	2	5	5		
n4	3	3	3	3	5	5	3	2	3	3	5	3	5	3	4	3	5	4
n5	4	2	3	2	5	2	4	2	3	2	3	2	3	3	4	2	4	3
n6	4	3	3	4			4	2	3	3			3	0	3	4		
n7	5	5	3	5	5	5	4	4	3	3	4	5	4	5	4	4	5	5
n8	4	4	5	5	5	3	3	3	3	3	4	4	3	3	3	3	4	5
n9	2	5	2	3	3	2	2	2	2	3	4	2	4	2	4	4	4	3
Male																		
m1	4	2	4	3	4	0	4	2	3	2	3	2	4	3	4	3	3	0
m2	4	2	3	3			5	2	5	3			5	0	4	3		
m3	5	1	5	5			4	1	5	2			5	0	4	2		
m4	2	3	5	5			4	2	5	5			3	3	4	3		
m5	4	4	4	4	5	3	4	4	3	4	4	3	5	5	4	4	4	4
m6	2	3	4	3			3	3	2	5			3	3	4	3		
m7	3	2	4	2			3	1	4	3			4	2	4	2		
m8	5	3	5	5	4	4	3	2	3	5	4	4	5	3	5	4	5	5
m9	5	2	3	3	5	5	4	2	3	2	4	3	5	2	4	2	5	4
m10	4	5	3	3	5	5	4	4	3	2	4	2	5	5	5	3	5	5
m11	5	3	3	5			2	2	3	3			2	2	4	4		
	p= .077		p= .754		p= .063		p= .001**		p= .267		p= .039*		p= .003**		p= .002**		p= .219	

0 = no conception could be indentified

I = interview, E = essay

The Wilcoxon Matched-Pairs Signed Ranks Test showed similar results. The findings here confirmed the correctness of the decision to focus on the interviews in examining the development and alignment of the conceptions. Indeed, in five cases I was unable to identify *any* of the conceptions expressed in the essay with regard to a particular phenomenon, either due to fact that some topic (the subject, the teaching, the learning) was not addressed at all, or else because it was impossible to interpret the meaning of the expression that was used.

5   DISCUSSION

5.1   A brief overview of the key findings and their conclusions

The aim of this phenomenographic study was (1) to identify and describe qualitatively varying ways of seeing *health education as a subject*, plus its *teaching* and its *learning* among health education student teachers (including also the early years of their career as regular teachers[4]), (2) to identify the critical aspects in terms of critical differences between the various ways of seeing the phenomena under study, (3) to detect the development of these ways of seeing (i.e. conceptions) during health education teacher training, and in the early years of work as teachers, and (4) to examine the extent to which the conceptions of the subject, its teaching, and its learning were aligned initially, and also how far they advanced in parallel with each other. The qualitative analysis produced three outcome spaces reflecting the understanding of the student teachers' understanding of health education as a school subject, and the teaching and learning of it. All the outcome spaces were hierarchical in nature, and this hierarchy was revealed through themes of expanding awareness grouping together critical differences between the categories of description. Thus, it could be said that some of the categories reflected conceptions that were lower in a hierarchy and were, therefore, less advanced or less complex, while some of the categories reflected conceptions higher in the hierarchy, corresponding to a more advanced or more complex understanding of the target phenomena.

Health education was reflected through five qualitatively varying ways of seeing the objective of the school subject, moving from seeing health education as *a context for disseminating knowledge and skills* towards seeing health education as *a means for developing responsible behaviour in society*. It could be concluded that student teachers were able to describe the objectives of health education in a

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[4]   From this point on, the term *student teachers* will refer also to the same individuals when they were subsequently employed as regular teachers and were studied at this stage.

fairly multifaceted way, thus meeting the expectations or demands that the Finnish National Curriculum sets for health education. Moreover, the student teachers' responses reflected a strong individual orientation, in so far as the focus was on the pupils' own life and daily practices, even in the fifth (i.e. highest) category, where the perspective was that of the individual as part of the wider community. However, student teachers need to expand their understanding towards seeing the importance of pupils' consideration of health matters from a wider angle; it would be desirable, for instance, for pupils to "consider what *other people* or *we* (as a group or as a society) regard as important and what could be done to improve *their* or *our* health and well-being" (Paakkari & Pakkari 2012), to evaluate local health-related political decisions, and to take part in wider discussions concerning ethical matters. This kind of awareness will be needed by pupils if they are to participate in health-promoting actions at different levels and thus move from individual behaviour changes towards wider changes such as organizational changes (Simovska & Sheehan 2000). The collective ways of understanding the objective of health education gave grounds for viewing *health literacy* as a desirable learning outcome or objective of health education. In fact, Paakkari and Paakkari's (2012) proposed definition of health literacy as a learning outcome in schools was based on these findings.

Student teachers' ways of seeing the teaching of health education fell into five categories, ranging from seeing teaching as *transferring knowledge and skills* to seeing teaching as *building a learning community with the pupils*. The categories were reflected through five themes of expanding awareness. The findings support earlier studies, but also contribute some new insights to discussions of teaching conceptions. The main similarities with earlier studies lie in the first three categories; these move from seeing teaching as teacher-centred – focusing on the non-problematic or non-complex nature of knowledge – towards seeing pupils as critical and reflective participants dealing with problematic knowledge (cf. Kember 1997; Samuelowicz & Bain 2001; Prosser et al. 2005). However, from this point on, in relation to conceptions reported previously, the findings presented in this thesis expand on ways of understanding teaching (especially the ways reported in studies on the teaching conducted by academics); they highlight the importance of supporting pupils' holistic growth and building a learning community *with* the pupils – a community in which there is a place for the teacher to develop as well. Thus, the findings not only confirm the findings of earlier studies but also bring some new insights to discussions on teaching conceptions.

In terms of student teachers' ways of understanding *learning* in health education, the study revealed six qualitatively varying ways of understanding the phenomenon, which were considered via three themes of expanding awareness. The first category of description encompasses a view of learning as the *reproduction of acquired health knowledge*, whereas the sixth encompasses a view of learning as *collective meaning-making*. The first five categories are approximately in line with findings reported in earlier studies (e.g. Marton et al.

1993). However, the analysis did not reveal the presence of the learning conception "increasing one's knowledge" (reported previously as the least complex conception of learning). This may be partly explained in terms of (socio-)constructivist theories of education. Such theories have been increasingly applied, and they have led to learning no longer being seen as the mere acquisition of more knowledge. Moreover, the present study identified, as a new way of understanding learning, a sixth conception, namely "as collective meaning-making"; this emphasizes the collective perspective in learning, and moves beyond the single *me* and *I*. Here one can see further confirmation of the communal nature of health education as a subject.

The student teachers pondered the learning conceptions through various themes, one of which was the nature of one's reflection. In the context of learning viewed as personal growth, the student teachers highlighted the importance of ethical reflection. However, the analysis suggested that they saw ethical elements mainly in the way pupils listen to other pupils' opinions and consider the perspectives of others. An aspect that was lacking was examination of the ethical nature of the pupil's *own* actions and thoughts, which is particularly important in learning for health.

The examination of the development of these three phenomena (the subject, its teaching, and its learning) during teacher education and after a period of work as a teacher suggested that health education student teachers' conceptions of the subject and its learning did *not* develop over time, but that their conceptions of teaching *did* show some development. Thus, the findings only partly confirm earlier research indicating positive development as students progress in their studies (e.g. Wood 2000; So & Watkins 2005). However, the findings of this research do confirm the notion that conceptions are capable of change (e.g. Marton et al. 1993; Boulton-Lewis et al. 2001b; Boulton-Lewis et al. 2004). The findings indicating only partial development may be at least partly explained by the fact that the student teachers had already studied basic level studies at the time of the first data collection, and held fairly high level conceptions at the start of the research. This highlights that the baseline for examining the change or the development has to be the initial conceptions (Meirink et al. 2009). Moreover, health education as a subject supports the view that pupils' should be allowed to have various interpretations of the topics and supported to their own meaning-making, which may positively influence student teachers' ability to express higher level conceptions (see Boulton-Lewis et al. 2001b).

In addition to the above, the inferential statistical results support the view that student teachers' conceptions of the subject and especially of its teaching and learning tend to be aligned with each other. This finding suggests that student teachers have a fairly coherent or holistic picture of health education with regard to the subject, its teaching, and its learning, and the result is consistent with findings previously reported on the alignment of conceptions (e.g. Koballa et al. 2000; Boulton-Lewis et al. 2001a). Although the percentages calculated might appear to convey a less uniform picture (with less than half of

the students expressing conceptions that were entirely aligned with each other) no statistically significant differences emerged. The broad alignment, statistically speaking, may be partly explained by the fact that the interview questions and the essay instructions covered the three phenomena under investigation; this in itself could have encouraged students to regard them as intertwined with each other.

An interesting and methodologically important finding (neither expected nor included within the initial research questions) was the finding that during the interviews the participants tended to express more complex conceptions than in their written essays. Hence, the conceptions expressed in the essays and in the interviews were not parallel with each other. Overall, this seems to support the dominant role of interviews as a phenomenographic data collection method, at least in preference to written essays, especially in cases where the aim is to examine the development of conceptions at an individual level. In such a context it is important that the method should be capable of reflecting the participants' most complex understanding at any given time. Nevertheless, the study did not show the extent to which the very process of writing the essays (which took place *before* the interviews) might have helped participants to express the conceptions that emerged *during* the interviews. Moreover, we do not know how far the essays (or the interview transcriptions), used as *unique* data sources, would have revealed all the critical aspects that were discerned using the means applied here, namely having *essays plus interviews as a single pool of data*. In my case this is important, since one of the main aims of the larger study was to identify and describe the conceptions and their critical aspects.

One of the most important contributions of the research was to identify three approaches to school health education (see Paakkari et al. 2011a). These approaches began to take shape when the categories of description identified for the three target phenomena (subject, teaching, learning) were *recategorized* for statistical purposes on the basis of their contents. As noted earlier, I examined whether I could find sufficient similarities between the three sets of categories (i.e. outcome spaces for the conceptions of the subject, its teaching, and learning) so that I could group together, connect, and recategorize the original categories. Hence, I looked carefully at the critical aspects, highlighting the main differences between the categories observable within a single target phenomenon and between the three target phenomena. Since I was able to find enough similarities in content between certain groups of categories, the original categorization was modified in such a way as to form three larger, inclusive categories, referred to as (1) the facts and skills approach, (2) the independent thinking approach, and (3) the personal growth and responsibility approach. Here I would argue that a division into only two orientations – content-focused vs. learning-focused – would have lost too much information and concealed too many critical differences between the categories. In the following section I shall describe the three approaches in more detail. Because they represent the combination and categorization of the three sets of categories, they serve as a

means to integrate the findings of the conceptions of health education and its teaching and learning.

5.2 Beyond the findings: three approaches to school health education

On the basis of the present study one can outline three general approaches to school health education; these encompass the various ways of seeing the subject, and its teaching, and its learning. The first approach, which I name the *facts and skills approach*, consists of conceptions that focus mainly on knowledge transfer in health matters. The second approach, the *independent thinking approach* moves the focus from factual learning towards the development of thinking, while the third approach, the *personal growth and responsibility approach* emphasizes not only the individual but also the social dimension of learning about health. The descriptions attached to the approaches (see below) are based on the following main assumptions: (a) the teacher's conceptions are intertwined with his/her teaching practices; (b) the way the teacher approaches teaching is associated with the learning approaches adopted by pupils, and eventually with their learning outcomes; (c) because the approaches are based on the ways of experiencing the subject, its teaching, and its learning, they are organized in an inclusive hierarchy in which the last approaches may include aspects of the previous ones, but not the other way around. Thus, the facts and skills approach to health education represents the least complex approach, with the personal growth and responsibility approach representing the most complex approach.

Figure 6 summarizes the essential and critical aspects of each of the approaches to health education mentioned above. The aspects represent the critical differences between the various approaches, while at the same time highlighting what teachers should discern and focus on when aiming to direct attention and activity towards a particular approach.

FACTS AND SKILLS
APPROACH

AIM: to increase of pupils'
theoretical knowledge capital
and skills

TEACHER'S ROLE:
To transmit knowledge
To activate pupils

PUPIL'S ROLE:
To receive information
To act as an active participant

NATURE OF KNOWLEDGE:
Non-complex

NATURE OF REFLECTION:
No reflection

INDEPENDENT THINKING
APPROACH

AIM: to foster reflective
thinking, personal meaning-
making, and self-awareness

TEACHER'S ROLE:
To facilitate thinking
To guide

PUPIL'S ROLE:
To reflect
To think critically
To listen other's opinions

NATURE OF KNOWLEDGE:
Complex

NATURE OF REFLECTION:
Descriptive and critical

OTHER IMPORTANT:
Atmosphere becomes essential

PERSONAL GROWTH AND
RESPONSIBILITY
APPROACH

AIM: to promote the growth of
the pupils as people, and their
citizenship skills

TEACHER'S ROLE:
To create a safe and accepting
atmosphere
To be a fellow-learner

PUPIL'S ROLE:
To be a supportive and
responsible fellow-learner

NATURE OF KNOWLEDGE:
Complex

NATURE ON REFLECTION:
Ethical and collective

OTHER IMPORTANT:
Atmosphere has a central role
Dialogue

FIGURE 6   Summary of the critical aspects of the three approaches to health education

5.2.1   The facts and skills approach

The *facts and skills approach* to health education covers the student teachers'
understanding of health education as a subject which aims to promote the
enhancement of pupils' factual and practical knowledge capital. Alternatively,
one could say that the aim is to support factual and practical knowledge as the
core components of health literacy (see Paakkari & Paakkari 2012).

Theoretical knowledge could be described as involving all-round
education on health matters; it includes principles, theories, and conceptual
models of various health phenomena, and thus it may further be described as
abstract (see Bereiter & Scardamalia 1993, 44; Tynjälä 2008a, b). The acquisition
of such knowledge may help pupils to understand a phenomenon more deeply,
and to create links between separate health issues (Paakkari & Paakkari 2012).
However, such knowledge is rarely enough to make people take health-
promoting actions or change their health habits. Practical knowledge on the
other hand, also referred to as skills or procedural knowledge (Bereiter &
Scardamalia 1993, 45; Tynjälä 2008a), includes the basic health-related skills that
pupils should learn in order to behave in a health-promoting way, such as the
ability to take care of one's hygiene, follow safety traffic regulations, and give
first aid. Practical knowledge can be understood as a competency or capability
to do something, to put theoretical knowledge into practice.

The facts and skills approach thus involves two modes of seeing pupils' learning: (i) learning as gaining (cf. Paakkari et al. 2011b) and reproducing acquired health knowledge, and (ii) learning as the application of health knowledge. At the same time, the pupils' role expands from that of being merely a knowledge recipient to that of an active participant – since the acquisition of skills does after all call for practical exercises. However, since the skills are for later use — to be taken and used on some indefinite future occasion — learning is not truly situated within the pupils' experiences, and pupils are not supported so that they truly reflect on the knowledge from the point of view of their own lives. In fact, the role of reflection during the teaching-learning situation is not emphasized. Thus, it could be said that this approach regards knowledge as non-complex or non-problematic, i.e. as something that can be said to be simply right or wrong. This way of seeing can be related to the argument that people who regard knowledge as certain and unchangeable, and teachers as experts who exert authority, tend to hold traditional (as opposite to constructivist) conceptions of teaching and learning (Chan & Elliott 2004; Aypay 2010; Otting et al. 2010). According to Tsai (2007) and Muis and Foy (2010), teachers who understand knowledge as something certain and non-complex (taking a positivist view) tend to pursue teacher-focused practices. Moreover, in the positivist perspective, health as a concept may be looked at from various dimensions (physical, social, and psychological), but is not treated as something personal and perceived (in terms of the concept of "perceived health").

In accordance with this perspective, the role of the teacher is to keep a firm grip of the teaching and learning. Teaching could be described as the transmission of knowledge and skills when the role of the teacher is mainly to deliver the health knowledge he or she regards as important to the pupils. It is true that when the focus of the teaching moves to supporting the active processing of knowledge through application, the role of the teacher expands to cover aspects such as that of inspirer and tutor. However, even if the teacher does inspire pupils to seek out information, this will tend to take place within the reading options the teacher has chosen. Begoray et al. (2009) has demonstrated how pupils perceive such teaching as encouraging dependency on the teacher rather than independent acting and thinking. In so far as the participation of the pupils is supported only within the framework of what the teacher has planned and what he or she aims to achieve (with ready-planned outcomes), we could see such participation as no more than token (Simovska 2000, 2004).

The above description of the *facts and skills approach* reflects certain assumptions about the nature of knowledge and knowing (see Hofer & Pintrich 1997) or the ways of knowing (see Baxter Magolda 2001). It could be said that this approach reflects health education student teachers' epistemic understanding mainly as a phenomenon of *Absolute Knowing,* which is the simplest way of knowing (Baxter Magolda 2001). Ultimately, one can say that such a form of knowing covers the following manifestations:

- knowledge is seen as non-complex or non-problematic, and as either right or wrong;
- pupils are seen as taking in knowledge without qualification or modification, and without questioning its certainty;
- the teacher, as an expert and authority, knows the right answers;
- knowledge within the teaching-learning events comes mainly from the discipline (the curriculum) and it is mainly the teacher who chooses what is covered in the lesson. If the pupils are allowed to search for knowledge, this happens under the strict guidance of the teacher;
- the pupil's role is mainly to obtain knowledge from the teacher;
- the development of the pupil's own voice is not seen as important (see Baxter Magolda 1999, 2004; van Rossum & Hamer 2010);

Van Rossum and Hamer (2010) have proposed that *Transitional Knowing* (a term introduced by Baxter-Magolda) is a feature of teaching-learning conceptions that include the application of knowledge by pupils and the use of group work (peer-peer interaction), the discovery of the pupil's own voice (with the pupil expressing his/her own opinions, though these opinions are not focused on further), and the shaping of pupils' knowledge by the teacher. Transitional knowing involves epistemic beliefs that are more sophisticated than Absolute Knowing. In so far as such a form of knowing includes aspects of the uncertainty of (evolving) knowledge, with (possibly) two-way teacher-student interaction, it does not precisely match the *facts and skills approach* to health education. Nevertheless, I would agree that some elements of Transitional Knowing are present in the facts and skills approach, though Absolute Knowing is the predominant form of knowledge and knowing in the facts and skills approach I have identified.

It is likely that teachers possessing the epistemological assumptions underlying Absolute Knowing (or Transitional Knowing) will support the development of pupils' understanding of knowledge and knowing in a corresponding direction (cf. Sormunen 2004). It is therefore fully to be expected that the facts and skills approach will help pupils to gain knowledge of many health matters and develop a number of health skills. However, pupils may not gain critical insights into health issues or understand how separate issues are linked to their own lives, and they be uncertain whether a certain form of health-promoting behaviour actually suits them personally. To take an example, pupils may be unable to evaluate whether they themselves wish to smoke, or whether they smoke only because of pressure from their peers.

5.2.2 The independent thinking approach

The *independent thinking approach* focuses on promoting pupils' critical and reflective thinking. Now, the aim is to support pupils so that they understand health issues from their own personal perspectives and create personal meanings. Thus, this approach highlights the focus on what a pupil learns

through health content – not what a pupil learns *about* health content. At the same time, the focus on enhancing the development of health literacy expands to cover critical thinking and self-awareness as the core components of health literacy (see Paakkari & Paakkari 2012; see also Abel 2007; Nutbeam 2008).

Critical thinking relates to the ability to distinguish the conditions that promote health from those that do the opposite (see Abel 2007). In addition, critical thinking enables pupils to identify and work out causal relationships, to set out firm arguments, to assess assumptions, to judge the credibility of arguments, and ultimately, to make sound health decisions after pondering various options (see Fisher 2000, 8). Ten Dam and Volman (2004) add that critical thinking enables people to contribute to society "in a critical and aware manner".

Self-awareness as a core component of health literacy involves the ability to inquire into and evaluate one's thoughts, feelings, and behaviour (Grant et al. 2002); it may focus on the self in general, or on the self as a learner (metacognitive knowledge, also called self-regulatory knowledge, see Bereiter & Scardamalia, 1993). The self-in-general aspect is particularly essential as it promotes personal meaning-making in health issues and the developing awareness of often tacit (implicit) routines in daily living. The self-as-learner aspect enables pupils to set learning goals for themselves, to adopt various strategies to reach these goals, to monitor the learning process, to manage time, and attribute reasons for what has happened in their learning (see Zimmerman 2002).

The *independent thinking approach* to health education includes two ways of seeing learning: (i) emphasizing the pupils' ability *to develop* their own meanings, and (ii) emphasizing the widening of horizons, that is, the *transformation* of thinking. Central to both modes of learning is the need for reflective thinking. However, the nature of the reflection differs in each case. When the focus is on developing meanings, the health education student teachers indicated that pupils should show descriptive reflection − asking *how* and *what* questions (How does this health matter relate to my life? What do I think about this particular topic? What are my current ways of behaving in a health-promoting manner?). In fact, questions like these relate to the larger question of "Who am I?" In asking this question, the pupils mainly draw a picture of themselves (their ways of thinking and behaving), but do not yet critically evaluate the assumptions underlying those thoughts and behaviours. At the same time, a transformation in thinking requires pupils to be able to show critical reflection, that is, to ask *why* questions: Why do I think or behave as I do? Why should I make this decision and not any other? Furthermore, critical thinking here moves from merely assessing health issues from various perspectives towards assessing these issues from the point of view of one's values, and "daring" to express a differing point of view (ten Dam & Volman 2004).

Along with the above, the role of the pupils will expand to cover the aspects of, first, the *reflective,* and later the *critical* thinker. Within the learning

process, the opinions of others play a crucial role. When the focus is on developing meanings the perspectives of others enable one to become aware of one's own perspectives and those of others. Hence, it becomes accepted that there may be different ways of seeing the same thing. But as the focus moves to seeing learning as a widening of horizons or as understanding something in a new way, the perspectives of others serve as an essential means for changing one's own way of thinking. However, these perspectives will be evaluated carefully; in other words, they will not be merely accepted without question, and this questioning clearly calls for critical thinking skills. Here, we may see elements of the ideas of ten Dam and Volman (2004), suggesting that the development of critical thinking is a *social* process. Moreover, if the pupils learn to separate their own hopes and wishes from those of their parents and friends, and if they succeed in balancing the expectations of others with their own aspirations – or as Baxter Magolda (2001, 94) puts it "letting go of external control and beginning to replace it with one's internal voice" – they will become able to think critically and define their own values.

Self-reflective and critical thinking reflects the fact that the knowledge that is handled during health education lessons is complex, problematic, and uncertain. In this case the knowledge is not just something that exists in books, but also something that exists in oneself and in others. Thus, certainty will not be evaluated only against scientific truth, but also against personal "truth". At the same time, people's health will be understood as personal, perceived, and relational, and not merely as something to be diagnosed. What is best for one person's health is not necessarily best for another person.

The focus on supporting pupils' individual and independent thinking requires teachers to challenge pupils to think critically, to ponder matters from their own personal perspectives, and to create their own points of view. Moreover, teachers should encourage pupils to construct arguments for their opinions. Tones (2005) argues that if education does not encourage people to think critically in order to make sound decisions, it will be nothing more than instruction, training, or simple brainstorming. Support for the expression of one's own thoughts calls for an environment that is tolerant and safe. As compared to the previous approach, the teacher is seen as loosening his/her grip, allowing personal interpretations, situating the issue (the object of learning) within pupils' personal experiences, and validating pupils as knowers (see Baxter Magolda 1999). This view is in line with the findings of Begoray et al. (2009), who reported that the pupils themselves showed a desire to personalize information and develop their own meanings; receiving overly generalized health information was perceived as insufficient.

The independent thinking approach reflects health education student teachers' ways of experiencing knowledge and knowing in health education in the manner identified by Baxter Magolda (2001) as *Independent Knowing*. Independent Knowing refers to:

- understanding that knowledge is uncertain;
- understanding that it is not only experts or authorities who own knowledge: everyone can have his/her own opinion;
- the ability to build arguments for one's perspectives;
- seeing that the validity of opinions differs in relation to the kinds of arguments on which the opinions are constructed;
- learning that calls for the expression of one's own opinions, listening to peers, and seeing that peers may contribute to the formulation of one's opinions;
- seeing the role of the teacher as one of providing a context for knowledge exploration (see Baxter Magolda 2001, 32–35; van Rossum & Hamer 2010, 62–65).

If one accepts the link between the teacher's and the pupils' epistemic beliefs, it can be said that the independent thinking approach to health education may ultimately support the pupils' *Independent Knowing,* and in so doing help pupils to "think for themselves and to discover their own distinctive voice" (van Rossum & Hamer 2010, 62; see Baxter Magolda 2001, 32). Moreover, in this approach to health education there is more than a glimpse of *Contextual Knowing*, which involves a more sophisticated way of seeing knowledge and knowing. This way of knowing refers to the integration of one's own ideas and thoughts with those of others when one is deciding what to think (Baxter Magolda 2001). Moreover, Baxter Magolda (1999, 51) found the following to be true among the "contextual knowers" she identified:

> Contextual knowers felt that rationality in terms of consulting experts and processing evidence was necessary but simultaneously valued working through their own perspectives by accessing their own experience and others' perspectives. […] Unlike independent knowers, contextual knowers are unwilling to rely solely on their own perspective or solely on the perspective of others.

5.2.3   The personal growth and responsibility approach

The *personal growth and responsibility approach* to school health education represents the most complex approach to health education. The approach combines an understanding of the subject, its teaching, and its learning that sees health education as aiming to promote the growth of the pupils as people, at the same time as it promotes their citizenship skills. In this context the focus of the teaching-learning is on supporting pupils' *growing through learning about themselves, others, and the world*, and *moving towards shared meanings through growing with others in dialogue.* The aims are connected with developing pupils' citizenship as a core component of health literacy (see Paakkari & Paakkari 2012). In this context, citizenship is understood as the pupils' ability to act in an ethically-responsible way and to take social responsibility. It is essential for pupils to gain this ability if they are to promote community-level health (Abel 2007). Through having citizenship, they may be able to advocate personal and community health (Benham-Deal & Hodges n.d.), influencing the policies and

environments that affect their own and others' health (World Health Organization 1997). Paakkari and Paakkari (2012) put the matter thus:

> This highlights the importance of students being able to understand their rights and responsibilities, and also to be aware of the effects of their thoughts and actions on other people and the world at large. The point is that students should be able to consider health matters beyond their own perspective: to think of what other people or we (as a group or as a society) regard as important, what could be done to improve their or our health and well-being. In other words, students should become health literate about themselves in relation to others, understanding the perspectives of others and of the collective.

This approach to teaching contains two modes of seeing learning, namely *learning as personal growth* and *learning as collective meaning-making*. Growth refers to growing as a person through seeing something in a different way, through being a supportive fellow-learner, and through dialogue with others in a learning community. Thus, the role of the pupils opens up not only towards the content to be learned or towards one's self, but also towards others (see Hoveid & Hoveid 2008): pupils are seen as having the capacity to be supportive fellow-learners and responsible members of the community. This calls for ethical reflection, that is, an ability to consider "the appropriateness of a variety of health-related practices […] and to show empathy when trying to understand something from the point of view of others" (Paakkari & Paakkari 2012). However, ethical reflection seeks not merely self-understanding, but also a collective or shared meaning in the context of reflective discussion (Kwak 2007), which in turn calls for collective reflection viewed as meaning negotiation within a dialogue (cf. De Lawter & Sosin 2000).

Collective reflection requires a genuine dialogue, a discussion in which all members may share their own ideas and experiences, learn about differences, and create a collective understanding. Lodge (2005) argues that dialogue is about engaging with others in building a shared narrative, one that ends up at a point that one would not have reached alone. Here, we may indeed see the elements of seeing knowledge as something that is socially-constructed – as compared to the previous approach in which knowledge was developed individually. Dialogue may support the participation of pupils in decision-making in the present and not merely the development of citizenship skills for the future (Barrow 2010). Hence, we may see elements of genuine participation (as compared to token participation), which could be described here as something that focuses on processes of knowing and meaning-making in dialogue, within the contexts that the pupils are part of (Simovska 2000, 2004). The possibility of participating and taking control, that is, of "sharing power" (Simovska & Jensen 2009), may for its part promote pupils' self-esteem and self-efficacy (King & Occleston 1998), thus supporting growth as a person.

As the focus of the teaching-learning event moves towards supporting personal growth, the teacher becomes viewed as building a context (atmosphere) for learning that could be characterized as safe, tolerant, and accepting (cf. Pigozzi 2006). Though such an atmosphere was already seen as essential in the previous approach, here it has an accentuated role. Such an

atmosphere permits a feeling of being respected, an increase in confidence, and the expression of personal (and sometimes uncertain) opinions and experiences, critical thinking and reflections, and genuine dialogue; it further allows the evolution of supportive interaction between *all* the members of a class. At the same time as the focus of the teaching-learning moves to supporting collective meaning-making, the teacher's role expands to include aspects of being a *reflective fellow-learner*. After all, the teacher with his/her pupils forms a learning community in which the teacher can learn from the pupils as well.

As was the case to some extent with the previous approach, the *personal growth and responsibility approach* to health education reflects student teachers' ways of seeing knowledge and knowing as a matter of *Contextual Knowing*. In interpreting the ideas of Baxter Magolda (1992), Van Rossum and Hamer (2010, 66) note that "contextual knowers while engaging in relationships with teachers and peers stress interdependency, characterized by equality and ongoing dialogue". In fact, the existence of dialogue in this approach constitutes a critical difference from the previous approach; though Contextual Knowing was already apparent in the independent thinking approach, only now is its development manifested in genuine dialogue.

The personal growth and responsibility approach highlights how a strong internal voice (related to personal growth) allows an equal relationship with peers and others, and how the internal voice is no longer merely in the background when one is discussing with others (cf. Baxter Magolda 2001, 170). From the perspective of health literacy, these aspects are particularly important in developing *collective* health, that is, in deciding what is good for *us* – not for me or you. Now, within this process, the pupils may act as equal partners, having equally valid thoughts, without being "consumed" by others. Yet in these manifestations one is also allowed to choose a differing stance, that is, to follow one's own independent path (see Baxter Magolda 2001, 170). Thus, the question is not merely one of a sense of competence, but rather one of having a sense of authority and agency (see Johnston et al. 2001).

5.2.4 Concluding remarks: three approaches to health education as a means of supporting the journey of pupils towards health literacy

In view of the fact that the aim of health education is to promote pupils' health literacy, the approaches taken can be examined according to how far they actually achieve this aim. The utility of the notion of health literacy is supported by the fact that I (in conjunction with Olli Paakkari) developed a way of understanding health literacy and its constituent parts on the basis of the findings described in this thesis. Figure 7 depicts how moving from a less advanced approach to health education (the facts and skills approach) towards a more advanced approach (the personal growth and responsibility approach) supports the achievement of a higher level of health literacy among pupils.
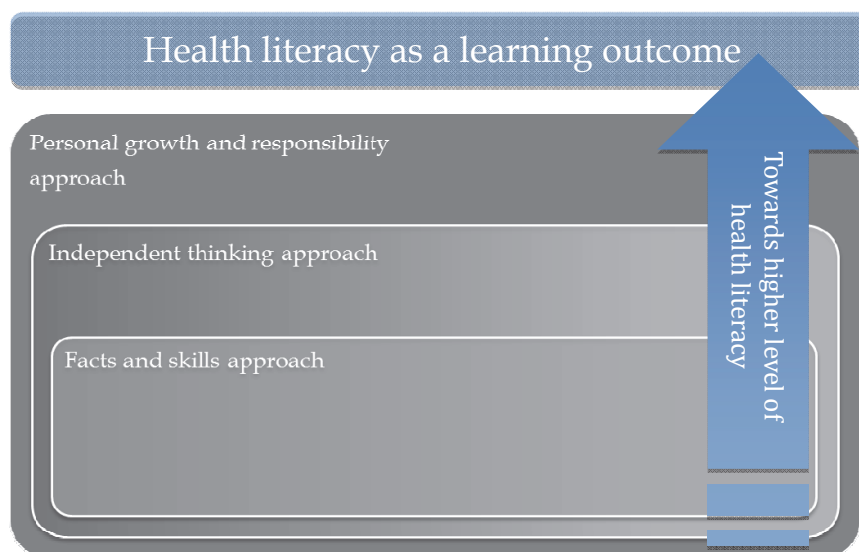
FIGURE 7 Inclusive approaches to school health education as a means towards a higher level of health literacy

Health literacy as a learning outcome means that the pupil becomes capable of evaluating, understanding, and developing health messages from the perspective of his/her own life. Moreover, health literacy enables pupils to become aware of themselves, other people and the wider context, to make ethically sound health decisions, and to work on and change their surroundings so that they influence not only their own, but also others' health possibilities (Paakkari & Paakkari 2012). The ability to engage in such meaning-making has similarities with the concept of self-authorship, which Baxter Magolda (2008) describes as an internal capacity to construct one's own perspective. Thus, we may loosely view the approaches as health education teachers' ways of supporting the development of self-authorship in their pupils – though the parallels with the "self-authorship" notion are no more than broadly descriptive.

Baxter Magolda (1998, 41) has argued that self-authorship is constituted by one's epistemological beliefs, referred to also as epistemic assumptions or epistemic beliefs (beliefs about the nature of knowledge and knowing; see also Hofer & Pintrich 1997), and further, by one's identity and social relations:

> Self-authorship requires complex assumptions about the nature of knowledge, namely that knowledge is constructed in a context based on relevant evidence, that evaluating evidence is necessary to decide what to believe, and that each individual has the capacity to make such decisions. Furthermore, self-authorship requires a sense of identity through which individuals perceive themselves as capable of knowledge construction. It also requires interdependence with other people to gain access to other perspectives without being consumed by them. As a result, self-authorship is more than a skill; it is a way of making meaning of one's experience.

In the course of self-authoring "the person becomes the *coordinator* of defining her/his beliefs, identity and social relations while critically considering the perspectives of external others" (Baxter Magolda 2008, 270−271). This capacity has a particular role to play in times when critical thinking, an appreciation of multiple perspectives, and civic engagement are seen as important learning outcomes, not only in higher education, but also in schools. In fact, Baxter Magolda (2001) argues that becoming mature in the three dimensions of self-authorship makes possible effective citizenship. Hence, we may indeed find similarities between self-authorship as an educational aim and health literacy as a learning outcome in schools (though self-authorship has been studied mostly among students in higher education); this was confirmed by the findings presented in this thesis, in so far as the student teachers emphasized the role of health education as a means of developing responsible behaviour in society. Moreover, Baxter Magolda's treatment of the development of self-authorship – as a phenomenon intertwining the conceptions of knowledge and knowing with the conceptions of teaching and learning (van Rossum & Hamer 2010, 55) – supports the relationship between her work and the three approaches identified above (the facts and skills approach, the independent thinking approach, and the personal growth and responsibility approach).

In the present study, the student teachers reflected all the pedagogical conceptions (the subject, its teaching, and its learning) through their understanding of knowledge. Their understanding of the nature of knowledge served as a theme of expanding awareness which, for its part, encompassed the critical differences between various ways of understanding the subject and its teaching and learning. Hence, it can be suggested that the role of the student teachers' epistemic beliefs in this context is of fundamental importance, especially given that (1) the teacher's epistemic beliefs tend to predict pupils' epistemic beliefs and eventually pupils' achievement (Muis & Foy 2010; cf. Tsai 2007); (2) the teacher's epistemic views tend to be associated with his/her teaching practices (Tsai 2007; Muis & Foy 2010) – in other words, positivistic epistemic views are aligned with teacher-focused teaching practices, and in contrast, constructivistic epistemic views tend to be aligned with student-focused teaching practices (Tsai 2007), and (3) the teaching practices tend to be linked to pupils' epistemic views (Muis & Foy 2010). Indeed, Sormunen (2004) has argued that the teacher can be regarded as the most important factor in the development of pupils' epistemic views. However, it should also be emphasized that the three approaches to health education do not reflect *pupils'* ways of understanding knowledge *per se* (in the manner in which Baxter Magolda considered students' personal epistemic beliefs in the context of their own learning), as they are seen as developing from the *student teachers'* understanding concerning knowledge during health education lessons.

5.3 Methodological considerations

My purpose was to conduct a phenomenographic study and not merely to conduct a phenomenographic data analysis. Thus, I tried to approach the entire research process from a phenomenographic perspective. In evaluating the success of this endeavour, I shall apply Bowden's (2005) understanding of the phenomenographic research process. Bowden argues that the phenomenographic perspective should reveal the entire process, starting from the planning and proceeding to the data collection, the analysis of the data, and eventually to the interpretation. During all these phases the researcher has to consider how to guarantee the trustworthiness of the process (Bowden 2005; see also Kvale 1996, 235).

In qualitative research there has been a tendency to replace the terms *reliability* and *validity* with terms such as *trustworthiness* or *credibility*, due to notion that the traditional terms are associated with the positivist perspectives of quantitative research (Kvale 1996, 2007). Nevertheless, *reliability* and *validity* are still used in discussions of the quality of qualitative research (Kvale 1996, 2007; Åkerlind 2005c). In the present case I shall use the term *trustworthiness* in referring to the overall quality of the research (cf. Kvale 1996). I shall use *validity* to refer to the extent "to which a study is seen as investigating what it aimed to investigate or the degree to which the research findings actually reflect the phenomenon being studied" (Åkerlind 2005c, 330; see also Kvale 2007, 122). I shall use *reliability* to refer to the consistency of the findings (see Kvale 1996).

Below, I shall consider methodological considerations and trustworthiness, phase by phase, complementing previous discussion in the data analysis section (Section 3.4), and taking up other aspects as necessary. Due to fact that qualitative data and qualitative analysis played the most important role in the research, the discussion which follows will focus mainly on the aspect of trustworthiness, in relation to the qualitative research presented in this thesis.

5.3.1 Planning the research process and collecting the data

Planning. Planning a phenomenographic study includes decisions on the purpose of the study and the strategies that will be used to fulfil that purpose (Bowden 2005). Bowden (2005) highlights the importance of clarifying the purpose(s) and keeping it/them in mind throughout the process. My initial purpose was to explore health education student teachers' conceptions of health education as a subject, and of the teaching and learning of the subject; also to examine the development and alignment of these conceptions during health education teacher training and after some years of experience as a teacher in a school. I wished to gain knowledge that could be used to develop teacher training in health education; however, I did not have a clear picture of the nature of the conceptions themselves.

These purposes were decided *before* considering the phenomenographic research approach. However, they became clearer after I became familiar with

the literature related to the field. In the end, as Kvale and Brikmann (2009, 243) argue "the validity of an investigation rests upon the soundness of the theoretical presuppositions of a study and upon the logic of the derivations from theory to the research questions of the study". I reformulated the purpose as one of gaining an understanding of the qualitatively varying ways of experiencing the target phenomena, that is, of the conceptions (as defined in the phenomenographic literature). At the same time, my understanding was that eventually I would be able to construct a pedagogical tool that could be used in health education teacher training, for the purpose of expanding students' understanding in a more complex direction. These purposes – of understanding the different ways of experiencing, studying the development of the conceptions, and building pedagogical tools – served as critical factors against which subsequent decisions were made. In pursuing these objectives, it seemed possible to operate within what Kvale and Brinkmann (2009) refer to as the ethical perspective of valid research, adhering to the principle that one should be able to produce knowledge beneficial to the participants, without causing harm while so doing.

Data collection. The aim of phenomenography is to identify and describe all the possible and qualitatively varying ways of experiencing something in a certain group of people. Thus, there is commonly a preference for maximum variation sampling as a way of conducting purposeful sampling (Bowden & Green 2010b). It was important to hear the voices of the kind of students whose education the findings would be applied to. My selection criteria for the sample covered the following participants and characteristics: physical education students doing intermediate level studies in health education teacher training during the academic year 2004—2005, of both sexes, and having no practicum experience in their main teaching subject at the time when the research began (because the practicum also included the teaching of health education); then, at a subsequent stage, the persons included would be teachers (selected from those already interviewed) with one to four years of working experience as a health education teacher in a school. Since my research took place in a health education department where the participants were nearly all students in physical education, it seemed that I was fairly well able to maximize "the range of individual voices, thereby enriching the researcher-interpreted collective voice" (Bowden & Green 2010b, 127). This was the case despite the fact that ultimately the effect of the practicum was not used as a variable in detecting changes in conceptions during teacher training. However, due to fact that nine out of the twenty participants were not followed up over the entire research period, there might be some doubt as to whether I was able to "hear" all the possible ways of experiencing the subject, and the teaching and learning of it, after the gaining of work experience.

The second aspect that is important for validity in data collection is the way the data are collected. Phenomenography aims to capture "conceptualizations which are faithful to the individual's experience of a selected learning phenomenon" (Francis 1996, 36); in other words, the focus

should be on the relation between the persons researched and the phenomenon. Hence, the data collection method should be chosen in such a way as to fit this purpose. My choice was to use *written essays* and *semi-structured interviews*. The written essays were intended to allow the participants to focus on those aspects they regarded as important, without the influence of the researcher, and to complement the data provided in the interviews. The idea was that the written essays would reveal what the participants had in their focal awareness, at the same time and at one particular point in time. However, since the participants were in fact able to choose the time and place for the writing, it cannot be claimed with certainty that the essays describe the ways of experiencing something *at a particular time*. In any case, due to difficulties in analysing the essays I would now, in retrospect, be cautious about choosing essays as a phenomenographic data collection method. It should nevertheless be pointed out that there are some good examples of studies using essays. For example, Tynjälä (1997) used essays as phenomenographic data when she studied education students' conceptions of the learning process. Here it should be noted that, unlike the procedure in my study, the essays written by the students in Tynjälä's research constituted an actual part of their study programme; this factor could have motivated the participants to truly ponder the objectives of the research (and possibly also the objectives of their learning), putting more pressure on them to express all the aspects they could discern at a given time. Moreover, the education students in Tynjälä's research might have been more accustomed to writing texts than my students of physical education, and this aspect could conceivably have influenced the ways in which thoughts were expressed.

The interview aims to encourage the interviewee to reflect on and discuss the topic of the research as much and as deeply as possible, without the influence of the interviewer's own insights on the topic (see Bowden & Green 2010b). Hence, it is important that the preconceptions that the researcher holds concerning the phenomenon should be *bracketed* (i.e. taken account of and set aside; see Bowden & Green 2010b). In respect of this, Kvale and Brinkmann (2009, 242) refer to "reflexive objectivity", involving a process of becoming sensitive towards one's own prejudices, that is, one's own subjectivity. Bowden and Green (2010a) argue that this aspect can be addressed by acknowledging the expressions of the person researched as the only acceptable evidence throughout the data collection – and later within the analysis.

My purpose was, with regard to any topic, not to introduce new ideas, issues, or aspects to the interviewees that they did not bring up themselves. However, as an inexperienced interviewer I found this guideline very difficult to follow. During the pilot interviews (n=3) I noticed that if the respondents did not fully understand my questions, I offered alternative ways of answering. To give an example, if the respondents had difficulties in thinking of and expressing their ways of experiencing knowledge in health education, I tended to encourage them to explore their thinking by asking, for instance, "*Could it be something where there is either a right or a wrong answer, or could it be something*

else?" As a consequence, the interviewee would be likely to focus on the aspects that I had offered, and not on the aspects she/he might have mentioned spontaneously; hence the aspects that I offered could influence the way the pilot interview proceeded. Very importantly, the piloting helped me to test and reformulate the questions, especially in cases where my questions ended up being longer than the subject's answers (see Kvale 1996, 145). Furthermore, the process enabled me to understand that there are different kinds of interview participants, varying in motivation level, the tempo of their speech, and their ways of expressing and describing their ways of seeing the target phenomena. As Kvale (1996, 147) indicates, it is the task of the interviewer to facilitate the participants in such a way as to reflect their ways of seeing and to obtain as rich data as possible. Finally, the pilot interviews served as a way of becoming aware of my preconceptions on the subject, its teaching, and its learning. As Ashworth and Lucas (2000) emphasize, consciousness of one's own preconceptions helps the phenomenographic researcher to focus on the participant's experienced world (the relation between the participant and the phenomenon under study): the researcher, as it were, "quarantines" aspects that may lead him/her away from that relation, and becomes able to listen carefully to the participant's voice. It may be the case that not all the preconceptions were made explicit. Yet overall, my experience is that the pilot interviews played a crucial role in assuring the validity of the findings.

Bowden and Green (2010b, 128) argue that "researchers want to hear the voices of the researched in relation to a particular phenomenon and ensure that they hear as much as the researched might be able to reveal". In this sense I believe that the interviews worked well in terms of helping interviewees to reflect on their ways of experiencing, and also in supporting them in making some implicit issues explicit. Furthermore, I would definitely agree with Kvale and Brinkmann (2009; see also Kvale 1996, 145) in seeing validity in interviewing as related to the quality of the interviewing; what is required is a continuous attempt to capture the meaning – the whole of it – by asking for clarifications, examples, and the like. It is also true that the quality of the interviewing increases as the researcher gains more experience as an interviewer. In my own case, piloting served as a good start, but I nevertheless felt that it was only during the actual interviews (after several dozen of them) that I was able to truly hear what the interviewees were saying, to probe or check the meaning of the expressions used, to be comfortable with silence after my questions, and to be satisfied with the respondent's line of reflection – or as Ashworth and Lucas (2000, 302) put it, to "engage in empathic listening to hear meanings, interpretations and understandings". Hence, it may be that I missed something, or that something was left without sufficient asking or probing, and hence without becoming understood. Thus, there can always be some degree of doubt about the validity of the interviews.

In conducting the interviews I had to be aware of my dual role: I was not only a researcher but also a health education teacher educator in the department in which the study took place. It is true that during the research

process I met only a few participants in my role as teacher educator. Nevertheless, all the participants (students) were aware of my profession. It is difficult to say whether my role as a teacher educator had some influence on the participants – that is, on their willingness to participate and on their responses in the written tasks and interviews. However, I did gain the impression that because the students "knew" me it was easier for them to take part in the research, and to have a discussion on the research topics. It also seemed to make it easier to have a comfortable and even informal atmosphere. Moreover, although in general I did not feel that my various roles made the students answer in a particular way, I did feel compelled to probe their answers more deeply if I had the slightest sense that they could have been answering according to how they had recently been taught in teacher training (e.g. in the case of the health concept of the WHO). The probing helped the students to express the issues in their own words and to clarify their own meanings. However, there were times when the students would have liked to hear my opinions and perspectives on the issues that were dealt with. On these occasions I answered that I would be happy to answer the question after the interview. It could be said that my dual role did influence my intentions to the extent that I hoped that the discussions would produce some positive consequences for the students (cf. Kvale 1996, 116). In fact, some students actually mentioned that the interviews had helped them to become aware of their own understanding, and to draw together the contents of various courses in teacher training.

One important aspect of phenomenographic interviews relates to *reliability*. Kvale (2007, 122) defines the matter thus:

> *Reliability* pertains to the consistency and trustworthiness of research findings; it is often treated in relation to the issue of whether a finding is reproducible at other times and by other researchers. This concerns whether the interview subjects will change their answers during an interview and whether they will give different replies to different interviewers.

In that phenomenography emphasizes that the interest is in what a group of people are able to discern and describe *at a certain point in time*, and that another context and another time might lead the same people to discern (bring to the focus of their awareness) other things, there is no need to seek reliability of the kind mentioned by Kvale. The same applies to Kvale's (2007, 122) concern about whether interviewees change their points of view during the interview. The phenomenographic perspective on this is that people may hold and express qualitatively varying ways of seeing something, and that in fact, people holding more complex conceptions are seen as being aware of aspects of less complex conceptions. Thus, the interviewees may very well express varying ideas and thoughts about a particular topic in the course of an interview.

5.3.2   Analysing and interpreting the data

Analysis. In describing the analytical process in relation to phenomenographic research methods (Section 3.4.), I stressed the importance of an iterative process of reading and re-reading, and drafting and re-drafting the categories of descriptions, going back to the empirical data (to the respondents' voices) in order to confirm the accuracy of the researcher-interpreted collective voice. I also mentioned the importance of reading the extracts in their contexts (reading the data as a whole or in large chunks) (see Green 2005b; Bowden & Green 2010a,b), and avoiding moving "too quickly from the data to an attempt to structure the data" when formulating the categories of descriptions (Ashworth & Lucas 2000, 298). The researcher must constantly maintain the focus on "the collective voice derived from the contextualised individual voices" (Bowden & Green 2010b).

Kvale (1996; see also Kvale & Brinkmann 2009) has highlighted the importance of checking *communicative validity* in analysing the data. Communicative validity refers to testing the validity of the findings (knowledge claims) in a conversation; hence what is regarded as "a valid observation is decided through the argumentation of the participants in a discourse" (Kvale 1996, 244-245). I shall consider the notion of communicative validity from the perspective of the person who is analysing the data (an individual or a team), and whether or not the findings should be taken back to the participants in question.

Bowden (2005, see also Green 2005b) stresses the importance of the use of a group in analysing the data (cf. "interjudge reliability" as a measurement of replicability or agreement among *independent* researchers analysing the same data, Sandberg 1996); this is seen as a means to set aside the researcher's individual perspective and to ensure loyalty to the data when one is formulating the categories of description. Team members serve as "devil's advocates", raising questions to be addressed, providing critical insights, and (possibly) bringing up alternative ways of seeing the data – bearing in mind that all the data must be critically considered and debated (Green 2005b). However, as Åkerlind (2005b) points out, phenomenographic researchers often analyse the data (or carry out the entire research process) by themselves, with no possibility for team analysis. Here it is worth noting that *all* such findings are partial; hence the question is not one of right or wrong findings but rather one of less or more complete findings. Thus, even if an individual researcher may end up with rigorous findings, one can assume that a team process could have taken the analysis a little further (Åkerlind 2005b). It should in any case be noted that although I analysed the data mainly by myself, I was able to communicate and debate with my co-authors about the emerging findings. There were indeed times when "we" were able to understand something better than "I" could myself, and thus the group process had a crucial role in analysing the data.

Be that as it may, I would agree that a more intensive group process would have increased a quality of the findings, especially as regards the findings on conceptions of the subject of health education, presented in the first paper. Here it could reasonably be claimed that the outcome space includes too many critical aspects in each of the categories related to one particular theme, and too many themes grouping together these critical aspects. As a novice researcher, I was not able to take the analysis to the level of abstraction that would have been warranted. Despite this, the matrix that emerged served well as a tool for describing the objectives of health education as a school subject.

Another aspect where a team process would have increased the validity of the analysis relates to the allocation of the participants' expressions to categories of the highest level. The allocation process was in fact the most crucial step leading to the non-parametric tests. As regards the tests applied, Friedman's test appeared to be well suited to detecting the changes in conceptions over time, depicting clearly the development of the conceptions (in terms of categorical shifts), and the alignment of the conceptions (between the three target phenomena, and between the conceptions expressed in the essays and the interviews). One might have reservations about the combination of statistical tests used, and their application to phenomenographic research; however, I believe that the combined use of the statistical tests and the phenomenographic findings was successful as a means of measuring development and alignment. Furthermore, it appeared to me that the use of both inferential statistical tests (Friedman's test) and descriptive statistics (percentages) complemented the qualitative findings, and also each other. The use of various approaches to examine the development and alignment of the conceptions "just tell[s] different kinds of story" (Denzin & Lincoln 2001, 12), or perhaps, provides different perspectives on the same story. This being said, it now seems to me that the calculations of proportions (descriptive statistics) would have been adequate for examination of the change and the alignment, and thus for obtaining sufficient information and feedback for the teacher educators on students' learning. For instance, the finding that less than half of the students showed alignment in all three phenomena seemed to me more informative than the finding that might suggest alignment of the conceptions among the students (a finding based on the lack of statistically significant differences on Friedman's test). Finally – as implied by Micari et al. (2007) in their assertion that phenomenography serves as a means to shift the measuring of performance to the measuring of understanding – I would argue that we should be cautious about measuring change merely in numbers. Here, the question framed by Dey (1993, 14) seems pertinent: "In reducing educational achievement to a quantitative measure, do we neglect or overlook altogether what is important about education – its quality?"

The allocation of the participants on the basis of their highest-level expressions allowed me to bring the qualitative findings into a quantitative and thus statistically measurable form. However, due to fact that only eleven out of the twenty participants took part in all three data collection phases, I cannot be

certain whether the conceptions of the "missing" nine participants (those who did not participate in the Time 3 data collection) would have developed in a manner similar to the conceptions of the eleven participants.

A point to be noted here is that due to the fact that the findings have been published in various papers, the peer review process has served as a kind of communicative validity check. Moreover, I gained important insights from my supervisors, who also raised critical questions – points that challenged me to go back to the data and look at the topic again.

The question of whether the findings should be taken back to the respondents is not relevant in phenomenography. Alternatively, one could say that it is relevant, but has not been seen as an appropriate way of improving validity. Åkerlind (2005c) summarizes three reasons for taking this view. Firstly, because the focus is on collective understanding and the analysis involves interpreting the collective voice, a single individual's voice will not necessarily correspond to any of the categories of description as such, and is not to be understood in isolation from the other voices. Secondly, the researcher seeks to understand also what is said implicitly and not merely what is explicitly stated. Thirdly, the ways of understanding something may change over time and over various situations, due to the contextual nature of the conceptions. Thus, it is highly likely that the participants would not necessary discern the same aspects or see them in the same way at the time of checking the findings. Thus, I did not ask my participants to comment on the findings I had arrived at.

Bowden (2005) has stressed that the analysis should not begin before all the data have been collected, in order to avoid influence from the findings on the way later interviews are carried out. Due to longitudinal nature of the study and the fact that there was a period of three to five years between Time 2 (at the end of teacher training) and Time 3 (after some years of working experience), I was not able to fully follow this guideline. It should be noted that the Time 1 and Time 2 data were analysed at the same time. Nevertheless, I do understand Bowden's concern; there was indeed a tendency to be satisfied with a certain answer if it was aligned with higher-level conceptions identified previously.

As regards the trustworthiness of the analysis, it is important to mention some aspects of the data *per se*. The essays differed considerably in the depth and breadth of the expressions used, and here it should be noted – as Ashworth and Lucas (2000) also observed – that short written statements tended to produce data with only limited scope. Some participants went into considerable detail in the aspects they wrote about, and this certainly helped me to discern the meanings of the text and to interpret them. However, many of the essays remained at a level where it was difficult or impossible to understand what was meant, even when they were read in the context of other essays and interview transcripts. Essays do not allow the researcher to (continually) check the information obtained, which would be necessary in order to improve the validity (see Kvale & Brinkmann 2009, 249). Consequently, there may be cases in which I have misinterpreted the "true" meaning of the text, bearing in mind that varying ways of expressing something may differ at word level but have

the same meaning (see Marton 1994). Moreover, in some essays the participants did not cover all the three phenomena (the subject, the teaching, the learning) as they were asked to do. Thus, it is easy to agree with the notion that interviews are the most appropriate way of collecting data and obtaining a rich description of respondents' ways of experiencing the phenomena under study (e.g. Marton 1994; Ashworth & Lucas 2000). This is especially important when the aim is to study the alignment and development of the conceptions over time, which requires allocations of the participants' expressions to the highest-level category.

Interpretation. Phenomenographic analysis produces an outcome space which is constituted from categories of descriptions that are related to but distinct from each other. In my case, the outcome space was represented as a matrix, including also the critical aspects representing critical differences between the categories of description.

The quality of the interpretations begins from an understanding that the findings describe *only* the various ways of experiencing the phenomenon under study and not something that is either more or less than this. Nor do they represent actual behaviour, though they have been found to be associated with people's practice. Moreover, the outcome space does not give a first-order perspective on something. What we have is a second-order perspective, describing how a certain group of people (as interpreted by the researcher) describe a particular thing. In line with this notion, it should be borne in mind that the findings describe the voices of those interviewed, in a particular context (Bowden & Green 2010b). Thus, though the findings of this research may well apply to other educational contexts, it is the task of any new "audience" to consider carefully and critically the possibilities for applying the findings to any new context (see Bowden & Green 2010b).

In relation to the validity of interpretations when one is conducting *developmental* phenomenography (see Introduction) I found points relevant to my research in Kvale's (1996) discussion of pragmatic validity. Kvale and Brinkmann (2009, 456–457) write as follows:

> On the pragmatic validation of a knowledge claim, justification is replaced by application. […] A pragmatic concept of validity goes farther than communication; it represents a stronger knowledge claim than an agreement through a dialogue. Pragmatic validation rests on observation and interpretations, with a commitment to act on the interpretations: "Actions speak louder than words."

Since the aim of developmental phenomenography is to produce findings applicable to the setting in which the data were collected, and to produce learning (Bowden 2000a), pragmatic validity has a central place in the discussion of validity. As a researcher and "user" (as a health education teacher educator) (see Kvale & Brinkmann 2009, 259), I was able to test my findings, that is, I tried to use them as a means to enhance learning among health education student teachers. It is my belief that the outcome spaces related to teaching and learning served the purpose of widening perspectives on these topics. Nevertheless, as indicated above, the outcome space regarding the subject (health education) did not; it was too complex and detailed. Hence,

there can be doubts about its pragmatic validity, even though I felt that it had served its purpose in terms of more general discussion on various ways of seeing the objectives of health education.

If the outcome spaces are to be applied among health education student teachers and among teachers majoring in subjects other than physical education, it is likely that there will be other critical aspects differentiating the various ways of seeing. After all, conceptions have been argued to be contextual at least with respect to the aspects related to the phenomena under study (Dahlin & Regmi 1997). Thus, one cannot be sure how far the critical aspects identified will facilitate learning among students and teachers beyond those represented by the sample used in this study.

5.4 Future perspectives and implications

5.4.1 Contributions to health education teacher training

The findings of this research drew a picture of qualitatively varying ways of seeing health education, its teaching, and its learning, with variations, too, in the development and alignment of these ways of seeing (conceptions) during teacher training and after a period of work experience. Below, I shall consider the implications of the research findings through a focus on the broader key findings.

First of all, the research was able to identify qualitatively varying ways of seeing health education as a school subject, and also its teaching and learning. It has been argued that an understanding of people's experience is in itself fundamental (Trigwell 2000). However, due to the fact that the topics addressed here have not previously been greatly researched in the context of health education as a school subject, the findings are of particular importance. With respect to health education teacher educators, the findings may increase their understanding of how the phenomena under study can be seen in qualitatively varying ways. After all, there is fairly general agreement that if teacher education is to develop students' understanding in a more complex direction, it has to take into consideration not only academic and practical knowledge, but also prevailing personal conceptions (Otero & Nathan 2008; see also Pendlebury 2008). Moreover, the findings can be used to assess the development of the conceptions (as was done in this research) and to evaluate the extent to which teacher education is meeting its goals (see Micari et al. 2007). In this sense, the findings of the study are relevant to the development of (health education) teacher training.

Secondly, it can be claimed that the identification of educationally critical aspects differentiating the qualitatively varying ways of understanding the subject and its teaching and learning are of crucial importance; in fact, the aspects highlighting critical differences form an essential part of the teacher's pedagogical content knowledge (Marton & Pang 2008). When one recognizes

that learning is a widening of horizons, that is, a change towards more complex understanding, it becomes clear that the critical aspects may serve as a means towards such a new and more complex way of seeing. Thus, the outcome spaces with their critical aspects may serve as a pedagogical tool for teacher educators in bringing about purposeful learning among their students (see Lo et al. 2004) – and also in raising the students' awareness of the variation that exists in the ways of understanding the subject, the teaching of the subject, and the learning of the subject. This may happen (for example) while one is instructing students so that they can plan their teaching lessons during the practicum, and/or it may happen during feedback sessions after the lessons. Moreover, the findings could be used to support students so that they understand the critical differences between their current understanding and the capability that is desired (see Dall'Alba 2000; McKenzie 2002; Lo et al. 2004).

Thirdly, the present longitudinal study examining changes in ways of experiencing the three target phenomena (the subject, the teaching, the learning) indicated that there were statistically significant changes in a more complex direction only in the conceptions of *teaching* after the gaining of work experience (considering the time between Time 2 and Time 3). Interestingly, the percentages observed indicated that during teacher training (i.e. the period between Time 1 and Time 2) the expressions of the most sophisticated conceptions (corresponding to the *personal growth and responsibility approach*) actually *decreased* in relation to all three target phenomena. However, this decrease was not maintained, and it was also noted that *no* students expressed the facts and skills approach to health education (the least complex approach) as the highest category after gaining work experience. Overall, one could tentatively view these three outcomes as consistent with the notion that teacher training could indeed have equipped the newly graduated student teachers with the reflective skill to ponder on their own experiences as a teacher, but that it was the teaching experiences in "real" schools that worked as necessary material for actual reflection on their conceptions. The broader conclusion might be that in conjunction with the teaching of critical reflection skills, real-life teaching experiences are important for developing student teachers' conceptions in the direction of increasing complexity.

One can see here a need to create learning conditions that will support the linking of actual teaching practices with one's ways of experiencing the subject, and the teaching and learning of it. In addition, on the basis of the findings, it can be suggested that if health education teacher education aims at developing students' thinking, it should start with the prevailing conceptions of the students and create learning conditions which will focus on critical aspects as a means towards a more sophisticated understanding. Teacher educators should foster reflection on student teachers' ways of seeing; they should deal with variation within these ways, focusing on the critical differences distinguishing various ways of seeing. Moreover, since the percentage of students who were able to express conceptions related to the *personal growth and responsibility* approach actually decreased during the teacher training, greater attention

should be paid to contents and practices associated with that particular approach. In this context, the emphasis should be on supporting the understanding of (i) health education as a means to support thinking about health issues from wider angles (historical, political, ethical, and global), and (ii) ethical reflection as a means to consider the ethical aspects of one's own health behaviour and one's own thinking.

Fourthly, the statistical tests showed that the pedagogical conceptions (on the subject, the teaching, and the learning) were fairly closely aligned with each other (though an exact alignment of all three phenomena occurred among less than half of the student teachers). It can be assumed that a coherent view of health education and its teaching and learning, will, in the best case, lead to practices in which the aims, the roles of the teacher and pupils, the knowledge handled during the lessons, and the kind of learning that takes place, are in line with each other. To enhance the development of a coherent view, the three approaches to health education examined in this study could be applied, on the grounds that they bring together key aspects that both combine and distinguish qualitatively varying ways of seeing the subject (its objectives), the teaching, and the learning.

Fifthly, in the context of discussing the three main approaches to health education, it was noted that all the pedagogical conceptions were reflected through ways of viewing knowledge. This allows us to suggest that along with promoting students' reflection on their conceptions of the subject, the teaching, and the learning, the focus should be on the development of student teachers' *epistemic* understanding, that is, how they view knowledge and knowing in health education. This is in line with the notion, mentioned earlier, that the teacher's epistemic beliefs are associated with the pupils' epistemic beliefs (e.g. Muis & Foy 2010).

To summarize, as Dall'Alba argues (2000, 99):

> Having knowledge about current and desired understandings is likely to make teaching and educational development more focused and effective. It gives direction to our attempts to bring about change. It also provides us with a basis for establishing the extent to which we have been successful in encouraging changes in understanding. That is, it gives us an indication of the change we desire and whether that change has occurred.

5.4.2   Suggestions for future research

This research focused on students who entered intermediate level studies in a health education teacher training program. They had already studied 25 ECTS in health education, and (as the findings showed already at the time of the first data collection) they were able to express fairly high-level conceptions about health education as a subject, and the teaching and learning of it. What remains unclear is whether such an understanding was gained during basic level studies or whether the students entered the university with such an understanding. Thus, from the point of view of teacher education, the study should involve participants at the start of their studies at the university, and they should be

followed up throughout their studies and working career. Moreover, as the sample consisted of students of physical education, the sample should be extended to include students (subsequently teachers) majoring in school subjects other than physical education. An examination of such students could bring up aspects that have not been looked at in previous research, and might provide further insights into health education, plus its teaching and learning.

Similarly, a longitudinal study could include studying the development of health education student teachers' *epistemological beliefs*. Given the posited association between teachers' epistemic beliefs and pupils' epistemic beliefs – and ultimately pupils' achievement (Muis & Foy 2010) – it would be important to know how these beliefs develop. After all, health education as a school subject involves knowledge that is about more than just what is right or wrong. Health is a highly personal phenomenon, and health information should be reflected on from the point of view of one's own life. Support for the development of high-level health literacy in pupils calls for an understanding that knowledge is uncertain and complex. Similarly, it would be interesting to study whether, in health education, a view of knowledge as something that is uncertain and complex would serve as a possible candidate for a "threshold concept". A threshold concept is a portal to a new and previously inaccessible way of thinking about something, and it involves something that must be understood if one is to progress (Land et al. 2010). According to Land et al. (2010, ix), "as a consequence of comprehending a threshold concept there may thus be a transformed internal view of subject matter, subject landscape, or even world view".

As was mentioned earlier, many critical opinions have been voiced concerning the possible link (direct or otherwise) between the teacher's conceptions and his/her actual teaching practice. Most of the critical comments have been aimed at studies that have asked about the teacher's conceptions while obtaining merely an oral or written account (without direct observations) of his/her teaching practices. Thus, research should be extended to include the observation of actual lessons and interviews with students before and after the lessons. For the purposes of teacher education, if lessons could be video-taped it would open up the possibilities to go through the tapes with the students. This could support the reflective thinking the students and help them to become aware of the critical aspects in their teaching (cf. Korthagen et al. 2006). Such a procedure would also make it possible to broaden the research, covering aspects of support for the development of the student's identity as a teacher, since interviews with the students would open up an understanding of what they focus on when reflecting on their teaching – in other words whether they consider only how they acted, or whether they pay attention also to the underlying reasons for their actions (e.g. conceptions, values and mission) (cf. Korthagen 2004). The study of health education student teachers' *teacher identity* – i.e. their beliefs, values, and mission as teachers in health issues as compared with the beliefs, vales and mission related to their main teaching subject – would be interesting and important, bearing in mind that the students

in question often study health education as their second teaching subject. Moreover, there is a need to examine how the student teachers (and/or teachers) see themselves as health promoters in the school (cf. Jourdan et al. 2008). After all, teachers are widely expected to take part in promoting a comprehensive approach to health promotion, rather than focusing only on the classroom-based teaching of health matters (Deschness et al. 2003; cf. St Leger 1999). Here, the crucial factor is to support student teachers' and teachers' professional identity in a direction which recognizes health promotion as an important part of their work. Jourdan (2011, 25) asks a relevant question:

> Does a young physics student who is trying to qualify as a teacher today have the means of knowing that the teacher's job goes far beyond the transmission of knowledge in a particular discipline?

The research showed how the student teachers reflected on health concepts in relation to the objectives of health education as a subject. In future, it would be important to examine more thoroughly their understanding of the concept of health *per se*. After all, that concept is the key concept in health education. This study already gave a glimpse of how the concept was understood in qualitatively varying ways.

Finally, this research brought up some new insights concerning the role of essays and interviews as data collection methods in phenomenographic research. It would be interesting to study how the qualitatively varying ways of seeing something differ between two groups of participants, with one group reflecting on their conceptions while writing an essay on a given topic, and the other reflecting on the same phenomenon during interviews. Moreover, it would be interesting to examine whether the content and quality of the essays differs depending on whether they are written *after* the interviews or *before* the interviews. The study could be extended to include students of various disciplines, since one would expect differences in the extent to which students are accustomed to writing as part of their studies and hence, to expressing their thoughts and ideas through writing.

YHTEENVETO (FINNISH SUMMARY)

Opettajien koulutuksessa ja sen kehittämisessä pidetään laajalti tärkeänä tutkia opettajien ja opettajaksi opiskelevien käsityksiä opetettavasta oppiaineesta sekä sen opettamisesta ja oppimisesta. Terveystiedon ja laajemmin koulun terveyskasvatukseen liittyvän opettajankoulutuksen saralla tämänlaisia tutkimuksia ei kuitenkaan juuri ole.

Tämän fenomenografisen tutkimuksen tarkoituksena oli kartoittaa terveystiedon opettajaharjoittelijoiden (n=20) käsityksiä terveystieto-oppiaineesta ja sen opetuksesta ja oppimisesta, ja tutkia näiden käsitysten kehittymistä ja samansuuntaisuutta opettajankoulutuksen aikana ja ensimmäisten työvuosien jälkeen. Laadullista aineistoa (puolistrukturoidut haastattelut ja kirjalliset esseet) kerättiin kolmena ajankohtana: terveystiedon aineopintotasoisen opettajankoulutuksen alussa ja lopussa sekä sen jälkeen, kun tutkittaville oli kertynyt terveystiedon opettajakokemusta 1—4 vuotta. Aineiston analysoinnissa hyödynnettiin ensin fenomenografista analyysiotetta ja lopuksi tilastollisia menetelmiä (Friedmanin testi, prosentuaaliset osuudet). Fenomenografisen analyysin tarkoituksena oli kartoittaa ja kuvata laadullisesti erilaisia tapoja ymmärtää kohdeilmiöitä, kun taas tilastollisia testejä käytettiin mittamaan osanottajien käsitysten kehitystä ja samansuuntaisuutta tutkimuskauden aikana.

Laadullisen analyysin pohjalta muodostettiin kolme kokonaismallia (kategoriakokonaisuutta), jotka kuvasivat opettajaharjoittelijoiden erilaisia käsityksiä terveystieto-oppiaineesta ja sen opetuksesta ja oppimisesta. Kaikki kokonaismallit olivat luonteeltaan hierarkkisia, eli hierarkiassa ylemmät kategoriat saattoivat sisältää aspekteja hierarkiassa alemmista kategorioista, mutta ei toisinpäin. Hierarkkisuus ilmeni tietoisuuden avartumista kuvaavien teemojen välityksellä. Nämä teemat rakentuivat kategorioiden välisistä kriittisistä eroista, jotka ryhmiteltiin keskenään samankaltaisuuksien perusteella. *Terveystieto-oppiainetta* kuvattiin viiden kuvauskategorian avulla. Terveystieto nähtiin kontekstina (1) teoreettisen tiedon välittämiselle (hierarkkisesti alin kategoria), (2) terveyteen liittyvien valintoja tukevien taitojen harjoittelulle, (3) oppilaiden itsesäätely- ja itsenäisen ajattelutaitojen kehittämiselle, (4) henkilökohtaiselle kasvulle ja (5) yhteiskunnallisesti vastuullisen käyttäytymisen kehittämiselle (hierarkiassa ylin kategoria). *Opetukseen liittyvät käsitykset* voitiin niin ikään jakaa viiteen kategoriaan. Opetus nähtiin (1) tietojen ja taitojen siirtämisenä, (2) tiedon aktiivisen käsittelyn tukemisena, (3) käsitysten muutoksen tukemisena, (4) kokonaisvaltaisen inhimillisen kasvu tukemisena ja (5) oppimisyhteisön rakentamisena yhdessä oppilaiden kanssa. Opettajaopiskelijoiden terveystiedon *oppimiskäsityksiä* kuvaava analyysi tuotti kuusi laadullisesti erilaista, mutta toisiinsa yhteydessä olevaa kategoriaa: oppiminen nähtiin (1) terveyteen liittyvän tiedon muistamisena, (2) terveyteen liittyvän tiedon soveltamisena, (3) terveysasioita koskevien henkilökohtaisten merkitysten rakentamisena, (4) yksilön ajattelun muutoksena, (5) henkilökohtaisena kasvuna, ja (6) kollektiivisena merkityksen luomisena.

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Edellä kuvatut kolme kategoriakokonaisuutta voitiin yhdistää kolmeksi terveystiedon lähestymistavaksi, jotka sitoivat yhteen käsitykset oppiaineen tavoitteesta, opettamisesta ja oppimisesta. Ensimmäinen lähestymistapa rakentuu käsityksistä, jotka keskittyvät lähinnä terveysaiheisten tietojen välittämiseen ja oppilaiden omasta arjesta irrallisten terveystaitojen harjoittelemiseen. Tätä lähestymistapaa voidaan kutsua *tieto- ja taitopainotteiseksi lähestymistavaksi* (facts and skills approach). Toinen lähestymistapa, jota voisi kutsua *itsenäistä ajattelua tukevaksi lähestymistavaksi* (individual thinking approach), siirtää opetuksen ja oppimisen painopisteen faktojen opettamisesta ja oppimisesta oppilaan oman ajattelun ja omien merkitysten rakentumisen tukemiseen. Kolmas lähestymistapa, *henkilökohtaista kasvua ja eettistä vastuullisuutta tukeva lähestymistapa* (personal growth and responsibility approach), korostaa sekä ihmisenä kasvun merkitystä että ymmärrystä laajemmista, yhteiskunnallisista asioista.

Tutkittaessa (Friedmanin testi) opettajaharjoittelijoiden oppiainetta, opettamista ja oppimista käsitysten kehittymistä havaittiin, etteivät oppiainetta eivätkä oppimista kuvaavat käsitykset kehittyneet juurikaan ajan kuluessa. Sen sijaan opettamista kuvaavat käsitykset näyttivät kehittyvän jonkin verran kolmen ajankohdan kohdan välillä. Lisäksi Friedmanin testi osoitti opettajaopiskelijoiden kuvaavan oppiainetta, ja sen opettamista ja oppimista, keskenään samansuuntaisesti, holistisena kokonaisuutena. Eräs mielenkiintoinen ja metodologisesti tärkeä havainto oli, että haastatteluiden aikana osanottajilla oli tapana ilmaista monipuolisempia (hierarkiassa korkeammalla olevia) käsityksiä kuin heidän kirjallisissa esseissään.

Laadulliset havainnot ja niiden pohjalta rakennetut kolme terveystiedon lähestymistapaa voivat toimia opettajankoulutuksen opetuksellisina työkaluina, joiden avulla voidaan kehittää opettajaopiskelijoiden terveystieto-oppiaineeseen ja sen opettamiseen ja oppimiseen liittyviä käsityksiä, ja arvioida näiden käsitysten kehittymistä. Tulosten pohjalta voidaan lisäksi ehdottaa, että jatkossa tulisi terveystiedon opettajankoulutuksessa enemmän keskittyä opiskelijoiden käsityksiin opittavista ilmiöistä ja painottaa opiskelijoiden käsitysten syventymistä käyttäen opiskelijoiden vallitsevia käsityksiä lähtökohtana. Lisäksi tulisi tukea sitä, että opiskelijalle kehittyisi samansuuntainen näkemys siitä, mihin terveystiedolla pyritään ja mitä se edellyttää opettamiselta ja oppimiselta. Terveystiedon kolmea lähestymistapaa voidaan käyttää tähän tarkoitukseen.

Avainsanat: terveystieto, käsitykset, opettajaharjoittelijat, opettajankoulutus, fenomenografia, opetus ja oppiminen

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APPENDIX 1

The interview guide:

How would you describe health education as a school subject? How would you compare health education to other school subjects?

What do you consider to be the main goal of health education? Why?

What are the most important issues that students should learn in health education? Why?

How would you describe the issues that are handled during health education lessons?

How do you understand the concept of health in health education? How does it manifest itself during health education lessons?

What is your understanding of knowledge in health education?

How do you understand teaching in health education? How would you compare it to the teaching in other school subjects?

How do you decide what contents will be handled during the lessons? Why do these aspects matter most?

How do you decide on the way teaching is organized during health education lessons? Why do these factors matter most?

How do you understand learning in health education? How would you compare it to learning in other school subjects?

How would you describe the roles of the teacher and the pupil in the health education learning situation?

What would you include in pupils' learning assessments?

ORIGINAL PAPERS

I

STUDENT TEACHERS' WAYS OF EXPERIENCING THE OBJECTIVE OF HEALTH EDUCATION AS A SCHOOL SUBJECT: A PHENOMENOGRAPHIC RESEARCH

by

Paakkari, L., Tynjälä, P. & Kannas, L. 2010.

Teaching and Teacher Education

Student teachers' ways of experiencing the objective of health education as a school subject: A phenomenographic study

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ARTICLE INFO	ABSTRACT
	The aim of this phenomenographic study was to identify student teachers' ($N = 20$) ways of experiencing health education as a school subject, using semi-structured interviews and essays. The findings indicated that the target phenomenon was discussed through the general objective of the subject in five ways: health education as 1) a context for delivering theoretical knowledge, 2) a channel for providing pupils with practical knowledge and skills to contribute to health-related choices, 3) a means to promote pupils' self-regulative knowledge and independent thinking, 4) a context for personal growth, and 5) a means for developing responsible behavior in society. The hierarchically-ordered categories arrived at varied along six themes of expanding awareness. The findings can be used as a basis for planning educational settings, with a view to deepening student teachers' understanding. © 2009 Elsevier Ltd. All rights reserved.

1. Introduction

When a teacher takes part in a teaching–learning situation she or he has a certain view – either explicit or implicit – of the aims and the concepts of the subject to be taught. The teacher is the one who translates the curriculum into classroom practice (Lederman, Gess-Newsome, & Latz, 1993). Moreover, the teacher's ways of understanding the subject matter have an association with the teaching practices (Trigwell & Prosser, 1996; Trigwell, Prosser, & Waterhouse, 1999). According to Prosser, Martin, Trigwell, Ramsden, & Gillian (2005), a teacher's atomistic and less integrated experience of the subject matter is related to seeing teaching as information transmission, whereas a holistic and integrated experience of the subject matter is related to bringing about conceptual change. This finding confirms Marton and Booth's (1997) view, that a capability for thinking, understanding and experiencing in a certain way is logically intertwined with a capability for acting in a certain way, since "you cannot act other than in relation to the world as you experience it" (p. 111).

From the perspective of teacher training for health education, it is essential to study student teachers' understanding of what health education as a school subject HE is or does. *Phenomenography* is

a qualitative research approach which aims to find out subjects' understanding of a phenomenon of interest, including their conceptions of it, or their ways of ways of experiencing it (Marton, 1981; Marton & Pong, 2005). From the perspective of teacher training, a recent development in phenomenography –variation theory – has produced important insights about what is needed when one is aiming to deepen student teachers' understanding of health education. According to Runesson (2006) "from the variation theory perspective, to learn implies to experience, understand, perceive or see something in a different way" (p. 397). She goes on to characterize variation theory as follows:

> "— — to learn is to be aware of critical aspects of what is learned. The way we experience or understand something depends on what aspects we are aware of and can discern simultaneously. The possibility for the learner to discern and focus on these aspects is critical for learning. But we can only discern an aspect if we experience a variation in that aspect. Thus the possibility of experiencing variation in critical aspects is a necessary condition for learning. Variation theory is proposed to be a powerful means for describing and revealing conditions critical for learning in a pedagogical setting." (p. 397)

Tsui (2004) adds that in addition to the conditions described above, a teacher should know about how the students experience the target phenomenon, and be able to expand the common ground of what is to be learned. If a teacher ignores students' ways of

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experiencing the object of learning, she or he will neglect an important contribution that students can bring to the teaching–learning situation (Tsui, 2004).

The aim of this phenomenographic study was to identify ways of experiencing health education, and to discover the aspects that are educationally critical to gaining a deeper understanding of health education. The following research questions were set:

- What kinds of qualitatively different ways of experiencing health education as a school subject can be discerned among student teachers, and what are the actual differences between the ways of experiencing thus discerned?

The results can be used in evaluating how student teachers are able to discern meanings related to health education, and in planning learning experiences aimed at enhancing student teachers' understanding of this area (see Bowden, 2000; Hella, 2007). Notice that although phenomenographic studies are based on the analysis of individuals' descriptions of the phenomenon in question, the ultimate goal is to create a description of the collective view. In other words, the analysis will produce an outcome space which represents a collective human experience (Marton, 1981; Åkerlind, 2005a).

Due to the novelty of health education as a school subject and of teacher training in it, there has been little research on health education, its learning or its teaching. As regards student teachers' understanding of education in various subjects, research has focused more on subjects such as mathematics (e.g. Philippou & Christou, 1999), physics (e.g. Huibregtse, Korthagen, & Wubbels, 1994), chemistry (e.g. Koballa, Gräber, Coleman, & Kemp, 2000), geography (e.g. Corney, 2000) or biology (Da'Silva, Mellado, Ruiz, & Porlan, 2007). There has, however, been research on teachers' views on the concept of a health-promoting school (St Leger, 1998), though St Leger's study was on a holistic, whole-school approach, rather than on health education as a specific school subject.

2. Educational context of the study

In 1997 the World Health Organization declared that an education which includes health-related knowledge, skills and attitudes lays the foundation for pupils' health and well-being throughout the pupils' entire life-span (World Health Organization, 1997). Different countries have responded to this challenge in different ways. From the review by Aira, Tuominiemi and Kannas (2009), it appears that in some countries/regions health issues are taught as integrated within other school subjects (Sweden, and Ontario, Canada), while in other countries the national curriculum has been revised to include an independent subject targeted at health issues (England, Iceland, Ireland and Finland). Furthermore, in many countries there are extra-curricular activities which serve the same purpose – to teach about health matters. In any case, despite the fact that in many countries and schools health issues are taught to a certain extent, it is clear that in general teacher education in health matters has not been organized with the thoroughness it requires – even if the need for teacher training in health issues has been widely recognized (e.g. Jourdan, Samdal, Diagne, & Carvalho, 2008; Marks, 2009; St Leger, 1998).

Because this study concentrates on the Finnish context and on teacher education organized in the University of Jyväskylä, Finland, it is important to describe the educational context some detail, see below.

2.1. Towards a health-literate pupil

Health education became an independent school subject in basic education (comprehensive school) in 2004, in general upper secondary education in 2005, and in vocational upper secondary education and training in 2001. The main idea behind changing the national core curriculum for basic education in Finland was to abolish the previous division between the upper and lower levels of this stage (Lindström, 2004; Peltonen, 2005). A similar notion of coherence applies to teaching health education. In Finland during grades 1–6 health issues are integrated with other subjects, while from grade 7 health education is introduced as an independent subject. There are three courses (each of 38 h) in health education within grades 7–9 (Peltonen, 2005). In general upper secondary education there are two elective courses in HE, and in vocational upper secondary education and training there are 0–4 elective credits (ECTS), in addition to one obligatory course.

Health education is grounded on a multidisciplinary foundation. According to the national health education curriculum, the purpose of health education is to "promote pupils' competence regarding health, well-being, and safety" (Finnish national board of education, 2004a, p. 196). The objective is a health-literate pupil. Within the framework of a school subject, health education health literacy encompasses various health-related skills. It also includes knowledge and attitudes, and the capacity to discuss health-related values. A health-literate person knows how to obtain health skills, to understand and interpret health information, and to critically evaluate various health-related phenomena (Kannas, 2002, 2005; cf. Kickbusch, 2001; Nutbeam, 2000; St Leger, 2001). Health skills (e.g. social, cognitive, functional and emotion-regulation capabilities) can be regarded as the individual's competencies to act in a health-promoting manner. Because of this, the question is not one of health behavior as a set of particular actions. The wider goal involves health habits, and through that one's own health and that of the community. These habits and levels of well-being serve as a mission: they encompass a goal that health education can move towards (Kannas, 2005).

2.2. University-level teacher training in health education

It has been officially laid down that after a transitional phase (lasting till July 31st 2012) a teacher will have to have the teaching qualifications required for a subject teacher in order to teach health education in schools at basic level or in upper secondary schools (Valtioneuvoston asetus, 2001). Teacher training in health education (60 ECTS credits) began at the University of Jyväskylä in 2002, and later in three other universities in Finland. Note that teacher training in Finland is conducted at university level.

Health education teacher training consists of both basic studies (25 ECTS) and intermediate studies (35 ECTS). The students of the Faculty of Sport and Health Sciences have the automatic right to do basic level studies, but for the intermediate level studies they have to take entrance examinations. Students from faculties other than the Faculty of Sport and Health Sciences must apply for the study program at both levels. However, among these (other) students, only student teachers (of varying subjects) are able to apply for intermediate level studies. Currently, most of the students who qualify as health education teachers are students of physical education. From 2006 to 2009 it has also been possible to take health education (as a school subject) as a major subject; each year 5–10 students have entered this program.

At the time of the data collection (academic year 2004–2005), the teacher training consisted of courses covering mainly the following areas: health education content knowledge (health topics, central concepts), pedagogical content knowledge, ethical thinking skills, the teacher as a researcher, and the school as a context for health promotion. At the present time there is also a separate *practicum* component within the studies.

3. Methodology

The research reported here is part of a larger investigation into the ways in which student teachers experience and understand school subject health education, its learning and teaching. The sample was made up of 20 students (9 females, 11 males, age range 22–31 years) of physical education from the Faculty of Sport and Health Sciences, University of Jyväskylä. All the students were specializing in health education. The data consisted of written essays and semi-structured interviews conducted twice during the students' health education teacher training. At the time of the first interview, the respondents had taken 25 credits (ECTS) of multidisciplinary studies in health education; these credits are required for applications to the intermediate level teacher education studies.

The informants were first asked to write an essay on the following topic: If a teacher other than a teacher in health education were to ask you to describe health education as a school subject, how would you describe the subject itself, its learning and its teaching? The length of the essays varied from half a page to three pages. The essays were read carefully before the subsequent interviews, so that the interviewer could ask for clarifications if need be.

The interviews were conducted individually at the Faculty of Sport and Health Sciences. The interviews lasted about 70 min on average. An interview guide (Table 1) was used to ensure that the questions were asked in a similar way for all the interviewees. The questions were further elaborated by asking: "Could you describe it/explain it a little further?", "Could you give an example of it?", "Why do you consider it to be important?" The follow-up questions played an important role in gaining a deeper understanding of the meanings revealed by the informants. The aim was to let the interviews proceed as freely as possible. The interviews were tape-recorded and transcribed verbatim.

The data analysis was conducted using phenomenographic research techniques (Marton & Pong, 2005; Akerlind, 2005a, 2005b). The aim was to bring to light the variety of ways of experiencing the target phenomenon (Marton & Booth, 1997, p. 124), i.e. health education. In the first phase of the analysis, the focus was on identifying and describing the ways of experiencing health education in general terms. The essays and the transcripts were read as a whole several times, looking for the focus: where the emphasis falls when informants describe health education as a school subject, and what they relate to it. Following Marton and Booth's (1997, p. 133) recommendation, the comments relevant to the perspective were searched

Table 1
The interview guide.

The interview guide:
- How would you describe health education as a school subject? How would you compare health education to other school subjects?
- What do you consider to be a main goal of health education? Why?
- What are the most important issues that students should learn in health education? Why?
- How would you describe the issues that are handled during the health education lessons?
- How do you understand the concept of health in health education? How does manifest itself during the HE lessons?
- What is your understanding of knowledge in HE?
- How do you understand teaching in health education? How would you compare it to teaching other school subjects?
- How do you decide what contents will be handled during the lessons? Why do these aspects matter most?
- How do you decide the way teaching is organized during the HE lessons? Why do these factors matter most?
- How do you understand learning in health education? How would you compare it to learning in other school subjects?
- How would you describe the roles of the teacher and the pupil during the learning situation?
- What would you include in pupils' learning assessment?

for and examined against two contexts: first of all, in the context of other comments drawn from the entire data, related to the same or related themes, and secondly, in the context of the individual essay or interview. The use of the entire transcript, or of large chunks of each transcript (rather than smaller excerpts), had the purpose of increasing accuracy in interpreting the answers (Akerlind, Bowden, & Green, 2005). We were aware of the danger of concentrating too much on individual meanings rather than on collective ones; hence we followed Åkerlind's (2005c) advice and regularly posed to ourselves the question: "Are we focusing too much on the individual?" This question was also important in recognizing that one transcript may include more than one way of experiencing the phenomenon under study.

During the repeated readings we looked for both differences and similarities between the expressions, in order to form a draft set of descriptive categories for the collective meaning. The categories were organized in a hierarchical and inclusive way, based on both logical argument and empirical evidence. In both cases the inclusiveness needed to be confirmed by the original data. Based on the hierarchical and inclusive nature of the categories, some conceptions can be regarded as more complete and more complex than others (Åkerlind, 2004, 2005b, 2005c).

In the next phase, we analyzed the ways of experiencing health education in terms of the aspects that appeared to be most important for both grouping together and distinguishing the varying ways of understanding; in other words we analyzed the structure of the outcome space. The focus was not on all the aspects of variation, but rather on the critical ones, since the aim of the phenomenographic approach used in this research was to reveal the variation in experience in a way that would be meaningful from the perspective of health education teacher training. We wanted to know what is required so that a student teacher can move from one way of seeing a phenomenon to another, more complex one (cf. Marton & Booth, 1997, p. 111; Runesson, 2006; Akerlind, 2004, 2005b). Thereafter we looked to see whether these critical aspects could be grouped into themes of expanding awareness, running through the categories. In this research a "theme of expanding awareness" refers to a unifying idea (arrived at from the categories) within which educationally critical aspects can be discerned, and which highlights the structural relationships between categories (Akerlind, 2005c). To some extent, the two phases of the analysis proceeded at the same time; hence, while we were looking for the meanings, the structure of the outcome space began to take shape. Nevertheless, in the initial phase the emphasis was more on the meaning, and it was only after this that the main emphasis shifted to the logical structure. During the analysis we often went back to the original data to confirm the results that were starting to be structured, in order to minimize the influence of our own perspectives on the outcomes (see Bowden, 2005). The steps in analyzing the data described above were important in ensuring the trustworthiness of the findings (see Green, 2005).

4. Findings

Five qualitatively different ways of understanding health education as a school subject were identified (Table 2). Health education was experienced as:

1) a context for delivering theoretical knowledge;
2) a channel for providing pupils with practical knowledge and skills to contribute to health-related choices;
3) a means to promote pupils' self-regulative knowledge and independent thinking;
4) a context for personal growth;
5) a means for developing responsible behavior in society.

Table 2
Categories of understanding the objective of HE, described in terms of themes of expanding awareness.

	CATEGORY				
	1	2	3	4	5
	Health education as a context for delivering theoretical knowledge	Health education as a channel for providing pupils with practical knowledge and skills to contribute to pupils' health-related choices	Health education as a means to promote pupils' self-regulative knowledge and independent thinking	Health education as a context for personal growth	Health education as a means for developing responsible behavior in society
Focus	Learning facts	Applying knowledge	Critical and conscious reflection of ways of behaving and feeling	Enhancing of identity and self-esteem Well-balanced person	Being a responsible neighbor and citizen
Themes of expanding awareness					
Prerequisites	Knowledge capital	As above Abilities to apply knowledge	As above Self-reflective and metacognitive thinking skills Independent thinking skills	As above Courage to be oneself	As above Respect for and recognition of others Tolerance Sense of responsibility
Perspective	Individual	Individual	Individual	Individual	Individual – society
Knowledge	Objective facts	As above Practical and concrete	As above Evaluative Personal	As above Tacit Relational	As above
Health concept	Multidimensional	As above	As above Perceived and diagnostic Positive and negative	As above Balance Personal resource	Personal and societal matter Value Resource for others
Representation of health concept	Separately taught content entities	Perspectives for other contents	As above The way the teacher looks at the students Teaching methods	As above Strengthening self-esteem Atmosphere Finding positive sides of oneself	Evaluation of health matters from the perspective of society and individual Acting as a participant in a group
Atmosphere			Acceptance Feeling of safety Trust and delicacy	As above Genuine caring Sensitiveness Humanity Encouragement	As above Tolerance Reciprocity

All the meanings were reflected through the main objective of health education as a school subject. The categories form a hierarchically-structured outcome space in which the first category represents the least complete and complex way of seeing health education, and the fifth category the most complete and complex way. The categories are inclusive, in the sense that the fifth category includes aspects of the previous ones, but not vice-versa. The categories also vary along six themes of expanding awareness: prerequisites, perspective, knowledge, concept of health, representation of the concept of health during lessons, and atmosphere. The categories are described in detail below, with illustrative extracts from the data. However, it is important to bear in mind that no extract from a single essay or interview transcript can be fully understood in isolation from the rest of the data; also that "anyone transcript is unlikely to correspond precisely with anyone category of description" (Akerlind et al., 2005, p. 81).

4.1. Category 1. Health education as a context for delivering theoretical knowledge

The first category focuses on learning facts about health matters. The prerequisite for reaching this objective is adequate knowledge. The interviewees saw knowledge as a set of objective facts which can be provided. Nevertheless, health knowledge was regarded as dynamic. Health topics were dealt with from the perspective of the individual. In addition, health as a concept was seen as a personal matter. From this perspective, health is multidimensional in nature, covering physical, social and psychological dimensions. The

dimensions were not seen as linked to each other, being described separately. This was seen also in the informants' view of how the concept of health could be dealt with during lessons – as a number of individual content entities taught separately.

> "A lot of information will be given related to for example sport, drugs and sexuality. Teaching is strongly teacher-centered. – – It is also important that a teacher speaks facts. – – Health education is important because a pupil will not necessarily receive similar information from other contexts." (female, essay)

4.2. Category 2. Heath education as a channel for providing pupils with practical knowledge and skills to contribute to health-related choices

The second category focuses on applying knowledge to practice. The informants indicated that during health education lessons pupils should learn how to make health-related choices regarding their own lives. Knowledge was seen in the same way as in the previous category – but also as something which is practical and concrete, and which can serve as a basis for pupils' own opinions. Because the information the pupils adopt is something that will be applied in everyday life, delivering information is not enough. The prerequisites consist not just of knowledge capital, but also of the ability to apply knowledge, and to anticipate situations where health-related knowledge can be used in making personal choices. As important objectives the respondents included the ability to envisage what might happen as a result of one's own choices, and

to understand causes and effects. The perspective of the teaching content was individual, as in the previous category.

> *"The objective of health education is to give pupils knowledge and competencies related to health matters, so that they have all that is needed to maintain and promote their own health and safety. The pupil should become literate regarding her/his own health. Health education should support people's health choices." (male, essay)*

> *"Health education is all in a day's work, you wash your teeth in the morning, you wash them in the evening. It is about learning causes and consequences. Reasons for acts. − −You will use it [health education] throughout your life-span. Every day you have choices to be made, sometimes more and sometimes less. − −It is about rote learning and application." (female, interview)*

While the concept of health was perceived as in the first category, there was a different view of the way in which it should be approached in health education. The teaching contents were considered in terms of various dimensions of health, with health as a multidimensional phenomenon seen as a theme running through all the aspects to be taught. It was also emphasized that there are certain health-related skills that need to be practiced (e.g. first aid skills).

4.3. Category 3. Health education as a means to promote pupils' self-regulative knowledge and independent thinking

The third category involves a critical and conscious reflection on one's own ways of behaving and feeling. It calls for self-reflective, metacognitive and independent thinking skills, in addition to the prerequisites for categories 1 and 2. Because the aim is to get pupils to reflect on health matters from the point of view of their own lives, the perspective remains individual, as in the previous categories. Yet knowledge is now not only factual, concrete and practical, but also evaluative and personal. In the opinion of the informants, not all the matters which are dealt within health education can be considered in terms of absolute rights and wrongs.

> *"The purpose is that a pupil should wake up and think, 'Hey, I am in this phase of life and I have gone through these kinds of happenings. What could I do in a different way to feel better?' Or, 'I do not have to do things differently as I already feel great under these present conditions.' If this kind of thinking process were to begin in a pupil's mind, a major objective would have been reached." (male, interview)*

In views of this kind, health was seen as multidimensional, and (in contrast to the first two categories) the dimensions were regarded as interrelational. Indeed, the concept of health was altogether deeper. Here, the student teachers indicated that health can be perceived and diagnostic in nature, and that it can be negative and/or positive. The approach to health during lessons had expanded from content-centeredness to the ways in which the teacher looks at the pupils, and to the teaching methods employed. While the focus regarding health was still on its subjective nature, there was also a focus on respect for the pupils and on the teacher's acceptance of individuality. It was also emphasized that the concept of health (and especially its social and psychological dimensions) can come across in the way the teacher listens to her/his pupils and to their opinions.

A new aspect was the atmosphere during the lessons. In contrast to categories 1 and 2, the interviewees showed awareness of this in reflecting on the objectives of health education. Acceptance, feelings of safety, trust and tactfulness were seen as elements that are important in promoting pupils' self-regulative knowledge and independent thinking (i.e. health education objectives). The atmosphere was often related to the personal nature of both knowledge and health, and also to listening to pupils' opinions.

> *"Often contents are handled through discussions. In order to get fruitful discussions and to encourage pupils to take part in discussions, there should be trust between the pupils and the teacher. There should be an open and trusting atmosphere, so that every pupil can take part in discussions gladly and safely. Everyone's individual characteristics should be taken into consideration. Not everyone is equally brave or open to giving their opinions in a big group. If a friendly and approving atmosphere is achieved, one can expect to get good results from small-group discussions." (female, essay)*

4.4. Category 4. Health education as a context for personal growth

The fourth category focuses on enhancing identity and self-esteem, and on becoming a well-balanced person. Along with the prerequisites mentioned above, personal growth calls for the courage to be oneself, and also the courage to accept the factors relating to one's situation in life.

Among the respondents, knowledge was mainly regarded as in the previous category, but its relational and tacit nature was mentioned. The term "tacit knowledge" was not explicitly used by the student teachers. However, the concept arose implicitly as an element of practical knowledge (category 2). Mention was made of knowledge that takes the form of something self-evident, something that one is not thinking about.

> *"And knowledge changes as a consequence of maturing. − − In two, three years we will be able to handle the same knowledge in a somewhat deeper way − at which point the knowledge itself may change a little. And that may to some extent change one's understanding of the issue the knowledge relates to. (female, interview)*

> *"[Health education] is about all your decisions, and that you are able to go to school in the morning and take all the things you need with you. It is about taking care of yourself. Mainly that. And that you know when to have your school lunch, which may be stating the obvious for some people, but for others it may not. It is about the issues which influence everything, and the whole of your life." (female, interview)*

Here, health is seen not only as a multidimensional matter but also as a sense of happiness. It is a balance in itself, and a personal resource that is balanced with external requirements. It is knowledge of one's own thinking, and information on the factors by which one is influenced. Through these aspects, individuals gain the ability to understand the world as it exists for them. It is also actual behavior. This was observable in the interview transcripts through comments such as the following: "Health is something that means that you care for yourself and really take care of yourself, and that you critically evaluate your behavior and actively control your health habits." In reflecting on the ways in which health can be seen during health education, the informants mentioned the importance of underpinning pupils' self-esteem. Through health education, one may be able to find out the positive sides of oneself − as well as the negative ones − and to accept oneself as one is. The teacher's way of looking at the pupils, and the atmosphere during the lessons, play essential roles in supporting the health concept.

Atmosphere plays a crucial role in attaining personal growth. The student teachers' understanding extended from the elements of atmosphere that were covered in the previous category towards genuine caring, sensitivity to pupils' feelings, and humanity. The data also revealed the importance of encouragement in strengthening a person's self-esteem. The atmosphere should encourage not only the teacher's positive feedback to the pupils, but also pupils' feedback to other students. The actual perspective is as in previous category.

"What I see is that first, you should learn to know yourself. Then you are able to get to know others better…and to accept others. I would begin from this. — — As a teacher you get to know the students and to know who is shy, and who does not care whatever you say to them. So, when the teacher asks a question and the student answers wrongly, the teacher is always capable of giving positive feedback. To create an encouraging atmosphere where there is room for errors, and where are no right and wrong answers." (male, interview)

4.5. Category 5. Health education as a means for developing responsible behavior in society

The fifth category moves from the perspective of the pupil as an individual to the perspective of the individual as part of a wider society. The focus of this category is on being a responsible neighbor and citizen. The prerequisites include respect for and recognition of people from different backgrounds, tolerance, and a sense of responsibility. The ability to apply information to wider contexts was also seen as a crucial competence (this in addition to the prerequisites mentioned in category 4).

"[Health education] is about the issues through which one is able to make one's own life and the lives of friends and neighbors easier. — — to take account of others — — to be able to understand that we are different and feel the same things in a different way — — to look at issues from various perspectives." (female, interview)

Health is seen not merely as a personal matter, but also as a value at a societal level. This means that health is not just a personal resource, but also — through helping and caring — a resource for others. It is the understanding that one is not able to deal with all the factors influencing one's own life and the lives of others. From this perspective, health is a kind of shared capital. In the interviews, health was seen as manifested in the ways in which pupils worked as a group during the lessons.

"The group should be experienced as safe, and everyone in the group should feel great. So that everyone could express their valuable opinion. And everyone should behave in an acceptable way, so that no one causes offence to anyone." (female, interview)

The informants also indicated that health matters should be evaluated from the perspective of society as well as the individual. However, the wider perspectives were evaluated from the point of view of individuals. The informants mentioned the influence of individuals' health choices and habits on the national economy and on public health. The atmosphere aspect was viewed as in the previous category, but elements such as tolerance and reciprocity were central in the informants' awareness.

"The kinds of choices made by pupils about their lives matter. Egocentrically, one could think that health is everyone's own business and that outsiders cannot interfere. I think health is a value that should be taken into account at the societal level, too. Just think how much people's use of the health services could be reduced if health were better taken care of." (male, essay)

5. Discussion

It was found that the student teachers reflected on health education and its objectives within five main categories, viewing health education as 1) a context for disseminating theoretical knowledge, 2) a channel for providing pupils with practical knowledge and skills to help them make health-related choices, 3) a means to promote pupils' self-regulative knowledge and independent thinking, 4) a context for personal growth, and 5) a means for developing responsible behavior in society (Table 2). The aim of the study was to describe the collective ways of understanding health education, and to find out the critical aspects for deepening the ways of experiencing in a more complex direction. Thus, the findings do not provide a detailed description of all the possible ways of experiencing, nor do they describe individual differences in experiencing (see Prosser, Martin, Trigwell, Ramsden, & Lueckenhausen, 2005).

The ways in which the respondents described the objectives of health education remained at a more general level than the objectives set out in the national curriculum. The respondents did not separate out different grades or different school levels. Broadly speaking, the students' collective understanding was in good accord with the objectives defined for health education by the Finnish National Board of Education. The major differences come with category 4 (health education as a context for personal growth). In the national curriculum, personal growth is not included within health education as such; nevertheless, it is mentioned as one of the cross-curricular themes (termed *growth as a person*) which serve as central emphases for teaching, and which are to be implemented in various subjects. It is worth noting that in health education (unlike many other subjects) the teaching content itself includes issues related to this theme. Consequently, it is natural to mention this theme as part of the content and teaching practices of health education. Perhaps that is the reason why students mentioned personal growth as one of the objectives.

The objectives that the student teachers raised can be seen in other subjects too, but the themes of expanding awareness that were found represent the elements which make health education unique. Indeed, health education is a unique subject in the sense that its key concept, *health*, serves not merely as specific teaching content or as a perspective on health-related topics; it also functions as a framework for and objective of teaching, and as a basic element for social relationships during lessons. This was observed especially when the objective of health education deepened, moving from merely applying knowledge towards self-reflection on the part of pupils, and towards independent thinking and personal growth. The student teachers reflected on the importance of the way in which the teacher looks at the pupils, when she/he is teaching topics that call for critical and conscious reflection on one's own life. At the same time, the importance of the *atmosphere* during teaching was mentioned in connection with topics that are most often personal, sensitive and emotionally-loaded. Hence, during lessons, health should be dealt with as content, but also as something that pupils live through.

The national core curriculum mentions the importance of being able to evaluate and examine health issues from various angles and levels (e.g. Finnish National Board of Education, 2004b). The respondents did not greatly focus on wider *perspectives*. In fact, although the ways of understanding the perspectives on health matters moved from individual-centeredness towards societal level aspects, their horizon concerning ways of understanding remained at an individual level, even in the fifth category, where the perspective is that of the individual as part of a wider community. This reflects the strong emphasis within health education on one's own life, lived on a daily basis. In basic education (in the comprehensive school) there is a clear focus on the individual's life. However, especially when pupils move to general upper secondary education, it is important that they should be able to look at health matters from a wider angle, for instance to evaluate local health-related political decisions and take part in discussion on ethical values. Bronfenbrenner's (1979) theory concerning the ecology of human development could serve as a framework for this kind of thinking. This theory takes into consideration not only

environments close to the individual but also the larger cultural context, including the patterning of environmental events and transitions over the course of a life. In addition, there is a need for advocacy skills for influencing broader policies and environments (World Health Organization, 2003, p. 4), which were not reflected by the respondents in this study. This finding confirms the discussion in St Leger (2001), to the effect that enabling pupils to be active members of society – in the sense of addressing the social, economic and environmental determinants of health – is not emphasized strongly enough in schools. These skills should be included as an essential part of the aim to develop responsible behavior in society.

The knowledge or substance of health education is distinctive compared to many other subjects, because of its closeness to everyone's daily living. Knowledge was seen as including knowledge of health issues (e.g. general diseases, health promotion practices, health choices), and it was generally regarded as action-oriented (cf. Jensen, 2000), except in category 1. In addition, the ways of seeing the knowledge expanded to include both a relational and a personal aspect. This was reflected in the prerequisites, in the atmosphere, and also in the concept of health and its representation during the lessons (categories 3–5). In categories 3–5 health education displays its special characteristics, in the way the pupil and his/her views are taken into the consideration. In health education, due to its personal and relational nature, the teaching contents cover matters which cannot be said to be right or wrong. In fact, Bowden and Marton (1998, p. 132) claim that dealing with pupils' "responses as wrong, inhibits those students from pondering on what it was about the phenomenon that led them to see it that way and what other aspects might be relevant to a more powerful way of seeing". It also inhibits the emergence of a dialogue, i.e. a pedagogical communicative relation (see Burbules, 1993, pp. 7–8). Health education calls for a humane approach and a sure educational touch.

Knowledge was also regarded as silent, or tacit, although the respondents seldom used the term "tacit knowledge". The respondents related the tacit nature of the knowledge to the routines of everyday life and to taking care of oneself. Tacit knowledge is something that is acquired through experiences and is difficult to describe (Bereiter, 2002, p. 138–139). It can also be socio-culturally structured (Tynjälä, 2008a) and may influence our behavior without our being aware of it. Many health concepts (e.g. mental health) and health behaviors are culturally specific. The respondents did not discuss socio-cultural knowledge, although one might well regard such knowledge as a basis for being a responsible neighbor and citizen (category 5), or a requirement for being able to reflect on health issues from a wider perspective.

The knowledge described above is also something that a teacher has to include as an essential part of the teaching; after all, in a teaching situation the learner's knowledge foundation meets the teacher's knowledge foundation (see Jakonen, 2005, p. 173). Kannas (2005) sees the knowledge foundation of health education (from the perspective of the teacher) as including cultural knowledge, philosophical knowledge, life-style knowledge, and methodological knowledge. However, this study also revealed the role of relational, personal, and tacit knowledge as a significant part of the knowledge that is needed and handled during health education lessons. This is a challenge for teachers, since such knowledge is difficult to gain during teacher training or before one actually starts to teach health education classes. It is often something that comes up during lessons through the opinions and thoughts of the pupils. The ability to react to something that is not foreseeable, and to include it as a vital part of one's knowledge foundation is something that is required of health education teachers. Important also is the ability to help the pupils to make tacit knowledge explicit: to

help them to reflect on the values and other factors which influence their own behavior, and to relate theoretical knowledge to implicit knowledge (see Jakonen, 2005; cf. Tynjälä, 2008b). According to Bereiter (2002), "important revisions of implicit understanding descend from changes in statable [explicit] knowledge" (p. 239).

The collective ways of understanding the objective of health education give us reason to consider redefining the concept of *health literacy* as a learning outcome or objective of health education. The students in this study saw that a health-literate pupil, one aiming to enhance his/her own health and well-being and that of others, has to have something more than personal skills and a knowledge of health issues. A health-literate pupil should also have self-regulative knowledge, independent thinking skills and the courage to be herself/himself, and show respect for and recognition of others, tolerance and a sense of responsibility (cf. Kannas, 2005; Nutbeam, 2000). However, the respondents did not reflect the ability to advocate, an ability which is seen in Nutbeam's (2000) model, and which should certainly be taken into consideration. In addition, the role of perceived self-efficacy should be considered thoroughly. This belief of being able to exercise control over one's own health habits plays an important part in personal change, and can form a basis for motivation and action (Bandura, 2004). Bandura (2004) argues that self-efficacy influences health behavior directly and through other determinants.

As a final remark, the categorization reveals an inclusive way of seeing the objectives of health education, through six themes of expanding awareness. Every category adds to or deepens the previous one; moreover, each of these additions or changes represents an educationally critical aspect that can be used as a basis for planning educational settings that may deepen student teachers' understanding. *Atmosphere* as a theme of expanding awareness differs from the other themes in that it was not focused on in the first two categories. However, it was regarded as a theme because the lack of it in the first two categories and the presence of it in the last three categories was well in accord with the nature of each category. Moreover, when the respondents mentioned atmosphere, it was tightly linked to other critical aspects in that category. Hence, the practice here differs from that of Åkerlind (2005c), who emphasized that to be regarded as a theme describing the critical differences between the categories, the feature has to occur in *all* transcripts or categories.

The identification of the student teachers' existing ways of seeing health education can help us to determine aspects that should be developed (cf. Dall'Alba, 2000). Hella (2007, p. 48) points out that teaching practices should be planned in such a way that the curricular content is integrated into the student teachers' understanding of the content; this will permit the development of personal meaning related to the learning task. Student teachers should see the variety that exists in ways of understanding, and should understand the critical differences between their current understanding and the capability that is desired (cf. Dall'Alba, 2000; McKenzie, 2002). The matrix presented in this article can be used for this purpose when wider contextual, environmental and historical thinking, along with advocacy skills and self-efficacy, are taken into consideration. In addition, although the sample is limited, the results can be used as a theoretical tool in the pre-service and in-service education of those teachers who integrate the teaching of health issues within their main teaching subjects.

Acknowledgements

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II

STUDENT TEACHERS' WAYS OF EXPERIENCING THE TEACHING OF HEALTH EDUCATION

by

Paakkari, L., Tynjälä, P. & Kannas, L. 2010.

Student teachers' ways of experiencing the teaching of health education

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The aim of this phenomenographic study was to identify student teachers' ways of experiencing the teaching of health education, and to determine the aspects that are educationally critical in gaining a deeper understanding of the teaching. Qualitative data (written essays, semi-structured interviews) were gathered twice during health education teacher training. Teaching was seen as transferring knowledge and skills, supporting the active processing of knowledge, supporting transformation of conceptions, supporting holistic personal growth and building a learning community with the students. The teaching was reflected through five themes: the nature of the knowledge, the source of the knowledge, the teacher's role, the pupil's role and the direction of the interaction. The findings support earlier studies but also bring new perspectives to discussions of teaching conceptions. The study also confirms that, although some conceptions seem to be parallel across different educational settings, other conceptions appear to vary over different contexts.

Keywords: teaching; school subject health education; student teacher; ways of experiencing; conceptions; phenomenography

Introduction

'Teaching necessarily begins with a teacher's understanding of what is to be learned and how is it to be taught' – thus wrote Shulman (1987, 7). A person's capability to act in a certain way is intertwined with his/her capability for experiencing something in a certain way, since 'you cannot act other than in relation to the world as you experience it' (Marton and Booth 1997, 111; see also Bowden and Marton 1998). The notions contained in these assertions have inspired many researchers to study the possible link between teachers' conceptions of teaching and their teaching practices. The causal relationship has been difficult to reveal and has been often criticized (Eley 2006; Kane, Sandretto, and Heath 2002). Nevertheless, an association has been confirmed (Kember and Kwan 2000; Trigwell and Prosser 1996; Trigwell, Prosser, and Waterhouse 1999). In view of this, from the point of view of teacher training, it is important to take into account the kinds of teaching conceptions presented to student teachers during their training, and the kinds of conceptions the students adopt.

In the present study we approach the question of teachers' conceptions in the context of the training of Finnish health education teachers, which takes place at university level. If we are seeking to develop student teachers' understanding in a more powerful, complete and complex direction, it is important to examine how the teaching

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of health, education (as a school subject) is understood by student teachers. Lo et al. (2004; see also Marton 1981) have argued that there are only a limited number of ways in which students experience the phenomenon to be learned. The differences between various ways of experiencing the same phenomenon are called *educationally critical aspects*. These aspects reveal what is needed to gain a more complex, complete or advanced way of understanding (Marton and Booth 1997, 111; Runesson 2006). For Marton and Booth (1997, 111), the changes involved in these critical aspects are what they take to be 'the most important kind of learning'. If the teacher is able, on the one hand, to take into account the students' prevailing conceptions and experiences, and, on the other, to discern the critical aspects differentiating the various ways of experiencing, there is great potential for bringing about purposeful learning among the students (Lo et al. 2004). Moreover, it is important that health education student teachers see the variety that exists in the ways of understanding the teaching of the subject, and understand the critical differences between their current understanding and the capability that is desired (cf. Dall'Alba 2000; Lo et al. 2004; McKenzie 2002).

Much of the research related to conceptions of teaching has been conducted among university-level teachers (e.g. Kember, Kwan, and Ladesma 2001; Prosser et al. 2005; Samuelowicz and Bain 2001) and among school teachers in subjects such as art (Lam and Kember 2004, 2006) and science (Gao and Watkins 2002; Tsai 2002; Yung et al. 2007). Kember (1997) conducted an extensive review of academics' teaching conceptions. He found that the conceptions could be grouped into five categories: imparting information, transmitting structured knowledge, student–teacher interaction/apprenticeship, facilitating understanding, and conceptual change/intellectual development. These five categories can be organized into two orientations, with the first two categories representing teacher-centred/content-oriented conceptions of teaching, and the last two categories representing student-centred/learning-oriented conceptions. A third category, a 'transitional' or 'intermediate' conception, serves as a link between the two orientations.

However, Samuelowicz and Bain (2001) argue, on the basis of their findings, that there is no such intermediate category between the two orientations, if one takes into account the purpose and nature of the interaction, and not merely the presence or absence of the interaction (see also Prosser et al. 2005). In a review of the literature, Åkerlind (2003, 2004) arrived at a categorization similar to that of Kember (1997). However, she also discussed the extent to which the studies in question might differ in their ontological assumptions concerning the nature of the conceptions identified. Some researchers regard conceptual categories as independent, while others see them as related in a hierarchy of inclusiveness; furthermore, some consider the conceptions to be relatively stable constructs, while others see them as relational, varying over different contexts and situations (Åkerlind 2003).

Because this study is grounded on phenomenography, the conceptions will be regarded as relational and organized within a hierarchy. In phenomenography the ways of experiencing and understanding are descriptions of a relationship between the person and the phenomenon (Marton and Booth 1997, 122) – the phenomenon in our study being teaching. Some persons are able to discern more aspects of the phenomenon than others, having more complex ways of understanding. Thus, it may be said that various ways of experiencing the same thing are: (i) related through the common phenomenon being experienced, (ii) constituted in relation to each other, and (iii) organized hierarchically (Marton and Booth 1997; Åkerlind 2005a).

Lam and Kember (2004) have observed that studies on academics' teaching conceptions have not revealed critical differences between disciplines. This is interesting,

since there are also findings which would indicate that academics' approaches to teaching are related to the discipline and teaching context in question (Lindblom-Ylänne et al. 2006). Moreover, since there is apparently a strong relationship between teachers' approaches to teaching and their teaching conceptions (Kember and Kwan 2000), it could reasonably be assumed that the teaching conceptions would be contextual as well. Nevertheless, Lam and Kember (2004) go on to argue that the school sector situation is different from that in the universities. They argue that the teaching conceptions of school teachers reflect their understanding of a particular subject.

This argument is supported by a phenomenographical study by Boulton-Lewis and others (2001), concerning secondary school teachers' conceptions of teaching and learning. The study indicated that, although school teachers' conceptions of teaching are parallel with those of academics, there are differences. The school teachers' conceptions were broader than those of the academics, going beyond content-centred conceptual change towards transformation of the students as persons. This finding was regarded as being related to the subjects the teachers were dealing with: the emphasis on the development of the student as a whole is more to be expected within subjects which are open to the students' own interpretations, and which require personal understanding, than within 'subjects where there is apparently an established knowledge base and set of skills which must be acquired in order to succeed in the subject' (Boulton-Lewis et al. 2001, 47–48).

If the subject to be taught influences the way teaching and learning are experienced, it can be assumed that the conceptions related to teaching and learning are contextually bound. This view has been confirmed by research examining the influence of the cultural context (Dahlin and Regmi 1997) and the educational context (Eklund-Myrskog 1998; Marshall, Summers, and Woolnough 1999; Tynjälä 1997) on students' learning conceptions. Nevertheless, there are also studies suggesting that the context and the conceptions are mainly intertwined or associated with each other, rather than existing in a causal relationship. In this vein, Dahlin and Regmi (1997), for instance, discussed the possibility that overall conceptions may be the same, or at least have similar features, across different contexts – but that the context may affect those aspects of understanding that will be focused on at a particular time. Gao and Watkins (2002) take the view that while, on the one hand, there may be some consistency in conceptions across differing contexts, on the other there are differences based on the context. This being the case, there is a need for research comparing different educational and cultural contexts.

Due to the novelty of health education as an academic and school subject, and of teacher training in it, there has been little research on teaching the subject, and almost no research at all among student teachers in this field. Thus, the purpose of the present study was to explore health education student teachers' ways of experiencing the teaching of health education. In addition, the aim was to discern the aspects that are educationally critical for expanding an understanding of the teaching of health education in a more complex and complete direction. The study is a continuation of a previous study which focused on student teachers' ways of experiencing the objective of health education (Paakkari, Tynjälä, and Kannas 2010).

Methodology

Sample and educational context of the study

The sample consisted of 20 university students (9 women, 11 men) of physical education, who were specializing in health education in the Faculty of Sport and Health

Sciences, University of Jyväskylä. The data consisted of written essays and semi-structured interviews, conducted twice during the students' health education teacher training. At the first data collection phase, the respondents had studied for 25 credits (ECTS) of the total of 60 credits of multidisciplinary studies in health education, but had gained no real-life health education teaching experience. At the second data collection phase all the students had completed their multidisciplinary studies in health education, and nine of the students had taken pedagogical studies for teachers, during which they had gained some experience of teaching health education in either a secondary school, a school providing general upper secondary education, or an upper secondary school for vocational education and training. However, there was no practice period specifically devoted to health education in the teacher training.

Methods of data collection

Before both interviews (first and second data collection phase) the respondents were asked to write an essay on the following topic: *If a teacher other than a teacher of health education were to ask you to describe health education as a school subject, how would you describe the subject itself, its learning and its teaching?* The essays were read carefully before the subsequent interviews, so that the interviewer could ask for clarifications if required.

The interviews were conducted individually, and took a semi-structured form. The respondents were asked, for example, to describe health education as a subject (in general) together with its teaching and learning, and also how the teaching and learning in health education differed from the teaching and learning in other school subjects. Elaborations of the answers were elicited by more detailed questions such as: 'Could you describe it/explain it a little further?', 'Could you give an example of it?', 'Why do you consider it to be important?' The purpose of the follow-up questions was to gain a deeper understanding of the meanings revealed by the informants. The aim was to let the interviews proceed as freely as possible. The interviews were tape-recorded and transcribed verbatim.

Data analysis

In the data analysis, phenomenographic research techniques were used to reveal different ways of experiencing the target phenomenon (see Marton and Booth 1997, 124; Marton and Pong 2005; Åkerlind 2005a, b). Phenomenography is a qualitative research approach which aims to determine subjects' understanding of a phenomenon of interest (Marton 1981; Marton and Pong 2005). Although phenomenographic studies are based on the analysis of individuals' descriptions of the phenomenon in question, the ultimate goal is to create a description of the *collective* view. In other words, the analysis will produce an outcome space which represents a collective human experience (Marton 1981; Åkerlind 2005b).

In the first phase of the analysis, the focus was on identifying and describing the ways of experiencing the teaching of health education in general terms. We were looking for the focus: where the emphasis falls when informants describe health education as a school subject, and what they relate to it. The essays and the transcripts were read as a whole several times. During the repeated readings we looked for both differences and similarities between what was included, in order to form a draft set of descriptive categories for the collective meaning. The use of the entire transcript, or of large

chunks of each transcript (rather than smaller excerpts), had the purpose of increasing accuracy in interpreting the answers (see Åkerlind, Bowden, and Green 2005). The categories were organized in a hierarchical and inclusive way, based on both empirical evidence and logical argument. Due to the hierarchical and inclusive nature of the categories, some conceptions can be regarded as more complete and more complex than others (Åkerlind 2005a, c, 2008). Thus, they would indicate that the respondents were able to discern more aspects of teaching health education.

In the next phase, we analysed the structure of the outcome space, i.e. the ways of experiencing the teaching of health education in terms of the aspects that appeared to be most important for both grouping together and distinguishing the varying ways of understanding (cf. Åkerlind 2004, 2005a). The focus was not on all the aspects of variation, but rather on the critical ones, since the aim of the phenomenographic approach used in this research was to reveal what is required so that a student teacher can move from one way of seeing a phenomenon to another, more complex one (cf. Marton and Booth 1997, 111; Runesson 2006; Åkerlind 2004, 2005a). Thereafter we looked to see whether these critical aspects could be grouped into themes of expanding awareness running through the categories (Åkerlind 2005c). To some extent, the two phases of the analysis proceeded at the same time; hence, while we were looking for the meanings, the structure of the outcome space began to take shape. During the analysis we often went back to the original data to confirm the results that were starting to be structured, the aim being to minimize the influence of our own perspectives on the outcomes (see Bowden 2005). The steps described above were important in ensuring the trustworthiness of the findings (see Green 2005).

Findings

The analysis of the essays and interview transcripts produced five qualitatively different categories, all representing various ways of experiencing teaching health education (Table 1). Teaching was seen as:

(1) transferring knowledge and skills;
(2) supporting the active processing of knowledge;
(3) supporting the transformation of conceptions;
(4) supporting holistic personal growth;
(5) building a learning community with the students.

It is important to keep in mind that this categorization describes the *collective* understanding of the teaching of health education. Thus, at an *individual* level some of the respondents had more than one way of experiencing the phenomenon. The categories will be described in detail below.

Descriptions of the categories

Teaching as transferring knowledge and skills

In the first category, transferring knowledge and skills, teaching is perceived as imparting or providing objective facts and skills. This view was often expressed in statements emphasizing educating and lecturing to pupils on health issues. In this case the knowledge itself is not viewed as problematic: the knowledge dealt with in the

Table 1.   Ways of experiencing the teaching of health education: five categories, described in terms of themes and critical aspects.

	CATEGORY				
	1	2	3	4	5
THEME	Transferring knowledge and skills	Supporting active processing of knowledge	Supporting transformation of conceptions	Supporting holistic personal growth	Building a learning community with the pupils
Nature of knowledge	non-problematic	hint of problematic	problematic	problematic	problematic
Source of knowledge					
Teacher:	curriculum	curriculum	curriculum	curriculum	curriculum conceptions experiences
Pupil:		curriculum conceptions experiences	curriculum conceptions experiences	curriculum conceptions experiences	curriculum conceptions experiences
Teacher's role	knowledge deliverer expert	inspirer tutor	facilitator guide	creator of safe and accepting atmosphere	reflective fellow-learner genuine participant
Pupil's role	knowledge recipient	active participant	reflective inquirer	supportive fellow-learner	responsible member
Direction of interaction	teacher → pupil	teacher → pupil pupil ↔ pupil	teacher ↔ pupil pupil ↔ pupil	teacher ↔ pupil pupil ↔ pupil	teacher ↔ pupil pupil ↔ pupil

lessons comes from the curriculum and is presented by the teacher alone. The teacher is regarded as an expert and the pupil mainly as a recipient of the knowledge provided. The following excerpt from a student teacher's essay illustrates this view:

> Information is given on a very wide range of matters, covering for example physical activity, drugs and sexuality. The teaching is very much teacher-led, since many issues are very sensitive for pupils of secondary-school age. It is also important that the teacher speaks the truth. (Male, essay)

Teaching as supporting the active processing of knowledge

In the second category, supporting the active processing of knowledge, teaching health education is regarded as helping and inspiring pupils to think about health issues, both in general and from the perspective of their own lives. However, it should be noted that although pupils are encouraged to reflect on the health issues from their own point of view, based on their experiences, the active changing of students' conceptions is not mentioned as an explicit aim within this category. Rather, students' experiences and views are seen as additional material providing possibilities for activation. Hence, the knowledge that is dealt with comes mainly from the curriculum; it is both given by the teacher and found by the pupils, but falls within the framework defined by the teacher. The teacher as an inspirer or tutor uses active practices by which pupils are encouraged to find information on the question the teacher has given them, or else (for example) to put the knowledge (provided by the teacher) into practice. The pupils, for their part, are seen as active participants in the teaching and learning situation, either individually or within a group. Although interaction between the pupils was mentioned in the context of group work, it was not reflected on more deeply, as the following examples show.

> I think that the role of a pupil is, or should be, to be active … to actively process, search for and find knowledge. And a teacher should be more like a tutor, one who by asking and provoking tries to get these pupils to find [the relevant information]. (Female, interview)

> One should not give ready-made solutions on how to act or behave. Instead, one should give the pupils the chance to think how the task could be carried out – so that the pupils could discuss the matter in groups and implement it as they prefer. Or apply it to their own lives, so that the information would not remain disconnected. For example [not saying] 'a person should exercise this much and in this way', rather, it should be linked to one's own life so that [the pupil would consider]: 'How could I exercise this week, what have I eaten?' Keep a diary about his/her eating habits for a few days or … really reflect on his/her own life. (Female, interview)

Teaching as supporting the transformation of conceptions

In the third category, supporting the transformation of conceptions, the focus of the teaching is on bringing about conceptual changes related to the content and to oneself. Our informants described teaching as facilitating these changes in order to clarify, expand or deepen one's understanding or one's perspectives on health issues. Teaching was also seen as supporting pupils so that they would reflect on health issues and link them to their own conceptions and experiences, the aim being to change their ways of thinking about themselves. In contrast to the previous two conceptions, in this

mode of teaching the nature of health education knowledge was seen as problematic, since it is not just information from the curriculum that is in focus, but also the experiences and prevailing conceptions of the pupils. Indeed, in this category the pupils' conceptions and experiences were seen as essential elements of the knowledge base dealt with during health education lessons. In the teaching mode belonging to this category, pupils are encouraged to construct their own opinions on the basis of the information they have received from the teacher or found for themselves, and also on the basis of the opinions and experiences mentioned by other pupils.

In this category the notion of a two-way interaction between the teacher and the pupils came up for the first time. However, it mainly covered the notion that, when the pupils bring their own thoughts to the teaching–learning situation, the role of the teacher should be to clarify their understanding and to probe it further. This is exemplified in the following excerpt from an interview.

> The teaching begins by asking what the issues under discussion bring to pupils' minds, and what kinds of conceptions they have. – All the pupils could write [their conceptions] on the board, and then they would realize [how much variety there is] … the teacher should stress [this aspect], saying, 'There was only one question, but look, how many different answers came from it'. To give the chance to be different and to look at the issues from various angles. That way the pupils would learn to think that although they may think in a certain way others may not share it. – [The role of the teacher] is to lead the discussions, to keep the pupils to the subject … but there should be a two-way interaction between the pupils and the teacher. And, at the same time, between a pupil and other pupils as well. So that a pupil should take in or listen to what other members of the group are trying to say and through that expand his/her own perspective. (Female, interview)

Teaching as supporting holistic personal growth

In the fourth category, supporting holistic personal growth, the aim of the teaching is to enhance pupils' self-esteem, together with respect for and recognition of others. The focus is on the pupil as a person, not just as a student. The support for holistic human growth calls for a supportive atmosphere, one that is emotionally mindful and accepting. With this in place, pupils can state their thoughts and experiences safely, or choose not to tell and share. The role of a teacher is not only to create and encourage such an atmosphere, but also, within this atmosphere, to use teaching practices that allow pupils to have genuine experiences of *being* supportive, respectful and honest fellow-learners. Our respondents also discussed the need for a teacher to be emotionally intelligent, and to take into consideration pupils' daily concerns relating to health. The following examples describe this conception:

> The teacher should value every pupil as a unique person and respect their answers. And emphasize that everyone's opinions are important. Take, for example, mental health as the teaching content. It is important that pupils are able to identify the risks … and their own psychological strengths, so that the teacher's role is to help to enhance their self-esteem, and to produce experiences that the pupils feel are good. – The group should be safe and everyone should feel good as its member. And should be able to say his/her own valuable opinion in that group. (Female, interview)

> The teacher tries to get a supportive atmosphere in the class. Or share positive feedback if there is a reason for it. And encourage the pupils to trust themselves, maybe. – There are pupils who easily praise their friends, and then there are pupils who aren't

accustomed to saying anything polite. So probably a good atmosphere can rub off on other people, or give people the courage to say something nice to a friend if they feel like it. And then it feels nice if it [the encouragement] comes from another pupil. (Female, interview)

Teaching as building a learning community with the students

In the fifth category, building a learning community with the pupils, both the pupils and the teacher are seen as learners. The respondents realized that: (i) since the experiences and the conceptions of the pupils form an essential element of the knowledge base during the lessons, and (ii) since the pupils are encouraged to think critically, a teacher has to be able to reflect on what he/she has heard, and be able to change or expand his/her own opinions. The teacher – as a genuine member of the learning community and as a reflective fellow-learner – may share his/her own experiences or conceptions concerning the health issues under discussion. Likewise, the role of the pupils is to work as responsible members of a learning community: to help the others to learn the object of learning. The class as a whole forms a community where there is a place for everyone to learn, grow, develop and share. Moreover, the class may produce some new knowledge as a group. The learning community conception is illustrated in the following examples.

> If one wants to teach something to other people, it means that one has to learn as well. I mean, teaching or educating another person is at the same time educating oneself – I mean, I accept the role of being able to learn in that situation, too. Despite the large and heavy set of issues I want to transmit to them, I accept that it may be chosen with the wrong arguments or something, and if there is a situation in which a pupil says, 'Hey, isn't there something wrong with this, this doesn't belong here', then I [as a teacher] have succeeded [in the matter]. Either I can justify it, showing that it is concrete and important, or I can say, 'You are right, it doesn't belong' – In that situation I have to do some reflecting myself, and learn. But although the practice may be based on community learning, a teacher is a teacher … and a pupil – although he/she can bring some new perspectives on the issues, his or her main role is that of a student. (Male, interview)

> In a way there are many teachers in a class. I think that when we talk about health issues, we are talking about things that belong to the pupils. They may say something and bring something and some opinions in a different way, which may get the other pupils to think differently. – It is good if there is disagreement and we pick some opinion, try to justify it and think of couple of different perspectives on it. And perhaps we can produce more opinions grounded on these [perspectives]. (Female, interview)

Relationships between the categories

The five qualitatively different ways of understanding teaching health education were reflected through five themes of expanding awareness: the nature of the knowledge, the source of the knowledge, the teacher's role, the pupil's role, and the direction of the interaction.

The nature of the knowledge was expressed in characterizations ranging from non-problematic to problematic. Moreover, the ways in which *the source of the knowledge* was understood varied from teacher-delivered content taken from the curriculum, through curriculum-content brought up by both teachers and pupils, to the conceptions and experiences of the teacher and the pupils related to the subject matter. In category 1, knowledge is seen as a body of taken-for-granted facts from the curriculum,

delivered by the teacher. In category 2, the respondents observed that health issues can be reflected on from the perspective of one's own life, meaning that there may be individual differences about how issues appear to various people. However, as in the first category, the focus is on the curriculum, since the personal points of view are seen mainly as additional activating material. Note that now the pupils, too, may bring issues related to the curriculum into the teaching–learning situation. In categories 3 and 4 the collective understanding of the issues expanded in such a way that the nature of the knowledge was seen as problematic, in the sense of being relational and personal. At the same time, the pupils' conceptions and experiences were seen as essential sources of the knowledge to be gained. Whereas in the first four categories the focus of the teaching is on either the curriculum or the conceptions and experiences of the pupil, in category 5 – building a learning community with the pupils – the source of the knowledge covers the teacher's conceptions and experiences as well.

The teacher's role varied from being a knowledge deliverer and expert to being a reflective fellow-learner and a genuine member of the classroom community. At the same time, *the pupil's role* ranged from being a knowledge recipient to being a genuine member of the learning community. In category 1, the teacher is seen as an expert who delivers knowledge to the pupils. The pupils' role is mainly to receive what is delivered. In category 2 the role of the pupil extends to include active participatory elements, while the role of the teacher is to inspire, stimulate and instruct pupils in their active thinking processes. In category 3 there is an additional emphasis on facilitating and guiding pupils' conceptual change. The pupils are regarded not only as active participants but also as reflective inquirers, who are actually aiming at a deeper understanding of the issues under discussion and of themselves. Note that in categories 4 and 5, the pupil's role was reflected more in relation to other pupils and to the teacher. When the focus of the teaching was on supporting holistic personal growth (category 4), the pupils were seen as supportive fellow-learners, and when the focus was on building a learning community (category 5) the role expanded to cover the possibility that the pupil may help the teacher (not just other pupils) to see something differently, or that the learning community may bring something new to everyone. Concurrently, the teacher's role will expand to becoming the creator of a safe environment and an accepting atmosphere, aiming at enhancing pupils' self-esteem (category 4). Moreover, the teacher will aim to become a fellow-learner and a genuine member of the learning community (category 5).

The direction of the interaction is closely intertwined with the roles of the teacher and the pupils. There was a movement from merely one-way interaction (from teacher to pupils) to two-way interaction between all the members in a learning community. In category 1 there is only one-way interaction, in which the teacher imparts knowledge to the students. In categories 2, 3, 4 and 5, a two-way interaction between pupils is supported. In category 2, the aim of the interaction is to provoke the active processing of knowledge. In category 3, the interaction between the pupils aims to stimulate the formation of people's own perspectives, and in category 4, its aim is to support respect for and recognition of others. The support for conceptual change (category 3) and the support for holistic personal growth (category 4) both call for a two-way interaction between the teacher and the pupils, but still with the aim of developing the *pupils'* understanding and growth. It is not until category 5 that the two-way interaction is seen to be an important element in supporting also the *teacher's* learning and development.

Discussion

Student teachers exhibited five qualitatively distinct ways of experiencing the teaching of health education as a school subject (Table 1). Teaching was seen as *transferring knowledge and skills, supporting the active processing of knowledge, supporting the transformation of conceptions, supporting holistic personal growth, and building a learning community with the students*. In general, it was possible to see the expansion of collective awareness of critical aspects, especially with regard to the following aspects:

- the problematic nature of knowledge;
- the roles of the experiences and conceptions of (initially) pupils and (later) teachers, as elements of the knowledge base during the lessons;
- the role of the teacher, not merely as a guide or instructor, but also as a reflective learner;
- the role of the pupil, opening up not only towards content, but also towards the self and others;
- a two-way interaction between *all* the participants in the class.

The findings support earlier studies, but also contribute some new insights to discussions of teaching conceptions. The main similarities with earlier studies lie in the first three categories; these move from teacher-centredness and the non-problematic nature of knowledge towards pupils as critical and reflective participants dealing with problematic knowledge (cf. Kember 1997; Prosser et al. 2005; Samuelowicz and Bain 2001). But from here on, in relation to earlier reported conceptions, our findings expand on ways of understanding teaching (especially the teaching conducted by academics), raising the importance of supporting pupils' holistic growth and building a learning community *with* the pupils – a community in which there is a place for the teacher to develop as well.

The respondents in this study emphasized the importance of creating a safe and supportive atmosphere in the class, with a view to supporting the growth of pupils as individuals, through (for example) the enhancement of self-esteem. Health education covers content that is closely linked to pupils' daily living, and is thus personal and sensitive in nature. When pupils are encouraged to express their feelings and tell others about their experiences, they make themselves vulnerable in front of the class. From this point of view, health education teaching is not only a matter of teaching content per se; it is also something that supports pupils' holistic growth and well-being via the way in which the teaching–learning process is organized (Paakkari, Tynjälä, and Kannas 2010). Such an endeavour calls for a kind of *pedagogical tactfulness* from the teacher. In addition, in this mode of teaching, the teaching of health education aims at enabling personal growth and development instead of merely increasing subject knowledge; what is targeted will be achieved *through* health education and not *in* health education (cf. Lam and Kember 2004, 2006).

In contrast with previous studies on teaching conceptions, the respondents in this study show an expansion of views to include the *teacher's* development in teaching conceptions. Developing and growing as a teacher was discussed, with health education teaching being seen as a matter of building a learning community with the pupils, one in which there will be a two-way interaction between all the members. This endeavour was related to taking into account pupils' opinions and experiences as matters to be reflected upon. The findings here are in line with the discussion of

Da'Silva and others (2007, 483), in which it was reported that 'knowledge of the students' alternative ideas has been found to be a catalyst of reflection and change in teachers'. However, in contrast with previous research, the student teachers in our study mentioned the possibility of the teacher expressing his/her own conceptions and experiences, and participating in knowledge construction along with the pupils. This way of seeing teaching is congruent with the idea of establishing reflective rooms (reflexive learning environments) for both pupils and teachers 'to express their thoughts and use language in order for both teacher and student to develop themselves' (Hoveid and Hoveid 2008, 135).

Two broad aspects, *seeing knowledge as problematic* and *taking pupils' experiences and conceptions seriously*, seem to constitute a cornerstone of a particular way in which teaching can be understood. In a similar vein, Bowden and Marton (1998, 132) have discussed the importance of seeing the curriculum as problematic, and of having respect for pupils' ways of understanding. They further argue that pupils should be able to value their own ways of understanding, but not take what they understand for granted. In other words, pupils should be taught to be critical towards their *own* knowing, and not only towards what is to be taught. This aspect was not taken up by the respondents in our study, though they discussed the importance of listening to the comments and thoughts of others, and of reflecting critically on the issues that arise. These findings are similar to the reflections expressed in studies on personal epistemology and self-authorship. Personal epistemology includes beliefs concerning the nature of knowledge (certainty of knowledge, simplicity of knowledge) and knowing (source of knowledge, justification of knowledge) (Hofer and Pintrich 1997). Within these dimensions some beliefs can be seen as more advanced ways of seeing than others. At a lower level of seeing there is the understanding of knowledge as truth in an absolute sense, and as something discrete, originating outside oneself and residing in an external authority from whom it may be received. At a higher level there is the understanding of knowledge as tentative, evolving, relative and contextual; here the self is seen as a knower who is able to construct knowledge along with others, and who critically evaluates and challenges the authority of knowledge.

In parallel with their considerations of the nature of knowledge and knowing, the respondents reflected on how the role of the pupils opened up not only towards the content, but also towards the self and others. A pupil was seen as a critical and a reflective learner, one who aimed to understand himself/herself better, and who was at the same time actively engaged in knowledge construction with fellow-learners (including the teacher) while a learning community was being formed by all the participants. Baxter Magolda (2008) calls this internal capacity to construct one's own perspective *self-authorship*. It combines the epistemological beliefs described above, together with identity and social relations; in the course of self-authoring 'the person becomes the *coordinator* of defining her/his beliefs, identity and social relations while critically considering the perspectives of external others' (Baxter Magolda 2008, 270–71). This capacity has a particular role to play in times when critical thinking, an appreciation of multiple perspectives and civic engagement are seen as important learning outcomes, not only in higher education, but also in schools – with health education classes having obvious relevance in this context (see Paakkari, Tynjälä, and Kannas 2010). The enhancement of self-authorship calls for a learning context in which the nature of knowledge is regarded as complex and socially constructed, and in which expertise and authority are shared in mutual knowledge construction among educators and learners (within collaborative partnerships) (Baxter Magolda 2003,

2004) – attributes belonging to the kind of learning community referred to above. Self-authorship also requires that the self (with its internal voice) should become the coordinator in constructing meanings (Baxter Magolda 2004). Referring to the reflections of Ekkerhard Martens, Kotkavirta (1995) has argued that the discussions between pupils and a teacher are not non-personal: the separate arguments do not participate in a dialogue per se. In pursuing mutual understanding, the members of the learning community put their selves and their identity as a whole into play.

Health education student teachers and teachers should become aware of the nature of knowledge in health education and of their personal epistemology with regard to health education, since the teacher can be regarded as the most important factor in the development of pupils' personal epistemology (cf. Sormunen 2004). A teacher who is aware of both her/his own epistemological beliefs and those of the pupils is able to take an equitable approach in developing pupils' understanding concerning knowledge and knowing in health issues. Teacher education should encourage students to such metacognitive reflection (Brownlee, Purdie, and Boulton-Lewis 2001), and create conditions which will advance self-authorship on the part of the students. Bendixen and Rule (2004) argue that if student teachers learn more meaningfully they will be more likely to promote such experiences and learning outcomes in schoolchildren. However, according to Baxter Magolda (2003, 232), higher education as currently conducted has overlooked 'the central role of the self in knowledge construction', despite students needing to regard their 'own identity as a part of knowing' and be able to reflect on their identity and its relation to that of others.

Because this study presents new perspectives on teaching conceptions, one may consider that these conceptions derive from the context in which the study was conducted. The research reported here supports earlier studies (e.g. Gao and Watkins 2002) in indicating that, although some conceptions of teaching seem to be parallel across different educational settings, there are also conceptions that vary over different contexts. However, whilst our findings do demonstrate that health education student teachers describe teaching in a fairly complex way, one has to bear in mind that the study is limited to physical education students studying health education as their second teaching subject. Although physical education teachers make up the main group teaching health education (Aira, Kannas, and Peltonen 2007), it is also possible that teachers in other school subjects – such as home economics, biology, citizenship education and psychology – may teach health education. It is, therefore, difficult to say whether all the critical aspects of teaching health education were identified, i.e. whether all the factors which make the categories distinct and qualitatively different were reflected upon. Given that different subject teachers may have different orientations to teaching health education, due to the differing nature of their main subject, it would be important to expand the research to include also students and teachers of other subjects. More immediately, the intention at present is to complement the research with the *same* respondents' views, once they have undergone two to three years of work experience. That will make it possible to see whether the work experience expands or restricts the ways of experiencing the teaching of health education.

Though this study has brought new insights into the existing literature on teaching conceptions, the congruence between the conceptions held by teachers in different contexts (e.g. educational, cultural) led us to consider the extent to which the conceptions ought to vary between different contexts, and also the extent to which the student teachers in this study were capable of being aware of and distinguishing *pedagogical content knowledge*. By this we mean that teachers should indeed have general

pedagogical knowledge and content knowledge – but that they should also have *subject-specific* knowledge and *an understanding of how certain kinds of subject matter should be taught* – referred to as pedagogical content knowledge (see Shulman 1986, 1987) . One could expect that this would lead to a greater variety of qualitatively different ways of experiencing teaching among teachers in different contexts. In addition, the development of pedagogical content knowledge will call for an understanding of one's own prevailing conceptions on a subject-matter level, and not merely on a general pedagogical level (Gullberg et al. 2008).

What are the broader implications of this article? There may be general agreement that if teacher education is to develop students' understanding in a more complex direction, it has to take into consideration not only academic and practical knowledge, but also prevailing personal conceptions (Otero and Nathan 2008; see also Pendlebury 2008). In this sense, the findings of this study are relevant to the development of (health education) teacher training. Moreover, the findings can be used as a starting point for studying student teachers' conceptions of the teaching of health issues in general, within other educational and cultural contexts.

Acknowledgements

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III

CRITICAL ASPECTS OF STUDENT TEACHERS'
CONCEPTIONS OF LEARNING

by

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Critical aspects of student teachers' conceptions of learning

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Abstract

The aim of this phenomenographic study was to discover the educationally critical aspects of learning conceptions among health education student teachers ($N = 20$). The qualitative data consisted of written essays and semi-structured interviews. Six qualitatively distinctive conceptions of learning could be discerned, namely learning as 1) the reproduction of acquired health knowledge, 2) the application of health knowledge, 3) developing personal meanings on health matters, 4) the transformation of individual thinking, 5) personal growth, and 6) collective meaning-making. These qualitatively distinct categories were reflected through three themes, which embodied critical aspects: the nature of the knowledge involved, the nature of the reflection involved, and the role of the social environment. In bringing new insights into the existing literature, this study confirms a need for research on learning conceptions across different cultural and educational contexts.
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Keywords: Critical aspect; Learning; Student teacher; Conceptions; Phenomenography

1. Introduction

Teachers' conceptions of teaching and learning have been regarded as associated with the teachers' teaching approaches, with consequent influence on the pupils' learning approaches and learning outcomes (Kember & Kwan, 2000; Trigwell & Prosser, 1996; Trigwell, Prosser, & Waterhouse, 1999), though the causal relationships have been difficult to demonstrate (Eley, 2006; Kane, Sandretto, & Heath, 2002; Laksov, Nikkola, & Lonka, 2008). Such conceptions have been the subject of an extensive body of research, focusing most frequently on academic learning (Dahlin & Regmi, 1997; Duarte, 2007; Marton, Dall'Alba, & Beaty, 1993; Marton, Watkins, & Tang, 1997; Samuelowicz & Bain, 2001; Tynjälä, 1997; see also Entwistle & Peterson, 2004) or on learning in school subjects such as physics (Huibregtse, Korthagen, & Wubbels, 1994) and science/biology (Mellado, Bermejo, Blanco, & Ruiz, 2007; Tsai & Kuo, 2008).

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Often the research on learning conceptions has been conducted within a phenomenographic research tradition, with one of the most cited studies being that of Marton et al. (1993), which was conducted among Open University students in Britain. Marton et al. identified six qualitatively different and hierarchically ordered conceptions about learning, namely learning as 1) increasing one's knowledge, 2) memorizing and reproducing, 3) applying, 4) understanding, 5) seeing something in a different way, and 6) changing as a person. The first five conceptions are parallel with those arrived at by Säljö (1979, see also van Rossum, Deijkers, & Hamer, 1985) almost fifteen years earlier, but the sixth conception was added when Marton et al. (1993) found a group of students who understood learning as a change in themselves − though it should be noted that, as van Rossum and Hamer (2010, p. 7) indicate, a similar conception had been formulated earlier by van Rossum, Deijkers, and Hamer (1984). In the interpretation of the findings it was suggested that the role of *meaning* in learning could constitute the main difference between the conceptions. While the constitution of meaning is absent in the first three conceptions, in the last three conceptions it is of central importance. To put it in another way, the first three

categories are *quantitative*, focusing on acquiring an increasing quantity of information, while the last three are *qualitative*, focusing on understanding and integrating knowledge (Boulton-Lewis, Brownlee, Berthelsen, & Dunbar, 2008). Entwistle (2007) has pointed out that the six categories form a hierarchical structure in which the higher categories have similarities with the higher epistemic beliefs found in classical studies by Perry (1970).

It should be borne in mind that in the phenomenographic research tradition, the structure of research findings is often described in terms of an inclusive or nested hierarchy (Marton, 1994; Marton & Booth, 1997). Hence, in the study by Marton et al. (1993) the later conceptions of learning build upon the previous ones, covering aspects observable in the previous ones but not vice-versa (see Prosser & Trigwell, 1999, p. 38). According to Cope and Prosser (2005), the categories that are higher in a hierarchy represent increasing focal awareness: they include more aspects related to understanding the target phenomenon, and/or more (or better described) links between the aspects, and/or a deeper conceptualization of one singular aspect. In that sense, the conceptions lower in a hierarchy represent less advanced, less complex or less sophisticated ways of seeing learning, whereas the conceptions that are higher in a hierarchy represent more advanced, more complex, more complete and more sophisticated ways of seeing learning (see Marton & Booth, 1997, p. 107). Thus, the conceptions do *not form a continuum* (cf. Kember, 1997), being rather a nested, hierarchical organization encompassing the breadth in awareness of the target phenomenon (Åkerlind, 2003).

A number of studies (e.g. Boulton-Lewis, 2004; Marshall, Summers, & Woolnough, 1999) have produced findings fairly similar to those of Marton et al. (1993) described above. This has led to certain assumptions on the nature of learning conceptions. It is argued that the conceptions of learning may be more or less universal; thus the conceptions found in different contexts (i.e. cultural or educational) either overlap or complement each other, with the addition only of cultural "color" (Dahlin & Regmi, 1997; Marton et al., 1997). However, there are also arguments supporting a greater role for context in defining the conceptions (Eklund-Myrskog, 1998; Gao & Watkins, 2002; Tynjälä, 1997), and a fairly widespread view that the conceptions are contextually-bound to some extent. In either case, there is a need for research comparing different educational and cultural contexts to show the ways in which the context either "colors" or defines the learning conceptions in question (Gao & Watkins, 2002).

In the present study we approach the question of learning conceptions from the point of view of student teachers, and more specifically, *how they understand their pupils' learning* (i.e. not their own learning). The context here is the training of Finnish health education[1] teachers, which takes place at university level. The aim of the teacher training is to create the kind of learning conditions that will support the development of

student teachers' understanding in a more powerful direction, since "powerful ways of acting spring from powerful ways of seeing," as Marton, Runesson, and Tsui (2004, p. 8) argue. To create such conditions requires consideration of the student teachers' prevailing conceptions and the aspects that are *educationally critical* in gaining a more complex, complete, or powerful way of seeing the learning in question (Marton & Booth, 1997, p. 111; Runesson, 2006) — in this case, the learning that occurs in health education.

Within the research literature one can observe differences in how the critical aspects have been understood and applied. One way of understanding the critical aspects is to see them as representing the critical features of certain types of disciplinary knowledge. As an example, Marton and Pang (2008) argue that in economics in promoting learning of the notion of price such features include "demand" and "supply," with economics as a discipline defining those features as critical for students to know (to discern and to focus on). These kinds of critical features are part of the teacher's (subject matter) content knowledge (see Marton & Pang, 2008) — in other words the teacher's subject-specific knowledge about 1) what he or she regards as important for students to know, and for what reasons, and 2) how this domain-specific understanding is related to other issues both within and outside the discipline (Shulman, 1986). However, in the present case we see educationally critical aspects as representing *the critical differences between various ways of understanding the same phenomenon* (see Åkerlind, 2004, 2005a), since we are interested in what a teacher educator has to take into account when aiming to develop student teachers' understanding of (pupils') learning in the direction of increasing complexity (see Marton & Pang, 2008). These critical differences contribute to the teacher's pedagogical content knowledge (Marton & Pang, 2008), which involves both subject-specific knowledge and an understanding of ways of teaching the particular content matter (Shulman, 1986, 1987).

With this as background, *the purpose of the present study* was to explore health education student teachers' ways of understanding the learning that takes place in health education within the school classroom. In addition, the aim was to discern the aspects that are educationally critical for expanding an understanding of such learning in a more complex and complete direction. The following specific research questions were set:

1. How do student teachers understand learning in (school subject) health education?
2. What are the educationally critical aspects that differentiate between qualitatively varying ways of experiencing learning in health education?

Our hypothesis was that health education student teachers' learning conceptions would display similarities to the conceptions identified in earlier studies, but that the context of health education might give rise to unique aspects. Due to the paucity of previous research on educationally critical aspects in the context of health education, it was not possible to form hypotheses about what these might be.

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[1] In this paper *health education* is used to describe a specific school subject in the Finnish school system.

2. Method

2.1. Participants

The sample consisted of 20 university students (9 females, 11 males, age range 22–31 years) of physical education who were specializing in health education in the Faculty of Sport and Health Sciences, University of Jyväskylä, Finland. Data were gathered twice during the teacher education program. At the first data collection phase, the participants had studied for 25 credits (ECTS, European Credit Transfer and Accumulation System) out of the total of 60 credits of multidisciplinary studies in health education. They had not at this point gained any real-life health education teaching experience. At the second data collection phase, nine of the students had taken pedagogical studies for teachers, during which they had gained some experience of teaching health education in either a secondary school, a school providing general upper secondary education, or an upper secondary school for vocational education and training. However, there was no practice period specifically devoted to health education in the teacher training. At the time of the data collection (academic year 2004–2005), the teacher training consisted of courses, which covered contents such as health education content knowledge, pedagogical content knowledge, ethical thinking skills, the teacher as researcher, and school as a context for health promotion.

2.2. Procedure

The data consisted of written essays and semi-structured interviews. These were administered at the beginning (autumn 2004) and at the end (spring 2005) of the students' health education teacher training; thus there were in all 40 essays and 40 interviews. All 20 students participated in each of the two data collection phases. Note that although the data were collected at two different points of time, the study does not address longitudinal changes in student teachers' conceptions. Instead, the data were used as a whole, as a means of observing the full range of variation in the student teachers' understanding (see Marton et al., 1993). The development of learning conceptions over the course of time will be examined in a subsequent paper (Paakkari, Tynjälä, Villberg, and Kannas, in preparation).

The informants were first asked to write an essay on the following topic: *if a teacher other than a teacher in health education were to ask you to describe health education as a school subject, how would you describe the subject itself, its learning and its teaching?* The length of the essays varied from half a page to three pages. The essays were read carefully before the subsequent interviews, so that the interviewer could ask for clarifications if need be.

The interviews were conducted individually at the Faculty of Sport and Health Sciences. The interviews lasted about 70 min on average. The participants were asked, for example, to describe health education as a subject (in general) together with its teaching and learning, and also how the teaching and learning in health education differed from the teaching and learning in other school subjects. Elaborations of the answers were elicited by more detailed questions such as: "Could you describe it/ explain it a little further?", "Could you give an example of it?", "Why do you consider it to be important?" The interviews were tape-recorded and transcribed verbatim.

2.3. Data analysis

The data analysis was conducted using a phenomenographic methodology (Marton & Pong, 2005; Åkerlind, 2005b, c). The aim was to bring to light the qualitatively different conceptions or ways of experiencing the target phenomenon at the collective level (Marton & Booth, 1997, p. 124). Thus the unit of the analysis was not the individual. Instead, the data were analyzed as a whole.

The essays and the transcripts were first read as a whole several times, looking for the focus: where the emphasis fell when informants described learning in health education, and what they related to it. The use of the entire transcript, or of large chunks of each transcript (rather than smaller excerpts), had the purpose of increasing accuracy in interpreting the answers (Åkerlind, Bowden, & Green, 2005).

In order to form a draft set of descriptive categories we looked for similarities and differences between the expressions used. For example, when two expressions differed at the word level but included the same meaning they were placed in the same category (Marton, 1994). Moreover, we looked for complementarity in the expressions, since different expressions may represent different parts of a single conception, as argued by Marton et al. (1993). For example, one expression may focus on and describe the "what" aspect of learning (what is learned), and another expression the "how" aspect of learning (how it is learned) (Marton et al., 1993).

During the repetitive readings of the data we were aware that one interview transcript or essay or even one sentence might contain more than one way of understanding learning in health education. This was important, since the main aim of phenomenographic studies is to reach what can be described as a collective understanding (i.e. a collection of all the possible ways in which the target phenomenon can be understood among a certain group of people) rather than an individual state of mind (Marton & Booth, 1997, p. 114). The categories were organized in a hierarchical and inclusive way, based on both logical argument and empirical evidence. In both cases the inclusiveness needed to be confirmed by the original data. Based on the hierarchical and inclusive nature of the categories, some conceptions can be regarded as more complete and more complex than others (Åkerlind, 2004, 2005a, c).

Next, we analyzed the ways of experiencing health education in terms of the aspects that appeared to be most important for both grouping together and distinguishing the varying ways of understanding. The focus was on the critical (or "key") aspects, since we wanted to know what is required for a student teacher to move from one way of seeing a phenomenon to another, more complex one (cf. Åkerlind, 2004, 2005c; Marton & Booth, 1997, p. 111; Runesson, 2006). Thereafter we looked to see whether these critical aspects could be grouped into themes of expanding awareness, running through the categories. In this research a "theme of expanding awareness" refers to a unifying

idea (arrived at from the categories) within which educationally critical aspects can be discerned, and which highlights the structural relationships between categories (Åkerlind, 2005a).

During the analysis we often went back to the original data to confirm the results that were starting to be structured, in order to minimize the influence of our own perspectives on the outcomes (see Bowden, 2005). The steps in analyzing the data described above were important in ensuring the trustworthiness of the findings (see Green, 2005).

The main outcome reached through the analysis was a structured set of categories of description called an "outcome space" (Åkerlind, 2005b). The outcome space "shows the relationships among the various categories of descriptions according to their logical complexity and inclusiveness and describes the variation in the possible ways in which a phenomenon is experienced" (Marton & Pang, 2008, p. 536). Marton and Booth (1997, p. 125–126) emphasize that the categories of description should meet three quality criteria: 1) each category should describe something clear and distinct about the ways of experiencing the target phenomena, 2) the categories should stand in a clear and logical relationship with other categories, revealing an inclusive hierarchy between the categories, and 3) there should be only a limited (parsimonious) number of categories, which, however, should be able to capture the critical variation in the data. In the final phase of the analysis we made sure that these criteria were met in our outcome space by re-checking the differences behind the categories in terms of themes of expanding awareness.

3. Results

On the basis of our data analysis the respondents' views on learning in health education could be grouped into six categories: learning was seen as 1) the reproduction of acquired health knowledge, 2) the application of health knowledge, 3) developing personal meanings on health matters, 4) the transformation of individual thinking, 5) personal growth, and 6) collective meaning-making (Table 1). These qualitatively distinct categories were reflected through three themes, comprising the educationally critical aspects for advancing

a higher level understanding of learning, namely: 1) the nature of the knowledge involved, 2) the nature of the reflection involved, and 3) the role of the social environment. What follows is a detailed description of each category, with special attention to the educationally critical aspects.

3.1. The description of the categories

3.1.1. Learning as the reproduction of acquired health knowledge

In category 1, the focus is on *reproduction* of the health knowledge that is acquired during health education lessons by rote learning (repeating and memorizing). The knowledge that is handled during the lessons is seen as non-problematic, involving merely facts about health matters, as the following extract shows:

"Firstly, it [learning] is about factual matters that it is good to know. They [the pupils] internalize and memorize it, and so on." (female, interview)

Handling knowledge in a non-problematic way refers to the pupils' tendency (as seen by the student teachers) to take knowledge for granted, without reflecting further on the nature of knowledge or on the ways of acquiring and constructing knowledge. In our data, this conception rarely appeared in isolation. Instead, in line with the principle of the hierarchical inclusiveness of categories, it was found that some subjects — expressing more complicated conceptions — might articulate their awareness of the possibility of seeing learning as more than the mere reproduction of learning:

"Learning in health education is strengthening one's identity and self-esteem. — Thus the learning is not only memorizing, but also really understanding [health matters] and getting to know oneself." (female, essay)

3.1.2. Learning as the application of health knowledge

When the focus of learning was regarded as *application*, the informants emphasized the importance of being able to apply the acquired health knowledge in practice. This was related to

Table 1
Categories of understanding learning in health education, described in terms of themes of expanding awareness.

Themes	Categories					
	1	2	3	4	5	6
	Reproduction of acquired health knowledge	Application of health knowledge	Developing personal meanings on health matters	Transformation of individual thinking	Personal growth	Collective meaning-making
The nature of the knowledge	Non-problematic	Non-problematic	Problematic	Problematic	Problematic	Problematic
The nature of the reflection	None	None	Descriptive reflection	Critical reflection	Ethical reflection	Collective reflection
The role of the social environment	None	The context for practicing skills	The context for becoming aware of one's health thinking and health behavior, and that of others	The context for expanding one's perspectives	The supportive context for personal growth	The context for dialogue

various practicalities in daily living such as going to a grocery store and being able to choose healthier food, following traffic regulations, and being able to use first aid skills when needed. Thus the informants raised the importance of learning through one's own experience. In considering the application of these skills the role of the social environment was highlighted by the informants: the pupils in the class were regarded as forming a context for practicing. However, in this mode of learning, though gaining one's own experiences is seen as a crucial element, the experiences are not reflected on further. The knowledge gained is seen as practical and "to be taken and used"; hence it is mainly seen as non-problematic.

> "It [knowledge] comes through one's experiences. Using much of that active learning. Take for example first aid skills — a lesson where one practices these skills physically. — Learning is — being able to apply them [the topics handled during the lessons] and use them in daily living." (male, interview)

3.1.3. Learning developing personal meanings on health matters

Category 3, learning as developing of personal meanings on health matters, highlights the importance of *meaning.* Learning is about developing one's own view of health matters by linking separate issues with each other and/or by reflecting on the teaching topics from the point of view of one's own ways of behaving or seeing. This can be seen in the extract below:

> "The topics in health education are closely linked to our lives with the consequence that learning may occur through reflecting on one's own life. I mean by this that when they are handling different topics, each pupil could ponder on these topics from the point of view of his or her own life situation and ways of life." (female, essay)

Knowledge is here seen as problematic, since the learning focuses on pupils' own personal lives — their own personal experiences or conceptions, which cannot be said to be right or wrong. In this mode of learning descriptive reflection is seen as a crucial element in learning: *How do I behave, feel or think? And how is it related to theoretical knowledge, or to others' ways of behaving, feeling, or thinking?* A further aspect exhibited in the data is that of pupils being able to think through the causal relationship between the health choices they make and the probable consequences of these choices. When the focus is on developing personal meaning, the social environment in the class serves as a context for comparing one's thoughts with other pupils' thoughts — and through that, as a context for becoming aware of one's own health behavior and health thinking, plus the behavior/thinking of others.

3.1.4. Learning as the transformation of individual thinking

In category 4, *learning as the transformation of individual thinking,* the emphasis falls on *a change* in ways of seeing things — whether with regards to the topics that are taught or to oneself. Though the focus stays on personal meaning as in the previous category, in this mode of learning seeing things in a new way and broadening or strengthening one's outlook enters the frame. The key element in this process is critical reflection, since through that, as discussed by the participants, the pupils are able to recognize *why* they think as they think or *why* they behave as they behave:

> "One has to think, why do I behave as I do, or why is my perspective on this issue the way it is." (female, interview)

The participants showed awareness that through a thinking process of this kind, the pupils may come to learn from their own experiences and change their own ways of behaving or thinking about health topics. The pupils may also become aware of something they did not know before, as indicated in the extract below:

> "[Knowledge] is about one's own experiences in a way. Or others' ways of seeing things…that is, something that one had not thought about before." (female, interview)

In the extract above — as in the extract, which follows — one can see how the role of the social environment broadens out from the previous category. Now, the varying voices of other pupils are regarded as a resource for broadening one's own way of thinking through critical reflection; in other words, the social environment serves as context for expanding one's perspectives through discussion and critical reflection. The pupils' role is to listen and to ponder on others' opinions, setting them against their own way of thinking. The nature of knowledge is seen as problematic, as in the previous mode of learning.

> "There are different kinds of pupils in the class, which may be more productive than if only the teacher gives the information. The pupils have different backgrounds — they think differently, with the result that you hear varying perspectives and arguments on topics. — If you just do the exam this kind of social aspect is left out. — A pupil may develop his or her understanding with regard to [health] related choices. In a way, related to these matters, as many people as possible could get broader ways of thinking" (male, interview)

3.1.5. Learning as personal growth

Whereas the previous two categories focused on personal meaning, category 5, *learning as personal growth*, puts the emphasis on growth. This mode of learning moves towards *growing through learning about oneself, others, and the world.* In other words, the learning does not merely produce changes in the way of seeing things; it also changes the person. The participants who touched on this aspect described learning as accepting oneself for what one is and others for what they are, becoming tolerant and responsible, improving one's self-esteem, or more broadly strengthening one's identity. The ethical nature of reflection was brought up in the sense that the pupil's role was seen as including not merely listening to others' opinions but also valuing the issues that others feel to be important. The participants mentioned that through that

kind of ethical thinking a pupil may be able to become more tolerant.

> "Through discussions with others, a pupil gets more perspectives on health matters and learns to understand other people and to respect what they consider important." (male, essay)

> "Being able to test and to practice responsible behavior in a class in a safe environment and atmosphere. — So that we learn to take other people into account and are able to understand that we are different and that we feel the same things in a different way. And that it is OK to feel angry on some occasion and through that be able to control your feelings. And if someone offers you drugs you are strong enough to say no." (male, interview)

As could be seen from the extract above, the role of the social environment is seen as creating supportive conditions for pupils' personal growth. Moreover, it not only supports pupils' individual growth; in so doing, it supports the growth of fellow-learners.

3.1.6. Learning as collective meaning-making

In category 6, which is based on the expressions of only one respondent, the focus moves from individual meaning to collective or shared meaning. In this mode of learning, the group of pupils plus a teacher form a community in which they ponder health issues together, through a dialogue. The difference between categories 4 and 6 is that now the pupils do not only learn from each other, but also participate in a dialogue with each other, in order to create something new and shared through collective reflection, as can be seen in the extract below:

> "In a way there are many 'teachers' in a class. I think that when we talk about health issues, we are talking about things that belong to the pupils. They may say something and bring up something and some opinions in a different way, which may get the other pupils to think differently. — It is good if there is disagreement and *we* [i.e. the whole class] pick some opinion, try to justify, it and think of couple of different perspectives on it. And perhaps *we* can produce more opinions grounded on these [perspectives]." (female, interview)

3.2. Educationally critical aspects and their relationships

Three themes of expanding awareness could be seen as highlighting the differences between the categories related to learning in health education: the *nature of the knowledge*, the *nature of the reflection*, and the *role of the social environment*. Based on the differences within these themes, the categories could be organized in a hierarchical way so that the first category represents the least complex way of seeing learning, and the sixth category the most complex way of seeing learning.

The nature of the knowledge is experienced as non-problematic in the first two categories, and as problematic in the last four categories. The non-problematic aspect of knowledge is related to seeing health matters as factual and practical, with learning regarded as merely reproduction or application. When the focus of the learning expands towards meaning-making, the personal, tacit, and relational aspects of knowledge are brought up — in other words, the knowledge that is dealt with during the lessons is seen as problematic since it includes pupils' conceptions and experiences as a vital element. Thus, the critical difference between the categories is found between category 2 and category 3.

The nature of the reflection was a second theme that could be discerned. Again the main critical difference between the categories is between categories 2 and 3, since the first mention of reflection comes in category 3. It is related to developing one's personal meanings through reflecting on health matters from the point of view of one's own life. However, the nature of the reflection changes between categories 3 and 6. Each of these four categories has its own special characteristics, with the result that there are also critical differences between those four categories. When learning is regarded as transforming one's personal meanings, *critical reflection* is emphasized (category 4). This critical aspect is not mentioned in category 3 since it does not focus on asking *why*-questions (*Why do I think in that way?*), only on *what*- and *how*-questions (*What do I think? How can this be seen in my way of behaving?*). Furthermore, the critical nature of reflection becomes insufficient at a time when personal growth (i.e. becoming tolerant and responsible, enhancing one's self-identity) is focused on (category 5). The informants touched on the aspect of *ethical reflection* in this mode of learning when they described how, in the process of listening to the perspectives of others, pupils do not merely critically evaluate them, but also approach them in a kind of ethical frame of mind — valuing, respecting, and being tolerant. Starting from this point, when the focus of the learning changes to shared meaning (category 6), the collective nature of learning enters the discussion. In the end, learning takes place within a dialogue, through a collaborative construction of meaning.

The role of the social environment comes up initially in category 2, when the group of pupils forms a context for practicing various health skills. From here, the role changes when the importance of developing one's own meanings concerning health matters is raised. Now, the social environment serves as a context for exchanging experiences and conceptions (category 3) and later as a context for expanding one's perspectives (category 4). In category 4, when the focus of the learning is on transforming individual thinking, the perspectives of others come to be seen as a vital part of the knowledge base that is handled during the lessons. From here, the role of the social environment expands to cover human and ethical aspects, with learning being seen as personal growth (category 5). The context is important in supporting growth, through its safe and supportive atmosphere. After creating a supportive and safe environment, the role of the context changes, now facilitating a dialogue in which the whole class is able to genuinely participate in collective meaning-making (category 6). One can see that there are critical differences between all the categories with regard to this theme.

4. Discussion

Our findings show both similarities to previous studies on learning conceptions (Boulton-Lewis et al., 2008; Cliff, 1998; Duarte, 2007; Marshall et al., 1999; Marton et al., 1993; Purdie, Hattie, & Douglas, 1996), and also differences. Our first five categories — from 1) *learning as reproduction of knowledge* to 5) *personal growth* — are similar to those identified by Marton et al. (1993). However, our analysis revealed an additional conception of learning, which has not previously been discussed, namely experiencing *learning as collective meaning-making* about health matters. In addition, our analysis did not indicate the presence of the learning conception "increasing one's knowledge" — reported earlier as the lowest, least complex or comprehensive conception of learning (see Duarte, 2007; Marton et al., 1993; Purdie et al., 1996). In this respect our findings are in-line with the studies of Eklund-Myrskog (1998) and Marshall et al. (1999). This may be explained in terms of the generally increased use of constructivist and socio-constructivist theories in education. Thus, conceptions of learning as merely increasing one's knowledge may have largely been abandoned, and correspondingly, the idea of learning as social meaning-making has become more general.

The health education student teachers' conceptions of learning confirm the claim of Marton et al. (1993) that the watershed, or dividing line between the conceptions lies between conceptions 2 and 3, when the focus of the ways of seeing learning changes to *meaning*. It is at this point (and not earlier) that the nature of knowledge is seen as problematic, that the role of reflection is first mentioned, and that the role of the social environment is seen to cover the potential for expanding one's perspectives on health matters. With respect to this dividing line one can see similarities with Perry's (1970) notion concerning a major shift in students' epistemological beliefs when they moved from merely seeing knowledge as absolute truths towards seeing knowledge as personally constructed and thus uncertain (see also Entwistle, 2007; Entwistle & Walker, 2000). In addition, as one crosses this dividing line, the question within the conceptions expressed arises as to what a pupil learns *through* the health content — not what a pupil learns *about* the health content.

Learning about health issues is the central focus in the first two categories, but when the learning is understood as meaning-making, the content is no longer an end in itself. In fact, categories 3 and 4 can be described as *learning about oneself, others, and the world through health content*, with health content serving merely as a mediating resource. Furthermore, when one moves towards seeing learning as personal growth, learning about oneself, others, and the world also serves as a mediating resource: category 5 can be described as *growing through learning about oneself, others, and the world*. And for its part, the respondents saw that learning as personal growth enables pupils to participate equally in a dialogue in which the focus of the learning is on collective meaning-making, since the pupil is now genuinely seen to be able to take into account other pupils' points of view without losing his or her own internal voice in/by seeking approval (see Baxter Magolda, 2004); or as Entwistle and Walker (2000, p. 337) put it, interpreting Perry (1970), the pupil is now seen to be able to show commitment to his or her own constructed perspectives "while retaining tolerance of alternative viewpoints." To put it in another way, category 6 can be characterized as *moving towards shared meaning through growing with others in dialogue*. In this sense, a dialogue, as Isaacs (1993) describes it, is a kind of established field of genuine meeting and inquiry, where permission is given for the free flow of meaning and the active exploration of personal inflexible aspects of individual and collective assumptions related to target phenomena.

Reflection in its different forms is the factor that mediates from categories 3 to 6. This finding runs parallel to the findings of Marshall et al. (1999). However, these researchers did not ponder the nature of reflection in greater depth or detail, whereas our findings indicate that, depending on the learning conception, the nature of the reflection changes. This could be recognized, despite the fact that the informants seldom described the reflection explicitly, using exact words. The first distinction arrived at was between *descriptive reflection* and *critical reflection*. We use the first phrase to describe reflection in which pupils are seen to mainly link and describe health matters from the point of view of their daily living, in order to enhance their self-awareness (cf. Hatton & Smith, 1995). The latter phrase includes critical analysis of the reasons (involving underlying values and assumptions) for actions and points of view, reasons, which lead to a change in perspectives. This is in-line with a review of the literature on reflection conducted by Atkins and Murphy (1993); they found that self-awareness, critical analysis, and the formation of a new perspective are indeed the key stages in a reflective process.

Some authors include ethical aspects within critical reflection (Hatton & Smith, 1995), but here we would wish to maintain a distinction between critical and ethical reflection, in order to highlight how reflection takes on a new aspect when the focus of the learning is on personal growth. Ethical reflection asks questions such as *What is the moral nature of my ways of behaving and thinking? What are alternative ways of behaving and thinking?* Indeed, (health) actions have ethical characteristics, which influence the actions we choose or refuse (Williams, 1985, p. 8). Our analysis suggested that the student teachers saw ethical elements mainly in the way the pupils listen to other pupils' opinions and consider the perspective of others. What was lacking was examination of the ethical nature of the pupil's own actions and thoughts, and through that, the change that might occur as a person. However, in this connection it is worth bearing in mind the perspective put forward by Kwak (2007). Citing Bernard Williams, Kwak (2007) notes that ethical reflection calls for both self-examination of our motives and "*theoretical* understanding of other kinds to be able to explain how and why certain practice was derived, how it has shaped our experiences, and in what way our beliefs are connected to it" (p. 469). Ethical reflection does not merely seek self-understanding, but also collective or shared meaning in the

context of reflective discussion (Kwak, 2007). In this paper, we refer to meaning negotiation in a dialogue as a process of *collective reflection* (cf. De Lawter & Sosin, 2000). We do this to highlight the expansion in awareness, but also because in this study, the collective nature of reflection was brought up only in relation to learning as collective meaning-making concerning health matters.

If we argue that meaning is a kind of watershed, we should point out that another probable dividing line – not reflected in earlier studies – could be discerned between the conception of personal growth and that of *collective meaning-making*. Here, the emphasis is placed on the collective perspective. In the end, learning is understood as collective meaning-making through collective reflection in a learning community. Use is now made of the whole class as a social context for learning, in order to reach "the potential that lies in the social nature of knowing and learning," as McGinn, Roth, Boutonné, and Woszczyna (1995, p. 164) aptly describe it. This finding confirms the communal characteristic of the school subject called *health education*, as revealed in a study on health education teaching conceptions conducted by Paakkari, Tynjälä, and Kannas (2010). The additional category also raises questions on whether classroom-based learning may produce collective learning outcomes similar to those discussed in the literature on work-related and more specifically, organization-level learning (see Garavan & McCarthy, 2008; Laat & Simons, 2002; Tynjälä, 2008). Here it should be noted that this category was based on just one student's response and hence the description of it may have remained incomplete. However, in a phenomenographic study it is important to identify *all* the possible ways of understanding the target phenomenon, however rare they might be – so long as they represent conceptions that clearly belong to distinct categories. An important task for further studies will be to see whether this kind of category can be identified in other groups of students and teachers.

This paper confirms Dahlin and Regmi's (1997) argument that the conceptions of the learning are to some extent parallel across different contexts, but that there are differences in the aspects focused on by informants. Thus, there is indeed a need for research on learning conceptions across different cultural and educational contexts with a view to determining the aspects that are educationally critical in a given context. Moreover, though this study is limited to physical education students specializing in health education in a particular university, the findings may serve as a starting point for examining how learning in health matters is understood in other educational and cultural contexts.

As was argued in the introduction, student teachers' ways of experiencing learning in health education form an important part of the pedagogical content knowledge of teacher educators, knowledge that teacher educators will need when they aim at developing students' understanding in a more complex direction. When the focus is on the critical aspects, which differentiate between qualitatively varying ways of understanding learning in health education, there is great potential for bringing about purposeful learning among the students (Lo, Marton, Pang, &

Pong, 2004). Thus, on the basis of our findings, we would argue that in health education teacher training it is important to create learning conditions which approach learning in health education from the points of view of the nature of knowledge, the nature of reflection, and the role of the social environment, and which support the expansion of awareness using the critical aspects that were indentified. In other words, student teachers should be exposed to the situations where they are challenged to reflect and see the variation in terms of non-problematic/non-complex and problematic/complex nature of knowledge in the context of learning in health education, to mention one example. In addition, in-line with the views of Cope and Prosser (2005), the hierarchical structure of the findings serves as a tool for evaluating the development that may occur in students' learning outcomes, that is, how learning moves from merely seeing learning as the reproduction of acquired health knowledge towards seeing learning as a collective meaning making (cf. Hella, 2008). It can also help students to become aware of the variations in ways of experiencing learning, and to ponder the differences between their current way of understanding and the more advanced ways of understanding that they may be moving towards.

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IV

THE DEVELOPMENT AND ALIGNMENT OF PEDAGOGICAL CONCEPTIONS OF HEALTH EDUCATION

by

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ABSTRACT

This study examines the development and alignment of conceptions of (1) health education as a school *subject,* (2) the *teaching* of the subject, and (3) the *learning* of the subject, among health education student teachers (n=20). The data consisted of outcome data from previously published phenomenographic studies on health education students' conceptions during their first and second semester of health education studies, and after gaining 1–3 years of work experience. The statistical analysis was based on Friedman's Test, the Wilcoxon Matched-Pairs Signed Ranks Test, and descriptive distributions. Statistically significant changes were found only in the conceptions of *teaching* after a period of work experience. It was found that during teacher training the proportion of the student expressing the most sophisticated pedagogical conceptions actually decreased. According to the statistical tests, the conceptions (relating to health education as a subject, its teaching, and its learning) advanced in broad alignment with each other, despite some statistically non-significant discrepancies. It was found that the participants expressed higher conceptions in the interviews than in written essays. Some methodological considerations are examined concerning research on the development of conceptions, with suggestions also for teacher training.

Keywords: longitudinal study, conceptions, teacher education, health education

1   INTRODUCTION

Over three decades, there has been a good deal of scholarly interest in conceptions of *teaching*, *learning,* and *subject matter* – here referred to as *pedagogical conceptions*. Researchers, often working within a phenomenographic research tradition, have aimed at describing students' and teachers' qualitatively different pedagogical conceptions arguing that such a research is important since there is an association between teacher's conceptions and his/her teaching practices (i.e. Marton & Booth, 1997) and for the fact that to know how students' and teachers' understand something is already fundamental (see Trigwell, 2005). At the same time, discussion has taken place concerning how the conceptions change or develop, and the extent to which the conceptions are parallel with each other. Assessments of such changes are crucial if we aim to develop students' and teachers' thinking (see van Rossum & Hamer, 2010, p. 573), and the only truly effective way of studying changes in conceptions is via a longitudinal approach (see Entwistle & Walker, 2000). Moreover, if the teacher's conceptions are intertwined with his/her actual teaching practices and eventually with students' approaches to learning (Trigwell, Prosser, & Waterhouse, 1999), it can be expected that a sophisticated and coherent view of pedagogical conceptions will have real potential in bringing about purposeful learning among students. Hence, there is also a need to study the *alignment* of the conceptions – the extent to which they advance in parallel in terms of the three domains already referred to, namely the *subject*, the *learning* of the subject, and the *teaching* of the subject.

Despite the acknowledged need for longitudinal studies, studies targeting developmental trends in pedagogical conceptions are rare, especially among student teachers and more specifically among health education student teachers. The present paper reports on a study aimed at filling this gap.

1.1 Phenomenographic studies on the development and alignment of pedagogical conceptions

In phenomenographic research tradition learning and development are considered as the widening of a person's ways of experiencing the object of learning. The focus is more on *what* students know than on *how* they know (see van Rossum & Hamer, 2010, p. 573), and more importantly, on measuring a change in understanding than measuring mere performance (Micari, Light, Calkins, & Streitwieser, 2007). Hence, the conceptual change is not understood as a *replacement* of one conception by another, but as the *expansion* of one's understanding (cf. Åkerlind, 2008). In fact, Åkerlind (2008) would not speak about the conceptual *change* approach in phenomenography, but instead about the conceptual *expansion* approach. Marton and Pang (2008) do not make such a differentiation between two approaches; nevertheless, they agree that in phenomenography conceptual change is not really about a change in what a person *has,* or about what can be replaced, changed, or added to. It is rather a change in the world experienced by the person: a person is able to see the same thing in a way that is more qualitatively advanced, powerful, or complex (Marton & Pang, 2008).

One of the few longitudinal studies on student teachers' pedagogical conceptions was that of Wood (2000), who aimed at identifying and describing student teachers' conceptions of teaching, and at examining the development of these conceptions during a one-year initial teacher education program. The phenomenographic analysis produced three hierarchically ordered categories, varying from a less complex understanding of the teaching to a more complex understanding. It was found that as the students progressed in their studies their conceptions developed in a more complex direction (Wood, 2000; see also So & Watkins, 2005). In addition, longitudinal studies on students' conceptions of their own learning have reported positive findings, indicating that such conceptions may indeed be capable of change (Boulton-Lewis, Wilss & Lewis, 2001a; Boulton-Lewis, Marton, Lewis, & Wilss, 2004; Marton, Dall'Alba, & Beaty, 1993). The findings to this effect support the view that in educating student teachers the focus of the education should be on developing conceptions in a more advanced direction. This view is further supported by indications of an association between teachers' conceptions and their teaching practices (i.e. Trigwell & Prosser, 1996; Trigwell, Prosser, & Waterhouse, 1999).In connection with this, Koballa, Gräber, Coleman and Kemp (2000) have pointed out the need to expand student teachers' understanding of teaching and learning so that it will match up with current perceptions of the modern culture of teaching and learning. For this to happen, it will be necessary to address how pedagogical conceptions develop during student teachers' education.

Studies on the alignment of pedagogical conceptions have generally focused most on teaching and learning conceptions. According to the findings so far, it seems that the conceptions of teaching and learning tend to be aligned

with each other, though total consistency has not been found (see Boulton-Lewis, Smith, McCrindle, Burnett, & Campbell, 2001b; Bruce & Gerber, 1995; Koballa *et al.,* 2000). Koballa *et al.* (2000) found that teachers' conceptions of chemistry teaching and learning are often parallel; thus teachers who see teaching as reproductive (less complex) tend to have a similar view with regard to learning, and teachers who hold constructive (more complex) views on teaching tend to hold constructive views on learning. However, they also noted a group of teachers whose teaching conceptions were less complex or less advanced than their learning conceptions (cf. Boulton-Lewis *et al.,* 2001b). They explained this according to the notion that during teacher training, students are open to elements of constructivism in the context of learning but not that of teaching.

Discussion on the ways in which the conceptions of teaching and learning may or may not be parallel has been linked to the subject matter *per se*, or to conceptions of the subject. Boulton-Lewis *et al.* (2001b) put forward an interesting notion, to the effect that teachers who teach subjects that allow personal interpretations and meaning-making tend to have more advanced ways of understanding teaching and learning. Prosser, Martin, Trigwell, Ramsden and Lueckenhausen (2005) for their part found that teachers' more holistic and integrated views on the subject matter they were teaching were linked to more advanced or more complex views regarding their students' learning and their own teaching. The researchers also considered the possibility that a less holistic picture of the subject might *restrict* ways of understanding teaching and learning, confining it within a teacher-focused perspective. So far, the study of Prosser *et al.* (2005) has been the one of the few to focus on the understanding by academics – and by teachers in general – of the subject matter to be taught, and the relation of this understanding to their teaching and to the learning of their students.

1.2 Student teachers' conceptions of health education as a subject, and of its teaching and learning

In Finland, health education is a fairly new school subject, and teacher-training programs dedicated to training health education teachers are rare. In fact, Finland is one of the few countries where health issues are taught as an independent school subject and where there is a possibility to study health education as one of the subjects taught in schools. Thus, student teachers' conceptions of health education, its teaching and learning were not studied into a great extent prior to the research conducted by Paakkari with her colleagues (2010a, b, 2011) All the studies by Authors were conducted within a phenomenographic research tradition, and all the three analyses revealed a set of categories (i.e. outcome space) which were organized in a hierarchical way, ranging from a less complex understanding to a more complex understanding.

In phenomenography the outcome space "shows the relationships among the various categories of descriptions according to their logical complexity and inclusiveness and describes the variation in the possible ways in which a phenomenon is experienced" (Marton & Pang, 2008, p. 536). The main findings of the studies by Authors will be briefly described below, since they have a crucial role in the research described in this paper.

The study on the student teachers' conceptions of health education (Paakkair, Tynjälä, & Kannas, 2010a) produced five hierarchically-ordered categories describing health education as (1) a context for disseminating formal or theoretical knowledge, (2) a channel for providing pupils with practical knowledge and skills to help them make health-related choices, (3) a means to promote pupils' self-regulative knowledge and independent thinking, (4) a context for personal growth, and (5) a means for developing responsible behavior in society. The first two categories, that is the less complex categories, mainly concentrate on facts and skills. Thus, the prerequisites for a pupil to reach the objective(s) are merely knowledge capital and application skills, with knowledge being seen as something factual and practical, and mainly non-problematic (in other words, as matters to be taken for granted). In contrast, the last three (more complex) categories relate to objectives that are bound up with the problematic nature of knowledge. Knowledge in these cases emerged as evaluative, personal, tacit, and relational. Moreover, the prerequisites have here broadened out to cover independent thinking skills. In these categories we also find aspects such as respect for and recognition of others, and a sense of responsibility.

Later, Paakkari *et al.* (2010b) published a paper, which described health education student teachers' conceptions on *teaching* the subject. The teaching conceptions could be grouped into five qualitatively distinct categories, moving from less complex conceptions towards more complex conceptions: teaching as (1) transferring knowledge and skills, (2) supporting the active processing of knowledge, (3) supporting the transformation of conceptions, (4) supporting holistic human growth, and (5) building a learning community with the students. The first two categories can be described as more or less content/teacher-centered and as focusing on the non-problematic nature of knowledge. By contrast, the last three categories focus first on pupils and later on the class as a learning community, both of which deal with problematic knowledge.

The conceptions of learning held by health education student teachers were reported only recently (Paakkari, Tynjälä, Villberg, & Kannas, 2011). Six different-but-related categories were formulated: learning as (1) the reproduction of acquired health knowledge, (2) the application of health knowledge, (3) the developing of personal meanings concerning health matters, (4) the transformation of individual thinking, (5) personal growth, and (6) collective meaning-making. The first two categories focus more or less on handling non-problematic or non-complex knowledge, and here the role of reflection is not regarded as essential. The categories from 3 to 6, however,

focus on problematic or complex knowledge and reflection, which, in a variety of forms, occupies a central place in learning.

1.3   Research questions

The main purpose of the present study was to examine the development and parallel of student teachers' conceptions concerning the school subject of health education, along with its teaching and learning, during teacher training and after the initial years of working experience. Considered in more detail, the following research questions were addressed:

1. How do conceptions develop (i) during health education teacher training and (ii) after gaining some teaching experience as a health education teacher in a school?
2. How are the ways of experiencing the *subject*, its *teaching*, and its *learning* aligned with each other?

On the basis of the previous studies, we set up two hypotheses as follows: (1) Conceptions will develop or become more complex and advanced as student teachers proceed in their studies and gain some work experience; (2) The conceptions or ways of experiencing the three target phenomena (the subject, the teaching, and the learning) will be aligned initially, and will advance in parallel with each other.

2 METHODOLOGY

2.1 The sample

This paper is part of a larger study on health education student teachers' conceptions of health education as a school subject, its teaching, and its learning. The sample consisted of 20 (9 females, 11 males) physical education student teachers who were specializing in health education. The study took place at the Faculty of Sport and Health Sciences at the University of Jyväskylä, Finland.

Health education teacher training consists of both basic studies (25 ECTS, European Credit Transfer and Accumulation System) and intermediate studies (35 ECTS). This study focused on students studying their intermediate studies. Thus, when the research began, all the students who took part to the research had already had some experience of studying health education. At that time basic studies covered themes such as the life course of children and young people, health education ideology and ethos, health education content knowledge, and pedagogical content knowledge. In addition, the intermediate level teacher training consisted of courses covering mainly the following areas: health education content knowledge (health topics, central concepts), pedagogical content knowledge, ethical thinking skills, the teacher as researcher, and the school as a context for health promotion.

2.2 Data collection

Data (essays and semi-structured interviews) were collected three times: at the start of the intermediate level studies in teacher training in autumn 2004 (T1), at the end of these studies in spring 2005 (T2), and after some 1–3 years of experience of working as a health education teacher in a school during the years 2008–2010 (T3). All 20 students participated in the T1 and T2 data collection, but at the T3 data collection, only 11 teachers (former students) either fulfilled the

criterion for selection (some 1–3 years of working experience as a health education teacher in a school) or could be reached. Altogether the data collection produced 51 interviews and 51 essays. The same researchers conducted all the interviews.

At each of points T1, T2, and T3, as a first task, the participants wrote an essay on the topic If a teacher other than a teacher in health education were to ask you to describe health education as a school subject, how would you describe the subject itself, its learning and its teaching? The participants were able to write the essay at their home. The length of the essays varied from half a page to three pages. The essays were read carefully before the subsequent interviews, so that the interviewer could ask for clarifications if need be.

The T1 and T2 interviews were conducted at the Faculty of Sport and Health Sciences. The T3 interview was arranged for any location where the participants felt comfortable about having a discussion The interviews lasted about 70 minutes on average. The participants were asked, for example, to describe health education as a subject (in general) together with its teaching and learning, and also how the teaching and learning in health education differed from the teaching and learning in other school subjectsThe interviews were tape-recorded and transcribed verbatim.

2.3   Data analysis

The research reported here is a continuation of previously reported papers (Authors, 2010a; Authors, 2010b; Authors, 2011), which aimed at identifying and describing student teachers' pedagogical conceptions, namely (1) the subject of health education, (2) its teaching, and (3) its learning. All the studies used phenomenographic research techniques in analyzing the data (Marton & Pong, 2005; Åkerlind, 2005). In this research, the three outcome spaces – i.e. sets of descriptive categories which encompass qualitatively different aspects of the target phenomena and the relationships between these aspects (Marton & Booth, 1997, p. 125) – function as frameworks and baselines, making it possible to study how the student teachers' understanding of the target phenomena develops (1) during their intermediate level studies in a health education teacher training program, and (2) after a period of work as a health education teacher in a school. The baseline data consisted of all the essays and interviews collected during the teacher training program.

We first of all examined *how the conceptions of health education and its teaching and learning developed* during the research period. The analysis proceeded through following steps:

1. **Qualitative comparison of the T3 data against the baseline data (T1, T2)**
   We looked at the T3 data (11 essays and 11 interviews), to see whether it brought new insights to the descriptive categories that were

formulated from the data collected during the intermediate studies (T1 and T2). The T3 data analysis could be described as a qualitative comparison of the new data with the findings previously reported (Authors, 2010a, 2010b, 2011). In reading and analyzing the T3 data, we took into consideration the possibility that if necessary, the existing categories (and the analytic frameworks they represented) might have to be revised.

2. **Allocation of the participants into their highest level expressions within interviews and essays**
   The study about the development of the conceptions required that the students were allocated to what were judged to be their highest level of understanding (Bradbeer, Healey, & Kneale, 2004; Marton *et al.*, 1993; Wood 2000This seemed the most reasonable way to proceed: after all, since we are interested in the students' abilities to become more aware of the subject, its teaching, and its learning, we should evaluate the development in thinking against the highest conceptions expressed. The highest conception expressed by each participant was identified, looking at both the essays and the interviews, since we could not be certain if two different data collection methods produced similar results. Further analysis was using interviews as the sole data to simplify the analysis process. However, the decision was confirmed with testing the significance of the differences between the conceptions expressed in the essays and in the interviews using Friedman's test and the Wilcoxon Matched-Pairs Signed Ranks Test.

3. **Recategorization of the findings into three man categories**
   Due to small sample size and the use of statistical tests in detecting the changes within three points in time the data was regategorized. We looked to see whether the three sets of categories indentified in the earlier papers (Authors, 2010a, 2010b, 2011) for the three target phenomena (subject, teaching, learning) were similar enough in their content. Hence we carefully read the critical aspects, highlighting the main differences between the categories within and between the three target phenomena, and tried to group together, connect, and recategorize the original categories.

Since we were able to find enough similarities between certain groups of categories, the original categorization was modified in such a way as to form three larger and more inclusive categories (Table 1). Category 1 could be characterized as the *facts and skills approach* to health education, since it combines categories focusing on enhancing pupils' factual knowledge capital and health-related skills, and focuses on handling non-problematic/non-complex knowledge. Category 2 focuses on supporting pupils' meaning-making processes through critical and reflective thinking. This category

assumes that the knowledge that is handled during the lessons is problematic or complex. It could be called as the independent thinking *approach* to health education. Category 3, for its part, moves beyond the individual focus: now the emphasis is on growing *in relation to* and *with* others through ethical and collective reflection, and on enhancing citizenship skills. Thus, this category could be characterized broadly as the *personal growth and responsibility approach* to health education.

Table 1. Results from the recategorization of the categories formed in previous studies (Paakkari et al. 2010a, b, 2011): approaches within health education

CATEGORY 1 Facts and skills approach	CATEGORY 2 Individual thinking approach	CATEGORY 3 Personal growth and responsibility approach
Characteristics		
Focuses on enhancing: factual knowledge practical knowledge	Focuses on promoting: reflective thinking meaning making self-awareness transformation of thinking	Focuses on facilitating: personal growth enhancement of citizenship skills
Knowledge seen as non-problematic	Knowledge seen as problematic	Knowledge seen as problematic
No reflection supported	Reflection (descriptive, critical) supported	Reflection (ethical, collective) supported
Conceptions of the subject		
Health education as a context for delivering theretical knowledge	Health education as a means to promote pupils' self-regulative knowledge and independent thinking	Health education as a context for personal growth
Health education as a channle for providing pupils with practical knowledge and skills to contribute to pupils' health related choices		Health education as a means for developing responsible behaviour in society
Conceptions of teaching		
Transferring knowledge and skills	Supporting transformation for conceptions	Supporting holistic personal growth
Supporting active processing of knowledge		Building a learning community with the pupils
Conceptions of learning		
Reproduction of acquired health knowledge	Developing personal meanings	Personal growth
Application of health knowledge	Transformation of individual thinking	Collective meaning making

4. **Inferential and descriptive statistics used to measure the development of the conceptions**

   To test *Hypothesis 1* concerning the development of the categories, we used Friedman's test plus examination of the relative proportions.

We then examined the ways in which such conceptions may or may not run in parallel with each other. *The examination of the alignment of the conceptions* was based the recategorization developed earlier (see Table 1). Again, Friedman's test was used to test Hypothesis 2 concerning the alignment of the conceptions,

in other words to detect differences relating to conceptions of the subject, its teaching, and its learning. In addition, in line with Tsai's (2002) method, we calculated relative proportions according to which the alignment of the conceptions could be regarded as (1) *nested* (all three conceptions parallel), *related* (only two of the conceptions parallel), or *divergent* (none of the conceptions parallel).

2.4 Findings

2.4.1 Differences between the conceptions expressed in the essays and in the interviews

Friedman's test was used to measure the difference in the phenomenographic classifications between the essay data and the interview data. The analysis was conducted using the original (non-recategorized) categorization. It was found that the mean values for the categories describing the teaching and learning conceptions were higher for the interviews than for the essays; in other words, the respondents expressed higher-level conceptions in the interviews than in their written essays (Table 2). Since the Wilcoxon Matched-Pairs Signed Ranks Test confirmed the results, it confirmed our decision to focus purely on the *interviews* when conducting the further analyses.

Table 2. Mean values for the highest-level conceptions expressed in the essays and in the interviews at times T1, T2, T3, for the subject, the teaching, and the learning.

| | T1 | | | T2 | | | T3 | | |
	I	E		I	E		I	E	
Subject	3.95	3.00	p= .077	3.75	3.65	p= .754	4.45	3.36	p= .063
Teaching	3.65	2.50	P= .001**	3.50	3.15	p= .267	3.90	3.00	p= .039*
Learning	4.15	2.60	p= .003**	4.15	3.25	p= .002**	4.27	3.73	p= .219

I = Interview   E = Essay

Note: There were *five* original categories describing the conceptions of the subject and the teaching, but *six* original categories describing the learning conceptions.

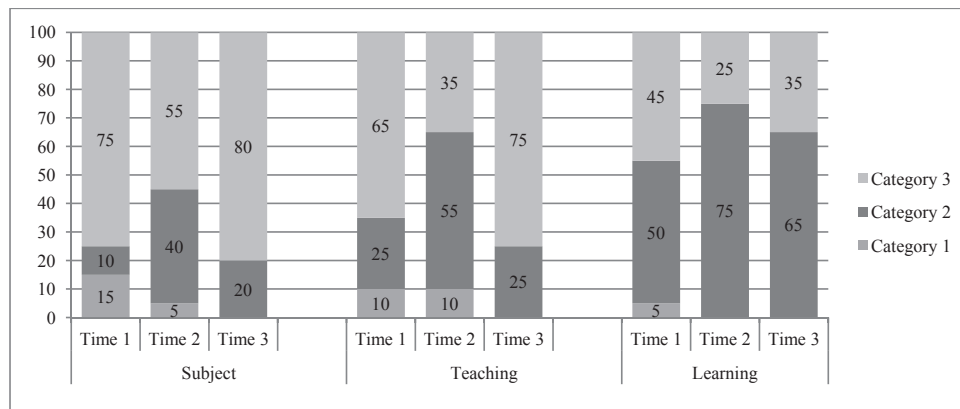### 2.4.2 The development of the conceptions

Qualitative analysis of the data did not show any major changes over time in the sets of categories that had been formulated from the T1 and T2 data. Nor did Friedman's test detect any statistically significant changes across times T1,

T2, and T3, at least in relation to student teachers' conceptions of the *subject* and the *learning* of health education. Overall, we can say that Hypothesis 1 was not confirmed, since the conceptions with regard to the subject and the learning did not develop in a more sophisticated or advanced direction during intermediate-level teacher education or the early years of work as a teacher.

Nevertheless, when we examined the student teachers' understanding of the *teaching* of health education, Friedman's test revealed a statistically significant change over times T1, T2, and T3 (p = .003). Closer examination detected a statistically significant change between Time 2 and Time 3 (p = .008), but not between Time 1 and Time 2 (p = .109) or between Time 1 and Time 3 (p = .687). Thus, our hypothesis – that the conceptions will become more complex over time – was confirmed with respect to a change between the end of the teacher training and a point in the early years of work, but not between other times.

Table 3 shows the differing proportions of the categories (corresponding to each individual's highest level conceptions) at each of the three points in time. First of all, it can be seen that the proportion of Category 3 (personal growth and responsibility approach to health education, highest in the hierarchy) for each of the target phenomena is highest at the beginning of the teacher training and after gaining work experience, but that it actually *decreases* during the teacher training phase. Secondly, Category 2 (independent thinking approach to health education) is the dominant category at the end of the teacher training, with respect to each of the target phenomena. Thirdly, after gaining some work experience, Category 1 (facts and skills approach to health education, lowest in the hierarchy) disappears.

Table 3. Relative proportions (as percentages) of category levels expressed (based on the highest-level conceptions expressed by each participant) at times T1, T2, and T3, in respect of the subject, the teaching, and the learning.

2.4.3 The alignment of the conceptions

We examined the differing proportions of the Categories (1, 2, or 3) to see how far the student teachers' conceptions were nested, related or divergent. We found that at each data collection point, half or more than half of the participants (T1: 55 %, T2: 50 %, T3: 54 %) expressed conceptions that were "related" – i.e. with only two of the target phenomena conceptions emerging as parallel with each other; conversely, less that half of the participants expressed conceptions that were totally aligned (Table 5). In addition, at T1 and T2, the most common conception system/pair to be aligned was student teachers' understanding of the subject and its teaching.

Table 4 The proportion of nested, related and divergent conceptions at time points T1, T2, and T3

	T1		T2		T3	
	n	%	n	%	n	%
Nested	8	40	9	45	5	46
Related					6	
Subject ↔ Teaching	7	35	5	25	2	18
Subject ↔ Learning	1	5	2	10	2	18
Teaching ↔ Learning	3	15	3	15	2	18
Divergent	1	5	1	5		
Total	20	100	20	100	11	100

Despite these apparent discrepancies, Friedman's test did not reveal any statistically significant differences across the conceptions for the subject, its teaching, and its learning at T1 (p = .500), T2 (p = .193), or T3 (p = .058). Hence these results do not overturn the view that the conceptions are likely to be parallel with each other at each of the data collection times. This being so, it can be said that results are in line with the hypothesis that the conceptions will be aligned initially, and will tend to advance in parallel with each other (Hypothesis 2).

3 DISCUSSION

This paper had two hypotheses. First of all, that student teachers' conceptions of the subject health education and its teaching and learning would develop or expand during their health education teacher training and in the early years of work as teachers, and secondly, that these conceptions would be aligned initially and would advance in parallel with each other.

The findings on the extent to which conceptions changed during teacher training and after a period of work as teachers suggest that health education student teachers' conceptions of the subject and its learning did *not* develop over time, but that the conceptions of teaching *did* show some development. One could conclude that the first hypothesis was not confirmed as a whole, even if there was some support for it with regard to the teaching conceptions. However, as has been highlighted previously (Meirink, Meijer, Verloop, & Bergen, 2009), the baseline for comparisons has to be the initial conceptions, that is, the conceptions that the participants express at the start of the research. In the case of our health education students, the conceptions were already at a fairly high level at time T1 (cf. Boulton-Lewis *et al.* 2001a), so it is perhaps not so surprising that the statistical tests did not reveal major changes in conceptions over time Our findings may at least partly be explained by the fact that the students had already studied basic level studies in health education at the time of the first data collection, and were embarking on (at least) their second year studies. In addition, health education as a school subject allows pupils to have various interpretations of topics and gives strong support to pupils' own meaning-making processes, and this may positively influence students' ability to express higher level conceptions (see Boulton-Lewis *et al.*, 2001a).

The differing proportions of the conceptions (Table 3) appeared to indicate that after intermediate-level studies in health education teacher training, there were actually *fewer* students who could express the aspects related to the most complex conceptions corresponding to personal growth and responsibility approach within each of the target phenomena. It appeared that subsequently, work experience supported the emerging awareness of aspects corresponding

to these highest-level conceptions. This raises the question of what happened during teacher training that did *not* support student teachers' ability to express the most complex conceptions to the same extent as at the beginning of their intermediate level studies. After all, the aim of the education is to support the "widening of horizons," in other words, to expand conceptions in a more sophisticated direction (Bardbeer *et al.* 2004). As van Rossum and Hamer (2010, p. 554) put it, "If conceptions are like lenses, through which we view reality [here they refer to Pratt, 1992] would classes with weak prescription lenses not prevent us from seeing clearly?" The question is important, since some of the student teachers still held on to the least complex conceptions (the facts and skills approach of health education) at the end of their teacher training, that is, at a time when they could be regarded as qualified health education teachers. Wood (2000) obtained similar findings, and reflected that a lack of more advanced understanding of teaching may cause difficulties when "an expert understanding is required" (p. 91). One probable explanation for the lack of development in conceptions may be in the way the teacher education program succeeded in taking into account students' prevailing conceptions during the teaching. This is worth considering more thoroughly when one is developing a health education teacher training program: in a study by Wood (2000), when student teachers' understanding of teaching was assessed at the beginning of a teacher education program, and when that assessment was used as a tool to support the development of their understanding *throughout* their studies, the procedure produced good learning outcomes.

The statistically significant change in the teaching conceptions after a period of work as a teacher was a positive finding. In a positive sense, we may consider that the teacher training could have equipped newly graduated students with the skill of critical reflection, and that this served as a necessary tool for the participants to ponder on their experiences later, when they were working in schools. However, it could equally be that it was the teaching experiences in "real" schools (note: there was no practicum in health education teacher training during T1 and T2, but now it has been included as part of the program) that functioned as necessary material for reflection on conceptions, which confirms the importance of practicum during teacher training. This is an important message for the developers of and educators in health education teacher training who constantly are challenged to think the true meaning of the practicum at the time of tight economic situations at the universities in Finland.

The statistical results support the view that the participants' conceptions of the subject, and especially of its teaching and learning tend to be aligned with each other. Hence our second hypothesis was broadly supported (see Boulton-Lewis *et al.*, 2001b; Koballa *et al.* 2000). This finding suggests that student teachers have a fairly coherent or holistic picture of health education with regard to the subject, its teaching and its learning, though however half of the students did not show nested (alignment of the conceptions between all the three phenomena) conceptions. Moreover, the findings showed that during the research period there were more students being able to show understanding

about personal growth and responsibility approach in the context of pondering about the subject or its teaching than its learning. This means that while it is easier to consider learning objectives and the kind of teaching they call for, there seems to be more difficult to consider the kind of learning that this might produce. If teachers are not able to discern the aspects matching learning in personal growth and personality approach, it is likely that they are not able to truly support or to assess the development of that kind of learning either. These findings lets us suggest that greater emphasis should be placed on supporting a coherent and sophisticated understanding of pedagogical conceptions, since such an understanding can be assumed to serve as a firm base for the development of teaching practices.

One interesting and unexpected finding emerged: the respondents expressed more complex conceptions in their interviews than in their essays. This is an important finding from the methodological perspective. In phenomenographic research, the open or semi-structured individual interview is the dominant data collection method, its purpose being to help the interviewee to reflect on issues that are often implicit (Marton, 1994; Marton & Booth, 1997). Moreover, by means of the interview, the researcher can help the interviewee to maintain the focus, and can elaborate the questions from different angles by asking alternative questions (see Marton & Booth, 1997, p. 130). Short pieces of writing, on the other hand, as Bardbeer *et al.* (2004) have argued, give little opportunity to develop or elaborate on conceptions and statements that might prompt an interviewer to ask for clarification. In addition, since the participants may write very little, the researcher has to be careful in deciding whether the conceptions fall into one category rather than another (Bradbeer *et al.*, 2004) – a problem which we also recognized. Thus, our finding seems to support the dominant role of interviews as a phenomenographic data collection method, at least in preference to written essays. Indeed, the finding would appear to raise questions about the role of essays as a phenomenographic data collection method, especially in a case where the aim of the study is to examine the development of conceptions at the individual level. After all, in that context it is important that the method should be such as to reflect the participants' most complex understanding at a given time. Note, however, that the study does not show the extent to which the very process of writing the essays might have helped participants to express the conceptions that emerged during the interviews.

Nevertheless, before putting forward any further arguments about written essays as a phenomenographic data collection method, in future we should consider thoroughly (1) the context in which the essays are written, (2) the purpose for which they are written (e.g. whether they form part of the university studies and may be graded – a factor which might motivate the participants to ponder the target phenomena as deeply as possible), (3) the participants' level of expertise in writing (e.g. language students' writing skills may be better that those of physical education students) , and (4) the order of the interviews and essays (e.g. whether the findings could be different if the

essays were collected after the interviews – something that is not an option if the essay is the only data collection method).

The study has certain limitations in that it examines the change in thinking or in awareness only as a categorical shift. We do not know how far the student teachers were able to discern *more* aspects or to build *more or better links* between the aspects of the single category to which she or he was initially allocated (see Cope & Prosser, 2005). Such favorable aspects might have been present despite a failure to show the kind of expansion of the awareness that would have led to allocation to another category. In other words, we could not detect a greater or smaller increase in the breadth of understanding *within* a given category; hence we were not able to fully follow the kind of phenomenographic perspective on conceptual development that would recognize development in the form of an *expansion* of awareness and not merely in the form of replacement of one conception by another (cf. Åkerlind, 2008).

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