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Author(s): Kurunsaari, Merja; Piirainen, Arja; Tynjälä, Päivi

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ABSTRACT

Skills have recently received widespread attention in education policy documents and discussions. This article reports the results of research on Bachelor's degree physiotherapy students' conceptions of skill at the beginning of their studies. The aim of the present study was to examine how beginning students understand skill, and the focus was on conceptions of skill in general rather than on any particular skills. The participants of the study were 35 physiotherapy students. The data were gathered within the first two weeks of their university studies. Specifically requested essays written by the students were analyzed using the phenomenographic approach. The data-driven analysis yielded four descriptive categories which reflect the students' conceptions of skill: 1) *Talents*; 2) *Skills requiring individual practice*; 3) *Skills requiring social practice*; and 4) *Competence requiring collaboration*. The categories form a hierarchy. The differences between the categories are described along seven themes of variation. The themes were named: *Acquisition, Emotions, Motivation, Reflection, Evaluation, Agency, and Social Environment*. This hierarchical system of categories sheds new light on students' understanding of skill. The findings can be used as a basis for planning physiotherapy curricula, especially for designing skills education and training, and for supporting students along their educational path, especially in offering opportunities for students to reflect on their skill conceptions. Ultimately, physiotherapy students' awareness of different skill conceptions and developing their skills to best advise and treat their patients will benefit the patients.

Keywords: skill, competence, conceptions of skill, physiotherapy student, phenomenography

INTRODUCTION

Skills have recently received widespread attention in education policy documents and discussions. The OECD has recently conducted a feasibility study for measuring higher education learning outcomes, covering both domain-specific and generic skills (see, AHELO, 2013). According to the World Confederation of Physical Therapy (WCPT, 2011), the main focus of physiotherapy is “human movement and function.” Therefore, physiotherapy is a profession in which practical skills are highly valued. Field-specific recommendations and skill descriptions are issued in position papers, such as benchmark statements by the WCPT (2011), the European Region of the World Confederation for Physical Therapy (2008), and the European Network of Physiotherapy in Higher Education (2010). These documents consist of criteria and guidelines regarding the body of knowledge on physiotherapy and the core skills and competencies required by a qualified physiotherapist. It is stated that physiotherapists need to be able to communicate effectively with patients and other professionals in addition to assessing the functional capacity in patients and making treatments plan to deliver effective physiotherapy interventions (European Region of World Confederation for Physical Therapy, 2008, 2013). The European Commission has launched the European Qualifications Framework (EQF), specifying skill, knowledge and competences at different educational levels; and, on the basis of this framework, national qualification profiles have been developed in many countries (EQF, 2008).

Despite the wide interest in the development of physiotherapy skills, less attention has been paid to how “skill” itself is understood in education. In general, and in the context of physiotherapy in particular, there is a clear need to study and critically evaluate skills and how skills are understood. This is important for two reasons. First, the learning of skills is central in physiotherapy practice, but it has been studied mainly in the context of motor control (Carr and Shepherd, 1987; Schmidt, 1991). Second, we lack information on how physiotherapy students and teachers interpret the concept of “skill” and what they think about the learning of skills. This kind of knowledge would have important implications for educational and pedagogical planning and practices in the field of physiotherapy. Thus, the purpose of the present study was to examine physiotherapy students’ conceptions of

skill. Our study focused on conceptions of skill in general, not on any specific skills needed in the field of physiotherapy. We particularly interested in the first year students' conceptions at the very beginning of their studies.

How skill has been conceptualized

The concept of “skill” is broad and fairly undefined. It is a widely used word in daily conversation, but attempts to define it are challenging (e.g., Vallas, 1990). WHO has defined life skills as a group of interpersonal skills, cognitive skills, social skills and psychosocial competencies, that determine the ability to understand and use information in order to maintain good health (Bornman, 2004; WHO, 2003; WHO, 2013; WHO Regional Office for Europe, 2013). Life skills, according to Gronin (1996), include such daily living skills that are needed in personal self-care and in interaction with others. Terms such as skills, knowledge and competence have been used in different ways and there is an ongoing discussion as to how to best develop skills to a professional level (see Brockmann, Clarke, and Winch, 2008; Clarke, Winch, and Brockmann, 2013). In the field of physiotherapy, the WCPT (2013, 13) has defined physiotherapy skills as the ability to use field-specific knowledge and solve problems. In a similar vein, in the context of the European Qualification Framework (2008), skills are described as being “cognitive and practical.” In everyday usage, the term “skill” is often used to describe something opposite to knowledge, or as something that completes knowledge, that is, as the application of knowledge into practice. From the scientific point of view, this kind of conception of skill is narrow.

In the scientific context, the concept of skill can be seen from three points of view, depending on traditions, that is, as *an ontological approach*, *an epistemological question*, or *a competence viewpoint*. The *ontological* perspective represents beliefs about the nature of human beings and human's relation to the world they experience (Lakoff and Johnson, 1999; Lakoff, 2012; Schlimm, 2013), the *epistemological* viewpoint examines the concept of skill in relation to the concept of knowledge (e.g., Anderson, 1983; Bereiter, 2002), and the *competence* orientation is a pragmatic approach to knowledge and skill and

examines skills as part of a system of qualifications acquired through education and training (EQF, 2008).

One example of the *ontological* perspective is the approach where skills are not treated as separate entities based on the distinction of body and mind, but are understood as an integral part of a consistent whole (Lakoff and Johnson, 1999; Lakoff, 2012; Schlimm, 2013). The practical *competence* orientation is represented in The European Qualification Framework (EQF, 2008), which defines skills, knowledge and competences on different education levels. In the *epistemological* tradition, the theoretical foundation of skill relates to expert knowledge. In the present study, our interest was mainly focused on the epistemological approach and we subsequently examined the components of expert knowledge in greater detail, as follows.

The forms of knowledge are traditionally divided into two basic categories: *declarative knowledge* and *procedural knowledge* (Anderson, 1983). The former can also be described as “know-that” and the latter as “know-how.” In this traditional dichotomy, “skill” belonged to the latter category. Often, a third component has been added to describe *metacognitive knowledge* (e.g., Bereiter, 2002; Eraut, 2004; Le Maistre and Parè, 2006), which is related to knowledge about one’s own knowing and thinking, or *strategic knowledge* (e.g., Eraut, 2004; Tynjälä, 2009), which refers to knowledge about the context and task at hand. Furthermore, some studies speak about *dispositional knowledge* (e.g., Billett, 2011), referring to “know-for,” that is, knowledge comprising values, attitudes, interests and beliefs.

Tynjälä (2009; see also Tynjälä and Gijbels, 2012) has summarized several accounts about expert knowledge (e.g., Anderson, 1983; Bereiter, 2002; Eraut, 2004) and presented a model including four basic components of professional expertise: 1) *Conceptual or theoretical knowledge*; 2) *Experiential or practical knowledge*; 3) *Self-regulative knowledge*; and 4) *Socio-cultural knowledge*. Conceptual knowledge includes declarative knowledge that is factual or theoretical in nature. This kind of knowledge is explicit and can therefore be learned from books, journals, lectures, discussions and so on. The second component of expertise, experiential or practical knowledge, finds its expression in skills and psychomotor knowledge, and is acquired mainly through practical experience. This procedural knowledge is often tacit and difficult, but not impossible, to express explicitly.)

(e.g., Bereiter, 2002; Eraut, 2004) For example, when a person learns psychomotor skills through bodily adaptation, this takes place mostly in a subcognitive way (see Bereiter, 2002, 144–145; Lakoff and Johnson, 1999; Lakoff, 2012). Practical or procedural knowledge can also be obtained in more explicit ways, for example, by reading a manual. The third element of expertise, regulative knowledge, consists of strategic and metacognitive skills and knowledge, and can be either implicit or explicit. Individuals use metacognition and self-regulative skills to evaluate their own activities and actions.

The three basic types of knowledge described above (conceptual, experiential and self-regulative) represent personal, individual knowledge (Bereiter, 2002; Eraut, 2004; Tynjälä, 2009), while the fourth component of expertise is comprised of socio-cultural knowledge. This form of knowledge is embedded in the practices and environments of social communities and can be experienced only through participation in these communities and by using the devices and tools that they provide (Bereiter, 2002, 158–159; Eraut, 2004, 215; Tynjälä, 2009; Wenger, 1999).

Tynjälä and Gijbels (2012) emphasize that although these four basic elements of expertise can be discerned analytically, they are far from separate entities, being tightly integrated into a whole. In this view, knowledge and skills cannot be separated from each other in professional competence but are deeply interrelated and integrated.

In the field of physiotherapy, interest in the *ontological* approach has been widening in recent years and more evidence has been presented regarding the multidimensional and complex nature of physiotherapy (Lindquist, Engardt, and Richardson, 2010; Skjearven, Kristoffersen, and Gard, 2008; Wikström-Grotell and Eriksson, 2012). This change of focus can be described as a paradigm shift as the ontology of physiotherapy described in earlier studies was mainly based on the traditional biomedical approach (e.g., Lindqvist et al., 2006). Increasingly, researchers and practitioners have also begun to pay attention to the *competence* perspective, in other words, how physiotherapy students acquire generic and professional skills for qualification. These studies have focused, for example, on interprofessional skills (e.g., Hallin, Kiessling, Waldner, and Henriksson, 2009; Rodger, Mickan, Marinac, and Woodyatt, 2005), clinical reasoning skills, and manual skills (e.g., Hendrick, Bond, Duncan, and Hale, 2009; Phillips, Barnard, Mullee, and Hurley, 2009).)

While the ontological and competence approaches have gained ground in physiotherapy research, less research has been conducted from the epistemological perspective. Especially research focusing on expertise in the field of physiotherapy is narrow (Boekhout, van Gog, van de Wiel, Gerards-Last, and Geraets, 2010; Piirainen and Viitanen, 2010). Some studies have focused on how physiotherapy students acquire regulative knowledge, such as reflective and critical thinking skills, in practice (e.g., Bartlett and Cox, 2002; Clouder and Toms, 2008; Cole and Wessel, 2008; Donaghy and Morss, 2007; Roche and Coote, 2008), whereas only Le Maistre and Paré (2006, 107) have attempted to present a holistic model of expert knowledge in the field of physiotherapy. They interviewed final year students, as well as freshly graduated newcomers in their first two years at work and their experienced colleagues in four professions, including physiotherapy. Based on their findings, they presented a typology of professional identity divided into two main components: professional knowledge and personal knowledge. The first main category, *professional knowledge*, is comprised of content knowledge, procedural knowledge and knowledge about the profession, including knowledge on the organization, such as geographical, cultural and political information. Procedural knowledge includes skills, practical knowledge and tacit knowledge, and finds its expression in the implementing of different procedures, in knowledge about clients, and in psychomotor knowledge, relating to touch and tone of voice in physiotherapy. The second main category, *personal knowledge*, involves knowledge of oneself as a learner and worker, as well as metacognition, seen to include self-knowledge and self-assessment - it resembles *regulative knowledge* in Bereiter's (2002) classification.

While the studies just mentioned offer some insights into the nature of expert knowledge in physiotherapy, less is known about physiotherapy students' conceptions regarding skills and knowledge. To the best of our knowledge, research on students' conceptions of skills has not been conducted previously. For example, searches of the Cinahl, Eric, Pedro, Philosopher's Index, PsychInfo and PubMed databases covering 2000 to 2010 (October 2–5, 2011) show that there is a lack of literature on physiotherapy students' conceptions of skill. Therefore we tackled this topic in the present study, and especially focused on the first year physiotherapy students' conceptions at the very first weeks of their studies.)

AIM

The aim of this study was to examine first year physiotherapy students' conceptions of skill at the beginning of their studies. The following research question was addressed: What kind of conceptions of skill do beginning physiotherapy students have?

METHODS

This study was conducted using a phenomenographic research approach. A data-driven analytic approach was used, meaning all findings emerged from the data (see, Marton and Pong, 2005; Åkerlind, 2005). Phenomenography can be used as a methodological tool to investigate individuals' conceptions of different things (Bowden, 2005; Green, 2005; Marton, 1981, 1995; Marton and Booth, 2009). Previous phenomenographic studies have focused, for example, on students' and professionals' conceptions of learning (Boll and Rosenqvist, 2011; Lam and Tsui, 2013; Larsson and Gard, 2006; Paakkari, Tynjälä, and Kannas, 2010a, 2010b; Skøien, Vågstøl, and Raaheim, 2009; Åkerlind, 2008). Overall, phenomenographic research has proved to be a systematic and fruitful research approach and can be seen as a suitable methodology for examining physiotherapy students' conceptions of skill.

As a research method, phenomenography differs from phenomenology. According to Marton (1981) and Marton and Pong (2005), the difference between phenomenography and phenomenology is related to the fact that any phenomenon can be interpreted and described from two perspectives. In phenomenology, a *first-order perspective* is taken, describing the essence of the phenomenon itself. In phenomenography, on the other hand, the focus is on individuals' conception of the phenomenon rather than on the phenomenon itself. This is referred to as the *second-order perspective*. In phenomenographic studies, data on individuals' conceptions are usually collected with interviews and questionnaires (e.g., Larsson and Gard, 2006; Paakkari, Tynjälä, and Kannas, 2010a, 2011b; Åkerlind, 2008).

In phenomenographic studies, the participants' conceptions are presented in descriptive categories, often referred to as "categories of description" that illustrate the *variation* in how the participants understand the phenomenon in question (Uljens, 1996; Marton and Pong, 2005; Åkerlind, 2005a). The assumption is that the categories are hierarchical in nature. In other words, categories or conceptions lower in the hierarchy can be seen as less complex or less developed than the conceptions higher in the hierarchy (Marton and Pong, 2005; Åkerlind, 2008). Another assumption is that although the categories are derived from individuals' in interviews or questionnaires, they do not directly represent different types of individuals. Rather, the categories describe the participants' conceptions on a collective level, that is, they represent collective human experience (Marton and Booth, 2009, 128; Paakkari 2012, 45). The variation in the participants' conceptions is considered to be so broad that even if an individual's conception were to have changed from one time to another, the categories' general representative proportion would remain nearly unaffected (Uljens 1989, 42; Marton and Booth, 2009, 128).

Participants

The participants in our study were Bachelor's degree physiotherapy students at a Finnish university of applied sciences, who started their studies in 2009 (for more information about the European higher education system and qualification structure, see EQF, 2008). The university granted the permission for the implementation of the study. The first author met all first year students (N=40) at the very beginning of their physiotherapy studies, that is, on their second day, she described the study and invited students to participate in the research. A letter providing details about the study was handed out to students and 35 of them confirmed their willingness to participate in the study by giving their signed consent. Participation was voluntary and participants were free to withdraw from the study at any time. Confidentiality was guaranteed in the informational consent document attached to the *Background Information* questionnaire. Anonymity and strict confidentiality have been maintained throughout the reporting of the findings (see e.g., Patton, 2002; Silverman, 2011).)

Of the 35 participants 9 were men and 26 were women, and they were between 19–35 years old. Everyone had passed the matriculation examination in upper secondary school. None of the participants had undertaken any previous studies in the field of physiotherapy, and having clinical experience before the start of the Bachelor's degree program was not a requirement. Six had already gained a higher education degree or a vocational degree earlier on, and three had dropped out of their earlier higher education studies. The majority of the participants had gained some kind of work experience before starting their university studies, mainly in the form of summer jobs or a profession—but none of the participants had worked in the field of physiotherapy before. Eight of the participants, however, had gained work experience in fields related to physiotherapy, such as having worked as an assistant nurse, massage therapist or rehabilitation assistant.

Data collection

In most phenomenographic studies, the data on students' conceptions are collected in interviews. In our study, we decided to explore the feasibility of essay writing to gather data since writing has been proven to be a functional tool for reflection and learning (e.g., Langer and Applebee, 2007; Tynjälä, Mason, and Lonka, 2001), and because reflective writing is used as a learning method in physiotherapy education. Furthermore, in some previous phenomenographic studies, conceptions have been successfully investigated using both interviews and written essays (see e.g., Paakkari, Tynjälä, and Kannas, 2010a, 2010b; Åkerlind, 2008). Åkerlind (2005a, 2008) emphasizes that essays can be a functional expressive medium through which individuals can report about their conceptions (see also Marton and Booth, 2009, 130).

Additionally, essay writing was the fastest way to collect students' conceptions of skill at the beginning of their studies. The research data were gathered immediately within the two first weeks of the participants' physiotherapy studies because our aim was to examine beginning students' conceptions of skill before they had studied physiotherapy. The students were asked to write an essay, 1-2 pages, on the theme: "My skills." The idea was that students' writings on their skills would reflect their general skill conceptions. The)

students were not required to adopt any specific genre but they were encouraged to write freely and in their own words.

The students wrote their essay in Finnish and the quotations that we have selected were translated into English. The first translation was undertaken by the first author and discussed with all the researchers, and finally proofread by a professional.

Analysis

In our analysis, we followed the principles presented in phenomenographic literature (e.g., Uljens, 1996; Marton, 1994; Marton and Pong, 2005; Åkerlind, 2008).

The analysis was carried out by the three authors in two main phases. The first phase focused on identifying and describing the participants' conceptions of skill in the general terms of their overall meanings. First, the essays were read thoroughly several times by the first author in order to get familiar with the contents of the essays and to distinguish different kinds of conceptions. Next, the conceptions expressed in the essays were grouped into meaningful clusters, tentatively, according to their differences and similarities. After that, the first author formed the first draft of qualitatively different categories. Thereafter, all three authors collaborated with one another to modify the categories several times, based on the selected quotations, until the categories were established and named. In the second phase of the analytic process, the relations and hierarchies between the categories were determined by identifying the *themes of variation*, that is, the themes that differentiate the categories. This was also done in collaboration between the three researchers. In this phase, some last modifications to the categories were made. Finally, the descriptions of the categories were developed and agreed on by the three researchers. To sum up, the categories mainly emerged in the first phase of the analysis, whereas the themes of variation emerged during the second phase of the analytic process. However, to a certain extent these two phases of the analysis overlapped.

In the present study, we aimed to outline the variation among physiotherapy students' conceptions of skill. In line with phenomenographic principles (e.g., Marton and Booth, 2009; Marton and Pong, 2005; Åkerlind, 2008), the descriptive categories do not represent

individual students but relate to the variation in the students' conceptions identified in the research data overall. In other words, the categories describe students' conceptions on the collective level (Marton and Booth, 2009, 124–128). In the present study, this means that the set of categories describes all possible skill conceptions in the overall data and that individuals may have expressed more than one conception. The categories are in a structural and logical relationship with each other and form a hierarchical whole (Marton and Booth, 2009, 124–128; Marton and Pong, 2005; Åkerlind, 2008). This means that the categories are nested and inclusive, so that the categories higher in the hierarchy may include categories that also appear lower in the hierarchy, but not vice versa. Due to the hierarchical nature of the categories, some conceptions of skill can be regarded as more complete or complex than others (see Åkerlind, 2005a).

FINDINGS

In this section, we first present four qualitatively different categories describing beginning physiotherapy students' conceptions of skill. Second, we describe each of the descriptive categories and the themes of variation in detail and excerpts from participants' essays considered to be relevant, citing quotations from both women (F) and men (M).

Physiotherapy students' conceptions of skill at the beginning of their university studies can be described with the following categories: 1) *Talents*; 2) *Skills requiring individual practice*; 3) *Skills requiring social practice*; and 4) *Competence requiring collaboration* (Figure 1). The formed categories can be seen to be hierarchically structured, so that the categories at the top of Figure 1 represent a more complex understanding of skill than the categories at the bottom. In addition, the categories II to IV may include aspects from the categories on their left (Table 1) or below them (Figure 1), but not vice versa. The aspects distinguishing the skill categories, the themes of variation, were named: Acquisition, Emotions, Motivation, Reflection, Evaluation, Agency, and Social Environment (Table 1). Each of the four skill categories is described in more detail below. The themes of variation is marked with italics when mentioned first time in each category.

Insert Figure 1 about here

FIGURE 1 The Four Skill Categories Describing Physiotherapy Students' Conceptions of Skill.

Insert Table 1 about here

TABLE 1 Physiotherapy Students' Conceptions of Skill at the Beginning of Their Studies

Category I: Talents

In the first category, skills were seen as talents. The *acquisition* of talents was seen as genetic. Thus, talents were perceived as inborn attributes inherited from one's parents. Related to talents, physiotherapy students expressed their *emotions* as gratefulness for having a talent or disappointment for lacking it since. As talents were regarded as genetic characteristics, the *motivation* in gaining them was not discussed, nor the aspect of *reflection*. One theme of variation was *evaluation*, that is, how students evaluated their skills. In this category, evaluation manifested itself simply in talent recognition. Students were critical in evaluating their own talents; they valued, underestimated or were proud of them. The theme of variation called *agency* refers to individuals' experienced capacity to act in relation to the development of skills. In this category the agency appeared as passive and individual. Learning skills was seen as inherent, requiring no active personal effort. Talents were regarded as constant. They did not change or disappear even over the course of many years. Talents were seen to be inherently individual, which is why the *social environment* for gaining those skills was not discussed and was regarded to be non-significant. The view of skills as talents often emerged in statements describing skills related to music, sports, technical fields, and social life. These points are illustrated by the following quotes (with sources in parentheses following each excerpt):

Skills are in some way inherent gifts. I consider myself to be a skilled listener. (F15)

You either have or do not have an ear for music. (F10)

I feel that I do not have any great and long-lasting expert skill. (F13)

I quit playing piano a long time ago, but not all skills disappear quickly. It is nice to notice that after a break of many years, I can still catch the notes and rhythm. (F9)

If I try to analyze my skills, what first comes to my mind is a division between sports and music. I have tried both and put a lot of my time into both, but for some reason my interest in music died and to this day I do not feel that I have musical skills. I do have a sense of rhythm but I cannot create music myself, so to speak, at least not by playing or singing. (F8)

Category II: Skills requiring individual practice

In the second category, skills were seen as attributes requiring deliberate practice. For the *acquisition* of these skills, in students' view, practice was essential; unlike in the previous category, where the skills were regarded as inherited. The experiences associated with this view were related to different hobbies, jobs, and duties in all areas of life.

In developing dancing skills [...], for example, it is not possible to be able to naturally know all of the small details involved in the different dancing techniques. Rather, you must repeat things many times, so that you learn the dancing techniques. Dancing is a kind of sport, where you learn a skill; you learn to master the meticulous movements only by training hard – there is no fast track. (F10)

As regards *emotions*, the respondents indicated that they are excited about and enjoy learning new skills. Passion, pleasure and pride were the feelings that they expressed when describing their emotions. Sometimes students found it a strain to practice and suffered from stress, but the strains were encouraging, positive stressors, and the emotional charge increased so that they wanted to train more without stopping.

I believe that human beings feel better about themselves and their experiences the more skillful they become at doing things that they enjoy, as pleasure and a feeling of satisfaction often go together with success. When you succeed you know that you can manage the subject or that you are skilled in it. (F27)

As for *motivation*, the responses grouped in category II reflect students who had their own personal goals and were motivated to achieve their targets; unlike in the previous category, where motivation was regarded to be non-significant.

Out of my own interest, I have built my own path toward skillfulness in different things, such as in sports and exercises; I mean, for example, my Karate hobby. (F12)

As regards *reflection*, the participants their own skills, and were able to reflect on their earlier skills and learning experiences in childhood or in primary school, for example. Sometimes students expressed disrespecting their skills, neglecting or abusing their abilities. Unlike in the previous category, where *evaluation* meant talent recognition, in this category, evaluation appeared as a kind of self-evaluation that seemed versatile and even critical.

I am a logical thinker. My spatial ability is good and it is easy for me to assess the whole as a unit [...]. Music partly goes hand in hand with mathematics I mean the sense of rhythm. I think that sport also contributes to one's sense of rhythm; that's why rhythm is the easiest of the musical skills. (F27)

While, in the previous category, putting active personal effort into skill learning was seen to be unnecessary, in this category, active *agency* was emphasized. The person's agency remained on the individual level without the element of the *social environment* being accounted for in the skill development, similar to the first category.

I grew to see how other people experience music, and when I was getting the hang of how differently they understand rhythm, my attitude changed completely. (F10)

Category III: Skills requiring social practice

In the third category, the role of *social environment* appeared as a new aspect in students' conceptions of skills. The skills in this category were seen as requiring social practice, in contrast to categories I and II, where skills were regarded as purely individual characteristic. Students described how they practiced skills through social interaction, and they illustrated experiences of developmental feedback having contributed to the *acquisition* and development of some of their skills. They felt that it helped them to recognize their skills when they received relevant feedback from others and benefitted

from it in developing their skills further. As regards *emotions*, the responding students were in a good mood after being successful in a social activity, and even so if their experiences were strainful and strenuous and their feelings were not really positive. Sometimes they expressed feeling emotions of anger or disappointment when having received negative feedback during practice with others.

My different kinds of hobbies have affected my skills a lot. When I was involved in team sports, I learned a lot about group work and being a team member. (F11)

You don't always have to be arrogant and harsh, but you can give feedback in a constructive and friendly way (like feedback to players as a captain of a sports team). At one point I learned this the hard way because I hadn't given others a turn to speak. (M20)

In this category, the *motivation* for practicing skills was the common goal or target that was seen to be important for improving one's skills. Unlike in category I, where the motivation was not discussed, or in category II, where personal targets were meaningful, in this third category the students were more dependent on a group and common goal.

My sports team has a common target: success. The team has to push hard to achieve its goal. (M1)

Regarding *reflection*, in students' view, engaging in critical reflection together with others was seen to be essential; unlike in category II, where reflection was up to the individual. It was seen to be important that other people encourage individual to reflect on him- or herself as well as on the group and the common skills. Thus, co-reflection was seen to be more relevant than self-reflection, in this category. For the *evaluation* of skills, in students' view, social communication was essential; unlike in the previous categories, where only talents or skills were recognized and self-evaluation was used. Peer-evaluation was seen not only as a personal resource, but also as a helping and caring resource for others. Students felt that it can be easier to evaluate others' than one's own skills. Peer-evaluation developed students' self-evaluation skills and grew in social practice.

It is often the case that people learn to appreciate their own skills but believe in them only after someone else shows appreciation for them and their specific skill. I think it is much easier to see things in other people what they are skillful at than to find and identify one's own skills. (F23)

As regards *agency*, in this category, similarly to the previous one, the students emphasized their active input in developing their skills. In this category, however, students' agency did not remain individual. Instead, the students were interested in working together in groups, thus stressing team agency. The students felt that the team or group helps them to gain new meaning and relevance for practicing or acquiring new skills.

[Regarding] us new employees [...], of course, at first you need help and support from others who already master the skill, but by doing and practicing you start to learn. After this experience, it was easier to develop my skills further and to be more efficient at them. (F5)

As the descriptions above show, the *social environment* emerged as a crucial aspect in this category. Interaction with peers and friends were seen as meaningful and as an important mirror for oneself. The social environment was also seen as a source for competition among students. Competition with others, such as in the case of team players in a sport, was a way for students to practice their skills, and in doing so, they were active and fought to get good results and to achieve their common goal. Thus, the social environment appeared either as a mirror for reflection or as a resource in the form of competition.

Our supervisor gave our gymnastics group a common challenge, saying: "You have to train and stretch every evening at home, girls. It would be great if all of you could do a split by Christmas time." After three months, the persistent and hard training finally paid off. After stretching at the end of our last training lesson, I did a perfect split – it came as a surprise to all. (F19)

Category IV: Competence requiring collaboration

The fourth category addresses the conception of skill emphasizing collaboration with others in certain contexts. The *acquisition* of this kind of competence was not seen as a one-off event, but rather as requiring continuous maintaining and monitoring within a community.

The development of competence was seen to occur progressively. As regards *emotions*, students' appreciation and respect emerged from the data. Students appreciated their own success alongside that of others and being respected as a team member. They expressed)

a wish to integrate in a community or respected themselves as part of a community or group. They felt frustrated, shocked or after being unsuccessful with a team, for example, if their team did not win a game.

In this category, the *motivational* basis was having a target orientation with collective goals. The students thought that collective aims can only be achieved through close teamwork, be it in collaboration with family members, fellow workers, colleagues, or sports team members. Building competence through collaboration with others required active effort and responsibility. As regards *reflection*, the co-reflection described in the previous category translated into social reflection here, involving not only individual reflection in pairs but also a larger group of people reflecting together. Social reflection was seen to play a role in taking care of everyday chores, and in acting as well as coping in conflict situations. Students presented social reflection as the ability to find solutions to problems together with other people in various situations or circumstances, similar to the social interaction that took place between siblings and parents or in working communities.

For me, one of the most important social skills is to be able to take account of people and their feelings. You must understand that not everybody experiences all matters the same way as you do, and our different kinds of background shape us to act in very different ways in some certain circumstances. I have two younger sisters and so I am the oldest sibling, which I believe has shaped my social skills to be somewhat different compared to those of my sisters [...] Because of being a role model as the oldest child, I consider myself to be a more highly skilled leader than my siblings are; but they have their own social strengths that I envy, such as my middle sisters' ability to be a great mediator. (F27)

The experiences reported by students express their efforts to develop their competences together with others, such as with team members preparing for a sports competition. In addition to category III, where *evaluation* was bilateral and related to one other, in this category, the evaluation of skills was seen to develop together with others, such as when students were participating in different kinds of societies and groups.

In my opinion, team sports develop all skills in an optimal way: an individual has to have good personal skills to be considered 'good news' for his or her team. At the same time, in team sports, social skills also have an important meaning. You don't relate well to other people, if you not get along with them. I have pretty good social skills, I think. I suppose so, because I have gotten into or have found myself in many different and sometimes tricky circumstances. For example, when someone in a sports team fails, someone must tell him or her about it. (M20)

As concerns to *agency*, in this category, it expanded from team agency to communal agency with individually experienced responsibility. The participants reported that they continued to maintain their skills collectively in different contexts and they would practice individually for the sake of their team. In this context, competence required active and responsible collaboration, and students wanted to go by their team. The students were willing to make adjustments to achieve the collective goal; they felt that they were prepared to make changes in their life in order to be a part of and practice with their team in collaboration.

In Italy, I have worked with dogs, and there I've learned different skills. I got to know a different culture and to communicate with people who do not speak the same language as me. (F11)

In this category, the *social environment* gave meaning to and provided a target for the collaboration, and it was the most significant aspect. Further examples of social environments mentioned included operating in international arenas or abroad, and interaction in student fellowships.

Fulfilling my military service was the greatest challenge for my social skills so far. Suddenly, I was in a small room with over ten strange people whom I would have to get along with for the next six months. Also, the complete loss of privacy was quite a shock at first. Despite my initial puzzlement, I have good memories from the army and made some friends there as well. (M1)

Summary of findings

Our study revealed that beginning physiotherapy students have wide-ranging conceptions regarding skill. Four descriptive categories could be defined as distinguishing the skill conceptions among the participating students: I. *Talents*; II. *Skills requiring individual practice*; III. *Skills requiring social practice*; IV. *Competence requiring collaboration*. Seven themes of variation were recognized: Acquisition, Emotions, Motivation, Reflection, Evaluation, Agency, and Social Environment. In the hierarchical structure's first category, the identification of skills as talents can be seen as the least complicated conception of skill; whereas the fourth category, the conception regarding skills requiring collaborative activities, is the most complex and extensive way of understanding skill.)

DISCUSSION

Skills, as part of higher education learning outcomes, have been given increasing worldwide attention. For example, the OECD has just completed a feasibility study—AHELO (*Assessment of Higher Education Learning Outcomes, 2013*)—in which both field-specific and generic skills were in focus. Evaluations of skills, knowledge and competences are also being conducted by the European Union within a qualifications framework (e.g., EQF, 2008), and by the European Network of Physiotherapy in Higher Education within the context of quality assurance (e.g., ENPHE, 2012). However, less attention has been paid to how participants in education, namely students, understand the nature of skill. In the present study, we investigated beginning physiotherapy students' conceptions of skill in order to produce knowledge that can be utilized in physiotherapy education.

Our study revealed that beginning physiotherapy students have wide-ranging conceptions regarding skill. In general, the specific value of the findings of the present study lies in the increased understanding of students' skill conceptions yielded and the possible pedagogical implications. From a pedagogical point of view, two critical aspects can be identified (Figure 2). The first one is *the role of training* and the second one is *the role of the social environment*. The first aspect, the role of training, emerges in category II, where the ways of understanding skill transforms from innate talents to skills requiring individual practice. The conceptions grouped in category II represent students who were motivated to achieve targets; active individual practice or training was seen as a prerequisite to developing one's skills.

Another critical aspect, the role of the social environment, is the distinguishing factor between categories II and III, where the emphasis on the ways of acquiring skill shifts from individual practice to practicing in groups. The conceptions in category III represent students who were interested in working actively together or required feedback from others, and who were motivated to have a common goal in order to develop and improve not only their own skills but also to be a helping and caring resource to others. In addition, the significance of the social environment — for instance in the case of sports team

members or among friends—emerged as a crucial factor in this conception of skill, functioning either as a mirror or as a motivator in the form of competition.

Insert Figure 2 about here

FIGURE 2 Physiotherapy Students' Conceptions of Skill and the Critical Aspects Defining the Most Important Lines Between the Categories.

The role of training and the role of the social environment are critical aspects from a pedagogical standpoint. Thus, it is important to keep these aspects in mind when discussing the development of skills with students. For example, the talent component among skill conceptions can be a challenge to students' learning of skills because some students may think that one either possesses or does not possess a skill and that practice does not play a significant role. Teachers' job is to emphasize the significance of practice and encourage students to actively develop their skills. Similarly, teachers' job is to organize learning activities so that the value of the social environment in skill development becomes clear to students.

The main finding of the study was that students' conceptions of skill vary. Therefore, it is important that physiotherapy teachers are aware of this variation in students' conceptions. In guiding students to become qualified physiotherapists, teachers and clinical educators are challenged to recognize the variations in their students' conceptions of skill (see, e.g., Cole and Wessel, 2008; Lindqvist et al., 2006). The process of reflection and re-evaluation among students, teachers and clinical educators must be continual in order to assess which skills and attributes are important for the development of students' competence (Jones, McIntyre, and Naylor, 2010; Viitanen and Piirainen, 2003).

Understanding the ways in which students think and act can positively influence the development of physiotherapy students and the future level of the physiotherapy profession (Wikström-Grotell and Eriksson, 2012). Students have to challenge themselves to reflect on the learning of skills and to achieve collaboration with others in order to form progressive skills (see, e.g., Piirainen and Viitanen, 2010). Students should learn to

evaluate their own learning of skills during their studies. Similarly, the teachers should conduct diagnostic evaluations of their students' skills because this enables individualization in their teaching. At the beginning of a course, teachers and tutors could allocate more resources to those students who think that skill is an unlearnable gift they lack and need more guidance and support. Pedagogical strategies could include small group or team teaching, for example. Students on different levels should work together and learn collaboratively. Peer teaching and peer evaluation could help the students with a low skill level and support students' self-directed learning. Writing skills are also important in physiotherapy. Documentation on patient treatments requires good writing skills; reflective diary writing, for instance, can be a good tool for learning those skills (see, Kurunsaari, Tynjälä, and Piirainen, 2014).

From a scientific point of view, the classification of students' broad and differing conceptions of skill may have potential for transforming the way skills are viewed in the physiotherapy profession (see, e.g., WCPT, 2013). An important challenge is to develop curricula and teaching methods that enable theoretical, practical and regulative knowledge to become truly integrated (see, e.g., Tynjälä and Gijbels, 2012). In this way, it is possible to create learning environments where skill and knowledge are no longer treated as separate entities, but where they will be deeply blended together; thus, theory would not be taught separately from practice but theoretical concepts would be used when exercising practical skills and when reflecting on practical experiences. For example, practical training periods could be organized so that students are assigned learning tasks requiring them to reflect on their practice in a learning journal with the help of some theoretical models or concepts. After the practice periods group discussions could be organized to share experiences, and, again, to examine them with the help of theoretical concepts.

In the present study, phenomenography was chosen as the methodological approach in order to spot the variation in students' understanding of skill. Marton (1990) claims that when asking people about their conception of some phenomenon, one can determine there to be a limited number of qualitatively different ways of conceiving the phenomenon. This is why conceptions of a specific issue, such as conceptions of skill in the present study, can be described in a valid way given that adequate research data are available. Thirty-five of the 40 physiotherapy students approached participated in our research and this considerable number of participants, for such a study, allows us to assume that all of

the main variations of skill conceptions are represented. According to Marton (1994), phenomenographic research can at best question self-evident conceptions and conceptualizations relating to the topic being analyzed. In the present study, the conceptions of skill are described in words similar to those used by the participants themselves. Thus, our study has produced knowledge that relates to and can be used in the development of physiotherapy education—as described earlier in the discussion on the pedagogical implications of the study.

In most phenomenographic studies, the data on students' conceptions are gathered through interviews (e.g., Marton and Booth, 2009, 130; Marton and Pong, 2005; Åkerlind, 2005a, 2005b, 2008). In our study, we decided to explore the feasibility of essay writing for this purpose because writing has been proven to be a useful functional tool for reflection and learning (e.g., Tynjälä, Mason, and Lonka, 2001), being versatile and descriptive. We believe that writing essays encouraged the students participating in our study to reflect on their experiences of different aspects of skill in a similar but more defined way as dialogue in interviews might have done (see Marton and Booth, 2009, 130).

The limitations of our study mainly relate to any potential generalizing of the findings. Our research was carried out in the Finnish context, relating to Finland's specific culture, education system and physiotherapy teachers' training in Finland. For example, reflections on Finland's good success in PISA studies have emphasized that, in many ways, the Finnish education system deviates from practices that are typical in many other Western countries (e.g., Sahlberg, 2010). In Finland, moreover, specialized education for physiotherapy teachers is available at universities, which is uncommon in many other countries (see, Piirainen, 2014; Suhonen, 2008). Therefore, further research is needed to examine and understand the conceptions of skill held by students in different cultures and education systems, as well as by individuals in other fields and professions.)

CONCLUSION

The system of categories used to describe physiotherapy students' conceptions of skill has given new insight into the different conceptions students have of skill. The four categories of skill conception reflect broad and differing views on skill, distinguishable by their focus on: I. *Talents*; II. *Skills requiring individual practice*; III. *Skills requiring social practice*; and IV. *Competence requiring collaboration*. These findings can be used as a basis for planning physiotherapy students' curriculum and supporting students on their educational path. Ultimately, physiotherapy students' awareness of different skill conceptions and developing their skills to best advise and treat their patients, will benefit both themselves and the patients.

Declaration of Interest: The authors confirm that there are no financial, employments or personal conflicts of interest associated with the present study and accept responsibility for the content of this paper.

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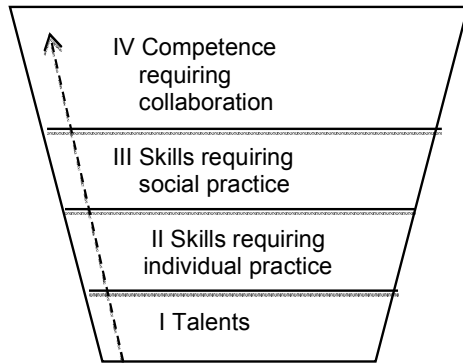


FIGURE 1 The Four Skill Categories Describing Physiotherapy Students' Conceptions of Skill.

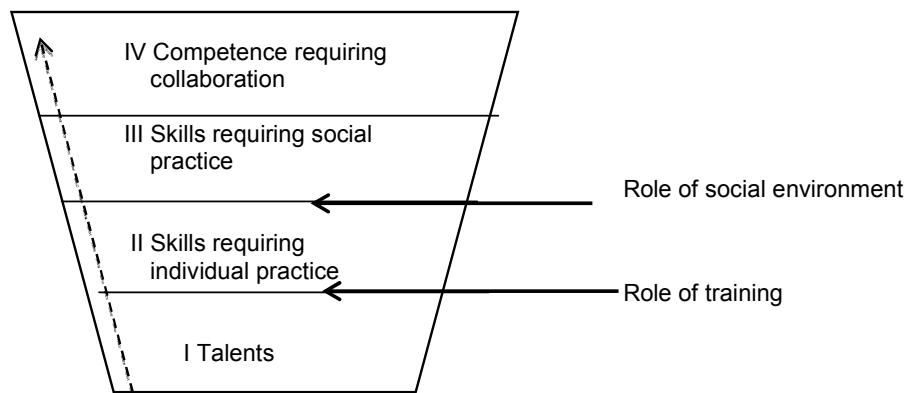


FIGURE 2 Physiotherapy Students' Conceptions of Skill and the Critical Aspects Defining the Most Important Lines Between the Categories.

TABLE 1 Physiotherapy Students' Conceptions of Skill at the Beginning of Their Studies

THEMES OF VARIATION	CATEGORIES			
	I. Talents	II. Skills requiring individual practice	III. Skills requiring social practice	IV. Competence requiring collaboration
Acquisition	Inborn genetic	Gradual individual practice	Practice and developmental feedback	Continuous maintaining and monitoring in collaboration
Emotions	Thankfulness vs. disappointment	Excitement and/or satisfaction vs. disappointment	Good mood vs. disappointment	Appreciation and respect vs. disappointment
Motivation	Non-significant	Personal goal	Common goal	Collective goal
Reflection	Non-significant	Self-reflection	Co-reflection	Social reflection
Evaluation	Talent recognition	Self-evaluation	Peer-evaluation	Collaborative evaluation
Agency	Passive individual agency	Active individual agency	Team agency	Responsibility in communal agency
Social Environment	Non-significant	Non-significant	As mirror, or as competition	Collaboration