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Experiences in sense making: Health science students' *I*-positioning in an online philosophy of
science course

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Experiences in sense making: Health science students' *I*-Positioning in an online philosophy of science course

ABSTRACT

This article reports on a qualitative study on the dialogical approach to learning in the context of higher education. The aim was to shed light on the *I*-Position and multivoicedness in students' identity-building, and to provide empirical substantiation for these theoretical constructs, focusing especially on the connection between personal knowledge and theoretical knowledge. The study explored how health science students' reflections on their work and discipline-related experiences provided resources for making personal sense of and understanding the subject studied. The students undertook an online course on the philosophy of science. To study students' internal and external dialogue in terms of multivoicedness in their sense-making processes a discourse analysis combined with a dialogical approach was applied. The results showed that in reflecting on their experiences in the light of different scientific approaches, the students became engaged in dialogues with different voices, thereby experiencing tensions in their professional positioning. The reasoning tasks gave rise to internal dialogue, involving negotiation between different *I*-Positions of the self or heterodialogue with the texts. These identity negotiations were manifested in refining, strengthening, and re-constructing professional and scientific *I*-Positions, and in sharing and constructing a *We*-Position.

Keywords: Dialogical learning, Dialogical Self theory, discourse analysis, *I*-Position, multivoicedness, internal dialogue, external dialogue

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INTRODUCTION

Current educational policies recognize a need for continuing professional development and life-long learning if workers are to participate effectively in society and working life (Collin, Van der Heijden, & Lewis, 2012). Thus, in parallel with rapid changes in the contemporary knowledge society, higher education has been required not only to produce academic knowledge and skills, but also to prepare students for their future working life.

In the field of professional development, issues of identity and professional agency have gained increasing attention (Vähäsantanen, Saarinen, & Eteläpelto, 2009). Consequently, the issue of how professionals themselves make sense of their practices constitutes a starting point for understanding and supporting professional development (Akkerman & Meijer, 2011). In this situation, it seems essential to move towards a pedagogy that will encompass the connections between the worlds of work and education. Attention to such links is likely to become critical for the professional development of students and workers, whether they are novices, beginners, or experts in their professional fields (Tynjälä & Gijbels, 2012).

The dialogical approach to learning and instruction offers a framework to conceptualize the connections between life experiences, including work experiences and education. It stresses the importance of acknowledging students' personal lives as resources for sense-making in educational contexts. Building on Dialogical Self theory (Hermans & Van Kempen, 1993), Akkerman and van Eijck (2013) draws on the notion of *I-Positions*, i.e. stances that people use to express their various voiced perspectives. *I-Positions* are connected to a person's identity, in the sense that they represent the person's various tendencies of thinking and doing (Akkerman, Admiraal, & Simons, 2012). These *I-Positions* vary within individuals and are connected to people's cultural and historical experiences and social relationships, including the *I-positions*

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connected to their work. This means that the self is based on multivoicedness, a phenomenon manifested in the expression of heterogeneous voices with different social and cultural origins (Akkerman & van Eijck, 2013; Grossen & Salazar Orvig, 2011).

In educational contexts it is important to value the fact that students come from various groups, communities, and social networks, all of which can be reflected in the students' differing voices and *I*-Positions. With this in mind, educators can be led to encourage students to use their personal life experiences and prior knowledge as resources for learning (Arvaja, 2012; Ligorio, 2010; Oztok, 2013; Rajala & Sannino, forthcoming). It is true that teaching and learning in educational contexts usually focuses on academic content knowledge, and on socially shared (institutionalized) meanings (Oztok, 2013; Zittoun, 2011) – aspects that tend to be supported by institutionalized resources such as textbooks. However, opportunities for personal sense-making through people's personal lives can help to connect different spheres of experiences, with possibilities for linking institutionalized and personal knowledge. Furthermore, life experiences, used as resources for learning, can be seen as promoting student identity work: they give personal meaning to learning activities, and at the same time provide possibilities for the re-negotiation of one's *I*-Positions and “being, thinking and doing” (Akkerman et al., 2012; Gee, 2010; Ligorio, 2010; Oztok, 2013; Paakkari, Tynjälä, & Kannas, 2011). From this perspective, an educational process can help students to make sense of cultures and communities (with their respective practices), as well as themselves as active members of these communities (Gee, 2010; Ligorio, 2010; Matusov, 2011; Rajala et al., 2013).

In line with these ideas, the pedagogical starting point in this study was to encourage health science students (most of them health science professionals) undertaking an online course on the philosophy of science, to study phenomena in the philosophy of science by reflecting on their

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own prior experiences, especially in their own work and field of science. The tasks in the course were based on “dialogical provocations” (Matusov, 2011), which in the context of this study means that the students were provided with diverse (sometimes contradictory) perspectives from various philosophical texts. They were encouraged to interpret these by reflecting on their own experiences, within their written work and in discussions with others. This was intended to lead them into negotiation with their own perspectives and the voiced perspectives of others. It was also presumed that interpreting philosophical texts would help the students to make sense of themselves and their experiences (i.e. their *I*-Positions) as professionals and as students of health sciences, in the context of the communities in which they were working and studying.

An important feature of this study was that while the pedagogical design of the project was constructed on the idea of collaborative learning – in the sense of involving interpersonal or external dialogue for learning – within the actual learning tasks an equal emphasis was placed on students’ individual reasoning activities. Thus, in addition to interactions with others, the role of intrapersonal or internal dialogue was seen as important for promoting learning. Here it should be noted that the dialogical nature of learning is often related to external dialogue *between* individuals, with the exclusion of internal dialogue *within* individuals, i.e. between the *I*-Positions of the self (Ligorio, 2010). As a consequence, most analyses – and most efforts to promote learning – have typically focused on face-to-face or online interaction and on the collaborative aspect of learning. This, in turn, has led to neglect of the role of individual reasoning (Crook, 2011) and internal dialogue (Ligorio, 2010; Linell, 2009). As argued by Linell (2009), human sense-making processes are profoundly interactional and contextual; moreover, interaction comprises not only talk-in-interaction, but also interaction with the (material and socio-cultural) world. The point to note here is that even a solitary activity such as thinking,

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writing, or reading (or sense-making in general) is interactional in its nature (Linell, 2009). In line with this view, dialogism stresses the importance of different “others” in sense-making, and the occurrence of several voices within individual persons, whether they are thinking on their own or engaged in an external dialogue.

Another important feature of this study was that the learning activities took place solely in an online environment. Basically, the students used an asynchronous discussion forum to write individual reasoning texts, based on given tasks, and to have a discussion around these writings with other students. In investigating learning and interaction in online environments, and particularly the learning that occurs in asynchronous discussion forums, most studies have concentrated on analyzing how the shared construction and transmission of academic content knowledge is supported (Oztok, 2013). Hence, as Stahl (2012, p.7) has pointed out, the most common method has been to code discussions in terms of a “presumed hierarchy of knowledge-building moves – a preexisting theoretical framework for measuring how students’ interactions meet an ideal of what they ‘should’ be doing from the researcher’s perspective.” Stahl noted that within such studies, posted descriptions of personal experience have tended to be coded as off-topic, with consequent exclusion from the analysis. Nevertheless, in recent years there has been a shift toward stressing the importance of participants’ perspectives, personal experiences, and subjective meanings, viewed as a starting point for studying and supporting learning and discourse in online environments (e.g. Arvaja, 2012; Ke et al., 2011; Oztok, 2013; Tee & Karney, 2010). A parallel development has been an increased emphasis on identity viewed in relation to learning (e.g. Ke et al., 2011; Leander, Phillips, Headrick Taylor, 2010).

The dialogical learning study reported here explored how health science students made sense of philosophical knowledge through their own work and discipline-related experiences,

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and how they saw themselves and their activities in the light of this knowledge. The focus was on the *I-* (and *We-*) positions the students took and constructed, and on how different voices appeared in the students' internal and external dialogue during an online philosophy course. Thus, within the study the focus was on learning as identity-building. Such an approach made it possible to explore how different philosophical approaches – and reflections on the issues bound up with these approaches – can become a resource for understanding oneself and one's own experiences, and thereby for identity construction.

Below, the dialogical approach and related concepts are discussed in more detail, with reference to the discourse analytic approach of Gee and Green (Gee, 1999, 2010; Gee & Green, 1998). Discourse analytical and dialogical approaches are used as complementary frameworks in analyzing *I-Positioning* and multivoicedness in the students' discourse.

THE DIALOGICAL APPROACH TO LEARNING

Dialogue and identity

Building on the writings of Bakhtin, the concept of voice – and in particular multivoicedness (polyvocality) – provides a tool for exploring how different voices or perspectives are embedded in a person's internal and external dialogue. As Bakhtin (1981, p. 293) puts it, “all words have the ‘taste’ of a profession, a genre, a tendency, a party, a particular work, a particular person, a generation, an age group, the day and hour.” As a consequence, according to Akkerman and colleagues (Akkerman et al., 2012), when an utterance is spoken and intoned with a certain taste, it is produced by a certain “voice.” They interpret Bakhtin's notion of voice “as a speaking personality bringing forward a particular perspective of the world” (p. 229). In the same vein, Linell (2009, p. 116) interprets Bakhtin's notion of voice as “an

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expressed opinion, view or perspective, something that the person would typically say and presumably stand for.” The theory of the Dialogical Self (Hermans, 2001) extends the concept of voice in arguing that voices exist not only in what we say, but also in who we take ourselves to be (Akkerman et al., 2012). Thus, following this line of argument, the *I-Position* of a person is “a particular voice that has been internalized in one’s Self presentation” (Akkerman et al., 2012, p. 230). According to Akkerman and van Eijck (2013), the *I-Position* links the notion of voice to a person’s identity. The self is multiple, in the sense of having multiple *I-Positions* or voiced positions that can be used in expressing a person’s self. Each position is connected to the person’s cultural and historical experiences and social relationships, and it reflects different cultural or social origins (for example the *I-Position* of a physiotherapist). The dialogical self, then, is defined by the person’s various social experiences, memberships, and commitments. Although different positions may merge or be hard to distinguish, there can also be different or even conflicting positions regarding the same issue (Akkerman & van Eijck, 2013; Linell, 2009). The consequence of this is that when people are talking or thinking, they often integrate, contrast, and move between different *I-Positions* (Linell, 2009). Seen in this light, the self is in fact a negotiated space, and the dialogue between different perspectives or positions (the self-dialogue) can be seen as an important resource for meaning-making and development. It is important to note that although a person’s *I-Positions* are socially and culturally interdependent, they are not socially or culturally determined or stable, but negotiated and changing (Linell, 2009).

Even though identity is subject to change, people have both the desire and the capability to maintain a coherent sense of self (Akkerman & Meijer, 2011). Continuity and coherence in identity are maintained through narratives, since these are what enable people to connect the past

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to the present (Akkerman & Meijer, 2011; Silseth & Arnseth, 2011). Identity can itself be seen as a narrative about ourselves (Akkerman & Meijer, 2011). Each individual has a unique personal narrative based on his/her life course (Linell, 2009). This means that sense-making always involves a *biographical perspective*. Our personal narratives have an effect on how we attend to events, on how we feel and think about events, and on how we see the world (Ochs & Capps, 1996). A personal narrative (or identity) is, as Ochs and Capps (1996, p. 20) put it, “born out of experience and gives shape to experience.” In this sense, narrative and self are inseparable.

Such views of narrative and the self have implications for the participants in the study. For example elicited reflections on participants’ own experiences in the philosophy course are assumed to invite personal expressions concerned with “who I am and what I am doing” (Gee, 1999, 2010), and thus yielding a self-narrative. Through narration, people construct their identity, integrating old and new experiences (Hermans & Hermans-Jansen, 1995). Thus, narration can also be seen as a resource for making sense of new experiences. The new experiences can generate tensions, and these provide a space for negotiation. As a consequence, there can be a modification or even a complete remaking of the way we see the world and ourselves (Gee, 2010). In view of this, when students re-interpret their work experiences in the light of new experiences and perspectives encountered in a philosophy course, one would expect that this would provide resources for re-negotiating their identity and *I*-Positions. On these occasions, narrative activities are likely to seek to bridge gap between the self that felt, acted, and thought in the past, and the self that feels, acts, and thinks in the present (Ochs & Capps, 1996, p. 29). Narration is thus used as a tool for building connections between the past and the present, and between unstable and situated selves.

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Wortham (2001, p. 7) emphasizes that the power of narratives lies not (only) in their ability to represent or maintain coherent identities; narration also includes possibilities to express and cope with fragmented and partly conflicting selves and experiences, and further, to create multiple possibilities for the self. The dialogical approach to narrative self-construction encompasses the notion that the self emerges through constant interactional positioning with respect to others in everyday action (e.g. Hermans & Kempen, 1993; Wortham, 2001). According to Wortham (2001) the self (and different *I*-Positions within the self) is narratively constructed through positioning different voices in the social world with respect to each another, and through taking a position of one's own with respect to these voices.

Despite a certain uniqueness due to the (unique) personal combination of different *I*-Positions within the self, the self is also social in its nature. According to Hermans and Van Kempen (1993, p. 114) it is through these multivoiced positions that “the individual speaks the words of the groups, social class, or society to which the individual belongs and reflects the unity of the group, class or society.” Akkerman and Meijer (2011) refer to Mead (1934) who used the concept of *generalized others* to reflect the fact that positions within the self are not solely personal, but rather connected to the social groups or communities that set rules, norms, and beliefs in the *Me*. Through generalized others, communities have an important role in the self, since they provide ways of talking, thinking, and acting. In this way, communities can be seen as becoming part of the *Me*. By inviting students to reflect on their work and discipline-related experiences (as was done in the present study) attention is targeted especially at the *transpersonal dimension* of the self. The transpersonal dimension highlights the role of institutions and communities in the construction of the self (Grossen & Salazar Orvig, 2011). According to Grossen and Salazar Orvig (2011), it is through the transpersonal dimension that

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the individual is “symbolically related to broader communities and systems of values that constitute his or her self” (p. 498).

Learning through heterogeneous voices

“The goal of education is not to make students have the same understanding as the teacher, but rather to engage them in historically valuable discourses, to become familiar with historically, culturally, and socially important voices, to learn how to address these voices, and to develop responsible replies to them without an expectation of an agreement or an emerging consensus” (Matusov, 2011, p. 115).

As envisaged by the dialogical approach, learning emerges through dialogical negotiations between the learners and their environment, or more precisely, through the negotiation of heterogeneous voices encountered in learning situations. Negotiation occurs between one’s *I*-Positions or voices and between the “other” voices. In terms of dialogicality, the “other” is not reducible to interpersonal relationships and external dialogue; rather, it takes the form of various third parties (Grossen & Salazar Orvig, 2011; Linell, 2009). The third parties can be, for example artifacts which are present in the learning situation and which frame the sense-making process (Silseth & Arnseth, 2011). For instance, in this study the philosophical reading material for the course can be seen as constituting “historically, culturally, and socially important voices” (Matusov, 2011, p. 115) that provide a resource for students’ sense-making within their discussions. The third parties can also be virtual others (persons not physically present) (Marková, 2006), generalized others (Mead, 1934), or authoritative voices (Bakhtin, 1981; Linell, 2009) that are implicitly or explicitly addressed in the situation. These others mediate the voice(s) of traditions, institutions, communities, colleagues, and friends through the dialogical

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participants (Marková, 2006). Thus, a person's discourse is interdependent with other perspectives, and also with the voices of individuals or groups in the sociocultural environment (Linell, 2009). This implies that one does not speak or think from a single, "monolithic identity" (Linell, 2009), but rather through various intertwined voices.

Dialogism stresses the existence of several voices within a single thinking individual (Linell, 2009). Billig (1987) argues that a person's thinking is largely internal dialogue and can often be thought of in terms of arguments with oneself. Internal dialogue takes place between voices arising either from different *I*-Positions of the self (auto-dialogue) or from something other people have said or expressed (heterodialogue) (Linell, 2009). According to Marková (2006), internal dialogue usually involves personal issues that require reflection on and evaluation of behavior – both one's own and that of other people, and both past and present. It can be seen as an attempt to solve a person's inner conflict between different voices. For example, internal dialogue may manifest itself in a struggle between a person's collective and personal positions (Hermans, 2001), where the collective position represents the norms adopted by the generalized other, while the personal position represents "true" subjective feelings (representing the "authentic" voice, see Marková, 2006) that may contradict the collective position. From this perspective, there may be a tension between the person's *social I*-position, outlined by societal definitions and expectations, and the person's *personal I*-position. Correspondingly, as conceived by Linell (2009), when engaging in heterodialogue a person may quote other people's ideas, positions, thoughts, and utterances more or less overtly, either as support for his or her own views or as counter-positions. In addition, the person may "speak through" the voices of other people by evaluating them, and in so doing taking up an individual position with respect to these voices (cf. ventriloquation, Wortham, 2001). Applying a dialogical

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approach to learning thus broadens attention from situated (talk-within-)interaction between students (i.e. external dialogue) to recognition of the importance of the “other world” and of internal dialogue in the sense-making activities that students engage in.

In their discussion of the dialogical approach to learning, Akkerman and van Eijck (2013) speak of *horizontal learning*, in the course of which the learner is seen as “continuously shifting between different worlds, hybridizing and negotiating insights from different sites” (p. 9). They go on to argue that learning should be seen as a dialogical practice through which students’ different *I*-Positions are stimulated. This presupposes recognizing the simultaneity of different positions which are part of students’ identity and which therefore are part of their sense-making processes. Ligorio (2010) argues that in the educational context, acknowledging students’ personal perspectives by giving them a space to voice themselves and their perspectives can enhance their identity (de-/re-)construction. This implies that learning will be facilitated by providing opportunities to talk and reflect on personal experiences, and in the process, stimulating different *I*-Positions, and negotiation between different voices.

With these notions in mind, in the present study the health science students were encouraged to reflect on their discipline and work experiences when studying the reading material. The texts dealing with the philosophy of science provided various perspectives – “ideological voices” – which stimulated reflection on the students’ own multivoiced experiences. Through the reading material and discussions with one another, the students came into contact with several voices (multivoicedness), and these provided a context for negotiation and meaning-making. Learning was seen as occurring when different voices (with different origins) are negotiated in the learning situation. As argued by Tsang (2007), making learners contrast their own voices or perspectives with several other voices promotes reflective processes that are

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important for learning. Moreover, internal and external dialogue constitutes the core of the reflective process. This in turn, enhances awareness of one's assumptions, beliefs, and values, and of the various voices, third parties, and others shaping these beliefs and values (Ho et al., 2001; Tsang, 2007). Reflecting individually and together on philosophical texts from the perspective of one's work-related experiences may also provide opportunities for students' identity re-negotiations. As Ligorio (2010) puts it:

“Learning is not only a cognitive and social experience, but also an identity experience. Who we are, what we are able to do, and what we will be, based on what we learn, are constantly challenged when we attend learning situations” (p. 97).

THE DISCOURSE ANALYTIC APPROACH IN STUDYING DIALOGICALITY

The ideas on studying and analyzing discourse proposed by Gee (1999, 2010) and by Gee and Green (1998) can be seen as complementing the dialogical approach. The conjoining of these differing perspectives creates resources for studying the relationships between the self and the social that neither perspective provides alone. The basis of discourse analysis is a recognition of the sociocultural nature of discourse, social practice, and learning (Gee, 1999, 2010; Gee & Green, 1998). Just as the dialogical approach aims to understand the “social in the individual”, Gee (1999) argues for the existence of the social mind. For Gee (1999, p. 52) the mind is “social (cultural) in the sense that sociocultural practices and settings guide and norm the patterns in terms of which the learner thinks, acts, talks, values, and interacts.” Moreover, according to Gee (2010), one can say that in a sense it is often not humans who are talking but rather the Discourses that we enact and represent – hence Discourses for which we are “carriers.” Discourses (with a capital D) are enacted through ways of using language, and of thinking,

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acting, interacting, valuing, feeling, and believing in a certain way as a member of a certain social group (Gee, 2010, p. 34). Discourses are also connected to specific places, objects, and artifacts. Just as the Dialogical Self theory (Hermans, 2001) argues for multiple identities and *I-Positions*, Gee (1999, p. 39) argues that individuals have contextually shifting multiple (socially situated) identities that “we take on in different practices and contexts” due to belonging to different sociocultural groups. Furthermore, just as the dialogical approach highlights the phenomenon of a unique personal narrative, in line with a biographical perspective on identity (Linell, 2009), Gee (1999) takes the view that individuals are unique, given that each individual belongs to multiple sociocultural groups, and that these in combination guide a person’s being and doing in unique ways.

The discourse analytical approach makes it possible to identify different “others” and the social world embedded in *I-* and *We-*Positions – a capability deriving from the tools it provides for studying “saying, doing and being in language” (Gee, 2010, p. 3). This *being* and *doing* (thinking) is connected to special “social languages” (Gee, 1999, 2010), to “cultural models” (Gee, 1999; Gee & Green, 1998, and also to “figured worlds” Gee, 2010) and “Conversations” (Gee, 1999, 2010). Looking at these aspects in more detail, one can say that social languages (cf. speech genres, Bakhtin, 1984) are different “styles of languages” that we use to enact and recognize different identities in different settings. For example, scientific language is different from everyday language, and different professional groups use different, specialized social languages. Cultural models, for their part (see Gee & Green, 1998), are narratives, typical stories, storylines, or theories that are shared by people who belong to specific social or cultural groups. These cultural models are the constructions of a group, but they become a resource for the individual to guide her/his actions, thinking, social practices, and use of language, and to

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interpret new situations. Cultural models link to each other, creating networks of cultural models that help in organizing the thinking and social practices of groups and communities (Gee, 1999). Cultural models are often unconscious, taken-for-granted “theories” that the individual does not question. Finally, Conversations (with a capital C) encompass all the talking and writing around major themes or debates that has gone on in a specific social group or society for a significant stretch of time and across many institutions (Gee, 1999, 2010).

Bearing in mind the starting point of this study – i.e. the analysis of dialogicality in the students’ discourse – one can see that discourse analysis provides tools for identifying different (possibly contradictory) voices that emerge in the students’ discourse when they express and position themselves as professionals and as students of health sciences, and at the same time as members of different institutions and communities. The underlying claim here would be that the discourse analytical approach provides an interpretative framework for exploring how – in positioning themselves as being, thinking, and doing as professionals and/or as students of health sciences – the students are *discursively* connected to the material, social and sociocultural world.

In summary, the aim of this study was to explore how health science students positioned themselves as professionals and as students of health sciences when they were exploring themes in the philosophy of science and interpreting philosophical texts in the light of their own work and their discipline-related experiences. Furthermore, the focus was to analyze the kinds of negotiations and tensions that occurred between different voices and perspectives in the students’ internal and external dialogue, and the kinds of sense-making processes and *I-Positioning* that such negotiations yielded.

METHODS

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Study participants and context of the study

The subjects of this study comprised eleven health science students (all female) undertaking an online course on the philosophy of science in the context of higher education. Nine of the students were in employment, for example working as physiotherapists and action therapists. They were pursuing additional studies in health sciences, aiming for example at a teaching qualification in health education. Thus, they were studying part-time via distance learning while also working full-time. The other two students were engaged in their full-time Master's studies in health sciences. The course dealt with the basics of the philosophy of science, and it was obligatory, preceding methodological studies in the field of sport and health sciences. Although the course took place in an Open University context, it was nevertheless conducted in collaboration with the Faculty of Sport and Health Sciences, and according to the curriculum of that Faculty. The students who participated in the course were located all over the country (Finland) and they only met virtually. The course utilized a web-based learning environment called Discendum Optima (www.discendum.com/english/), consisting of an asynchronous discussion tool, a tool for making text documents, and folders containing course material.

The course consisted of six learning tasks, five of which dealt with historical approaches to the philosophy of science. The time allotted for completion of each task was one week. In the first task, there were no philosophical texts to be read; at this point the students could freely reflect on the meaning of science and scientific knowledge in their work and discipline without being required to anchor their ideas to any given course material. The next five tasks (tasks 2–6) were reasoning tasks in which the students were asked to read a given text (or texts) dealing with a particular approach within the philosophy of science, such as positivism, realism, and constructivism. In the sixth task, the students were also supposed to reflect on the previous tasks.

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The texts assigned were of different types: general reviews of the philosophy of science, or introductions to specific themes. They included thematic articles or chapters of books, or extracts from some classical works in the field (e.g. Heikkinen & Laine, 1997; Kiikeri & Ylikoski, 2004; Niiniluoto, 1984; Raatikainen, 2004; Varto, 1992).

The students' reasoning concerning the task involved interpretations of the philosophical texts. As resources for this, the students were asked to use their prior experiences or conceptions of their own field of science, or their work. For each task the students were first supposed to write an *individual reasoning text*. The tasks offered two or three options from which the students could choose one. In the list below, *one* example (from four separate tasks) is presented to illustrate the tasks. All the material (task descriptions and data samples) is translated from Finnish. In addition, all the names in the data samples are pseudonyms.

- Task 2: What differentiates science from non-science? In the philosophy of science, this question is named as a demarcation problem. [...] The starting point of scientific thinking is that the scientific method and the theory that originates from research are based on observation, and that this connection must be proved true. In this way, two relevant criteria are to be fulfilled: objectivity and criticalness. Are these bases and criteria suitable for describing all kinds of scientific research? Are the limits set by these criteria too narrow? Do they exclude other perspectives or research methods that are reasonable? If you have examples of these other kinds of phenomena or research perspectives, describe these, and consider whether the line between science and non-science could be defined differently and on what grounds. If you are familiar with qualitative research, you can also think about the theme from that perspective: does qualitative research fulfill the basic criteria of science?

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- Task 3: What is the view of science that emerges from the perspective of realism? How has this realistic approach been criticized, and how can it be defended? You can think about whether you recognize the realistic view of science and thinking in your own science or field of work.
- Task 4: So far, the focus has been on the traditional view of science. What problems are related to this approach? Why is it reasonable to think that this approach is insufficient? Consider this from the perspective of your own science and/or your own work practice.
- Task 5: Read Juha Varto's introductory chapter. Explain how Varto differentiates "exact" sciences (= natural sciences) and "strict" sciences (= human sciences). What arguments does the author put forward concerning the differences between the types of researchers in these different sciences? Do you recognize the necessity of this division in your field of science? Is the division justifiable? Think especially about what the knowledge of meanings consists of, and how it relates to knowledge in natural sciences.

In the next phase, the students posted their individual writings onto a shared web-based (asynchronous) discussion forum. Here, their task was first to read each other's writings and subsequently to have a *shared discussion* based on these. The shared asynchronous discussion was intended to enhance collaborative exploration of the themes under study.

The role of the researcher

The researcher did not act as a teacher on the course. The collaboration between the teacher and the researcher was part of broader collaboration between the researcher and a group

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of Open University teachers aiming to develop online pedagogical activities. The teacher on the course had many years of experience in teaching philosophy students. However, this was his first course for health science students, and his concern was how to engage the students to explore phenomena that are often regarded as difficult and abstract. Working collaboratively, the researcher and the teacher developed the idea of utilizing, as resources in the course, the students' work or discipline-related experiences and knowledge. The pedagogical approach was in part built on the researcher's earlier work (e.g. Arvaja, 2007). However, the teacher planned the reasoning tasks, and the ways of triggering students' earlier experiences so that they could carry out the tasks.

Data sources and analytical approach

One type of data consisted of students' individual writings based on the six reasoning tasks. Eleven students posted in total 61 pieces of writing across six tasks. One of the students only posted two pieces of writing due to absence from the course for personal reasons, and one other student posted five pieces of writing across the six tasks. All the other students posted one initial piece of writing per task (hence six pieces of writing in total per person). These initial writings were submitted as postings onto the shared asynchronous discussion forum. The other data consisted of discussion postings that commented on the writings or responses of others. Across the six tasks, there were 54 such discussion postings altogether.

The analytical framework of this study was based on a combination of (i) the dialogical approach to communication (e.g. Linell, 2009), and (ii) the discourse analytical approach adopted by Gee (see Gee, 1999, 2010; Gee & Green, 1998). These approaches were seen as

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complementary in analyzing students' *I*-Positioning and the social, socio-cultural, and material elements embedded in their (discursive) positioning.

In analyzing the initial writings and discussion postings from the perspective of students' personal experiences, the first step of the analysis involved extracting from the data those work-, study-, and discipline-related experiences that emerged as discursively relevant (Linell, 1998) in interpreting and making sense of the philosophical phenomena that the reasoning applied to. These "tellings of personal experience" (Ochs & Capps, 1996, p. 21) were manifested in explicit discursive references to *texts, tools, artifacts, people, discourses, contexts, practices, activities, knowledge, values, norms, beliefs, and conceptions* related to the students' work, studies, or discipline. The episodes or thematic meaning units containing the experiences (Linell & Korolija, 1997) were separated out for further analysis. Typically, in each initial writing task and discussion posting, there were one or more such episodes. Because the individual writings mostly served as "starters" for the discussion threads in the discussion forum, the writings, and the discussion postings around these writings, were analyzed as a single dataset.

In the second step of the analysis, there was a stronger focus on those episodes in the selected data segments in which the students expressed their *I*-Positioning, in terms of exhibiting a personal tendency of being, thinking, doing, believing, or valuing (Akkerman et al., 2012; Gee, 1999, 2010) as a professional or as a student of health sciences. *We*-Positioning was identified when the students assigned this tendency not only to themselves but also to the collective (Akkerman et al., 2012). Positioning was often expressed through discursive references such as *I think, I feel, in my opinion, my work, I use, I am, I act, as an action therapist I see (I*-Positioning); or alternatively *we have to, we physiotherapists, we need, we are (We*-Positioning). However, positioning was not always explicitly stated through the use of these pronouns, and the

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students might well position themselves, or take a stand towards the phenomena under discussion more implicitly. For example, they often positioned themselves as part of their communities (*in physiotherapy, in health sciences*) or used a passive form (*one has to measure*) in expressing their thinking, doing, and believing. The students also spoke through other characters to position themselves. Thus, they either differentiated themselves from or identified themselves with the voices of certain characters (in other words, they used ventriloquation or evaluation, Wortham, 2001). Examples of such phrases included *an Obvious physiotherapist/sport scientist wondered, my clients ask, As Raatikainen says*.

In the third step of the analysis, the episodes with *I*-Positioning were read through several times to explore the main themes, topics, or meanings that were made relevant through the *I*- and *We*-Positionings. The themes and topics addressed, plus the web of meanings (Grossen & Salazar Orvig, 2011) constructed through the students' discourse, were analyzed across and within the different tasks. The general themes and topics of the discourse were contextual and situated (Arvaja, 2011; Arvaja et al., 2007), and hence related to the reasoning tasks and the reading material. From the data, four general themes were identified:

1. The role of science in defining the Self (Task 1)
2. Positioning different approaches to science (Tasks 2-4)
3. Constructing a *We*-Position (unity-in-diversity) through heterodialogue (Task 5)
4. The (dis)continuity of *I*-Positions (Task 6)

In the fourth step of the analysis, the episodes containing *I*- and *We*-Positionings under these different themes were analyzed in more detail. The analysis focused on the kinds of *I*- and *We*-Positions that the students constructed and reflected; also on how these were related to other positions and voices (originating from the philosophical reading material or from contributions

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by students in the situated here-and-now discourse). Hence, closer examination of the students' discourse revealed (i) how they positioned and saw themselves through and in relation to their work, study, and scientific communities; and (ii) how they displayed the people, activities, norms, values, and beliefs attributable to these communities and/or to their Self. The focus was on analyzing the sociocultural nature of discourse, revealing the embeddedness of social, sociocultural and material, and hence of different "others" in the *Me/We* (Akkerman, et al., 2012; Gee, 1999, 2010; Gee & Green, 1998). The questions that guided this interpretative analysis were as follows: (i) What *I-* and *We-*Positions – with their related personal, social, and cultural knowledge, beliefs, values, and activities – seemed to be relevant in the situation? (ii) What interconnections, tensions, contradictions, negotiations, and re-negotiations took place between different voices and positions? (iii) What cultural models, social languages, and Conversations seemed to be connected to the *I-* and *We-*Positions constructed and reflected in the course? (iv) How were the positionings changed and (re)negotiated as the course progressed?

The examples in the Results section have been selected to represent the data, including both the generalities and the exceptions. In addition, examples have been selected so that every student's voice is heard and represented, even though some of the students were more active than others in expressing their experiences.

RESULTS

This section discusses the different *I-*Positionings found in the analysis of the students' discourse (including initial writings and subsequent discussion postings). In interpreting the findings, the goal is to illustrate the dialogicality of the *I-*Positions, and the encounters between different voices (multivoicedness) in the students' discourse. The section covers the four general themes

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that were identified in the analysis. The themes form a narrative of the course, and also serve as a timeline that makes it possible to track possible continuities, changes, and developments in the students' *I*-Positioning.

The role of science in defining the Self

In the first task, the students were supposed to reflect on some key concepts such as theory, scientific knowledge, and science, including their relationships with the students' work or discipline. The first task did not present any philosophical texts; thus students could freely reflect on their experiences without having to anchor their ideas to the course material.

(i) Science as a generalized other; the struggle between the collective and personal position. Through their discourse, the students defined themselves as professionals whose work was strongly based on science and research, theories, and scientific knowledge. The following examples represent this position:

Niina: In my own life, scientific knowledge comes up on an almost daily basis. I work as an occupational physiotherapist and my work is largely based on research knowledge regarding issues such as the impact of muscular strength training on backache, for example the role of strained working positions/work practices in causing musculoskeletal symptoms, and that of health hazards due to indoor air problems. In my opinion, it is important to give the grounds for some action or for the purchase of a product/piece of equipment and the consequences thereof and in this respect research-based knowledge, in particular, brings confidence both to myself and the client.

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Anni: At the moment, while I'm mainly studying, I feel that I'm working quite a lot with scientific knowledge. Of course it's always present in the workplace as well, directing one's thinking and giving a basis for practical solutions. For example, at work I use different approaches, frames of reference based on various theories, established facts, for example regarding the psychological, physiological, and social development of humans.

Here, Niina and Anni describe how, within their work and studies, their actions and their thinking are guided by scientific knowledge, theories, and research. Thus, their discourse indicates that a scientific *I*-Positioning forms a strong part of their professional self. In identifying herself as an occupational physiotherapist Niina also uses specific social language (e.g. the impact of muscular strength training on backache) which exemplifies the scientific knowledge utilized in occupational physiotherapy. Theories, frames of reference, and research-based knowledge can be seen as cultural models (Gee, 1999) that play a significant role in defining the way students think and act in their professions. Thus, being, doing, and thinking through science (as they see it) can be viewed as a relatively stabilized perspective in their professional selves. This position highlights the social in the *Me* (Akkerman et al., 2012; Gee, 2010). In other words, positions within the self are not solely personal, but are connected to the social groups or communities (the generalized other) that set rules, norms, and beliefs in the *Me*.

While the discourse depicts a professional whose work is strongly defined by scientific knowledge and theories, there are also traces of an internal dialogue that questions the dominance of science in positioning the self. The following dialogue between Aino and Niina exemplifies shifting positions within the participants' internal dialogue:

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Aino: We can think that in physiotherapy, for instance, the reliability of the therapies applied needs to be proven scientifically before they can be used. This, I think, is just for reasons of effectiveness and safety. And also so that the particular field of science will become better known and gain credibility. I myself always try to find research-based knowledge before therapy. But isn't the success of a process after all dependent on the client's/patient's subjective feelings rather than on a bunch of studies? If the patient is dissatisfied and finds that the therapy was of no help, even if it has been scientifically proven, does it then make any difference? Then again, if we reach the desired goal, does it matter what means were used?

In her discourse, Aino first defines herself as a person whose work as a physiotherapist is strongly based on scientific evidence. However, in her internal dialogue she presents another perspective on success within therapy. She contrasts the patient's perspective ("subjective feelings") with "a bunch of studies." This shows how different stances struggle in Aino's overt talk, and how her inner dialogue seems to contain several voices (Linell, 2009). Hence, despite a strong research-orientation in her work, Aino questions the dominant role of science in defining the therapy process; in so doing she takes the patient's perspective, thereby including the patient's personal voice. This situation illustrates how there can be two points of view (voices) struggling within the same person.

Later in the same piece of writing Aino categorizes herself as a mathematical and numerical type of person:

Aino: I am a mathematical and numerical type myself so that sometimes at work I have had to consciously broaden my views from staring at instruments. Do the degrees of an angle make any difference to the end result in terms of the patient's

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functioning? Indeed they do, but they need to be used together with a broader way of thinking.

Through her self-categorization (Grossen & Salazar Orvig, 2011) as a recognizable type of person (i.e. voicing, Wortham, 2001), Aino relates her activity to a one particular kind of science (as distinct from another). However, she questions her own activity of “staring at instruments” in her internal dialogue. Her internal dialogue reveals that she finds this positioning too narrow: “I have had to consciously broaden my views.” The confusion manifested in Aino’s internal dialogue is supported by Niina’s account, based on her own work:

Niina: Aino, you took up an important issue about the effectiveness of therapy. Just how many intervening factors there are, with regard to human-related research! This week at my work on several occasions I again happened to notice that no matter how strictly you have worked (i.e. as a therapist) according to the rules of science/knowledge, the human mind keeps surprising you. Indeed, what a huge impact the psyche has on recovery! Once the “core” of a person is in order, many other things settle down and improve. Often my clients ask about so-called alternative treatments of different kinds (massage of the neural pathways, zonal therapy, etc.). As you know, conventional medicine does not acknowledge these alternative treatments, so there is not what you could call research evidence for these. Nevertheless, some clients have got help from these, is this after all something to take account of?

Niina understands Aino’s internal dialogue and continues her discourse within the same frame. Thus, Niina identifies an internal dialogue in Aino’s utterances and verbalizes it further. It seems that the external dialogue provides a space for supporting the contradiction in an inner

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dialogue. Moreover, in Niina's internal dialogue, too, there are traces of conflicting voices. She sees a contradiction between "the rules of science" and the unpredictability of the "human mind." Furthermore, as in Aino's case, in Niina's internal dialogue there is a struggle between her own community (that of conventional medicine) and the clients' differing perspective (on alternative treatments). Thus, both Aino and Niina voice the perspective of patients/clients, and the importance of patients' subjective meanings. Even though they position science as a strong part of the *Me*, they also define themselves as practitioners whose work with patients is defined by their interpersonal encounters with them, and not solely by the rules of science. Through their personal accounts they define these encounters as unpredictable, subjective, and situated, and hence contrary to what they consider science to be. In this way, the students question the authoritative voice (that of conventional medicine, informed by the rules of science) which dominates and defines their activity as physiotherapists. In the students' discourse, two ways of thinking and believing are in tension. Even though rigid scientific rules seem to form the framing model that the students draw on to guide their activity as therapists, their internal dialogue demonstrates that this cultural model (i.e. the guiding therapy process) is open to modification, expansion, and re-negotiation (Gee & Green, 1998, p. 124). It seems that the rules of science are in tension with the "practical wisdom" (Tsang, 2007) gained and constructed through the students' everyday work. In the examples, the students' *I*-Positionings shift from a strong faith in science to questioning the pre-eminent position of science. This aptly demonstrates the inner struggle that can occur when one faces fundamental questions related to one's professional practice.

(ii) *Opposing the role of science.* In the next example – which is the opposite of the "reliance on science" position that the students above took in their discourse – one can see a

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position in which the emphasis on science is questioned. Nea indirectly criticizes the strong need felt by others (physiotherapists) to define their own field as science-based. In doing this, she uses *We-Positioning*, including herself within the same collective (the collective self, cf. Hermans, 2001), as if to soften her criticism, even while excludes herself from the others' position:

Nea: I'm glad to see that there are a few other physiotherapists hanging around here online. I wonder if we physiotherapists have a particularly strong need to prove our field as more scientific, so that people wouldn't just include it in what they see as quack treatments? I haven't heard very many physicians, nurses or, say, social workers ponder whether such and such a treatment has been scientifically investigated and proved effective. As far as I understand it, not many of the current commonly used treatments/therapies/interventions have been studied exhaustively, not more than any other – if I remember right, among medicines only penicillin has a completely “clean record.”

In her criticism, Nea emphasizes her *We-Positioning* by distinguishing physiotherapists from physicians, nurses, and social workers, who according to her observation do not speculate about whether their treatment is based on scientific research. She also puts forward the idea that many of the aspects that are influential in their work have not been thoroughly investigated. Aino answers Nea's criticism by acknowledging the role of education in defining their (the physiotherapists') thinking and actions as “evidence-based”:

Aino: In our training at least the evidence-based was emphasized so heavily that it may have become an obsession for physiotherapists. I guess we are the kind of people who must always be a little better, more efficient, and more careful.

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In this statement, Aino explicitly highlights the role of institutional education in the construction of the self. Through this transpersonal dimension, Aino associates physiotherapists with their educational community and its values and norms, i.e. the entities that define the physiotherapists' professional self (Grossen & Salazar Orvig, 2011). In this way of thinking, a reliance on the evidence-based research stressed in education is regarded as culturally correct behavior for a physiotherapist. It is a norm belonging to the generalized other, and a taken-for-granted cultural model that guides their activity. Evidence-based research can be seen as part of a professional genre, which consists of activities with a history in the educational and work community in question. The term *evidence-based* (which is constantly used in the students' discourse) is therefore, on the one hand, part of a social language, and on the other hand part of a theory of action and practices (Gee, 2010) existing in the students' educational and work communities. Aino reinforces this positioning by voicing (and thus characterizing) physiotherapists as people with certain characteristics (Wortham, 2001). Here, Aino seems to be defending her science-oriented position by relating it to the generalized other, which has become part of the *Me* (as a physiotherapist) or the *We* (as physiotherapists). Marjo (below) shares Nea's critical position, expressed through categorization:

Marjo: At a lecture on qualitative methods, someone who was an Obvious Physiotherapist/Sport scientist wondered how, in general, it is possible to obtain reliable information just by asking, "How have you experienced such and such a thing?" or "What is your view about such and such a thing?" This guy seemed to think that the only things that are true are those that can be measured by instruments, like gadgets for measuring muscular strength. It got me thinking about the LIMITED SCOPE OF SCIENTIFIC RESEARCH. In measuring the increase in muscular

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strength, a researcher is measuring the effects of exercises conducted in certain ways.

Well, then another researcher measures the effects of another kind of exercise conducted in a different way, and so on. **AND THESE ARE TRUE, AS TESTED BY SCIENTIFIC METHODS!** But they are only fragments of the truth.

In recounting her prior experience Marjo voices and characterizes physiotherapists/sport scientists as persons whose faith in science is based on quantitative methods. In using the term *obvious* she reveals her general attitude toward physiotherapists and sport scientists as belonging to a category which does not acknowledge the value of qualitative research, and which sees only the value of instrumental measurements. Her strong stance – emphasized with capital letters in her text– exhibits criticism of a measurement-based approach and of reliance on science as truth. This is a good example of how one’s position can be constructed by voicing and ventriloquating (evaluating) other characters (the “obvious” physiotherapist/sport scientist, researcher) in one’s personal account (Wortham, 2001). Marjo is distancing her own self from the voices the characters represent; in so doing she constructs her own critical position toward these voices.

The characterization here matches Aino’s self-categorization as a “mathematical and numerical type” (being) and “staring at instruments” (doing) presented above. Through these characterizations and self-categorizations, the students build their professional identity. On the one hand, the categorizations define what they are and do (Aino, identifying), but also what they do not want to be, do, or believe (Marjo, differentiating) (Gee, 2010; Wortham, 2001). Through these characterizations and categorizations they also build up a certain conception, to the effect that practices, activities, and beliefs based on quantitative research are dominant in physiotherapists’ work and in their *We*-Positioning. This appears to demonstrate the social origin of the categories in question, which can be seen as based on activities and practices in the

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students' educational and work communities. According to Grossen and Salazar Orvig (2011), these kinds of (institutional) categories are kept alive through discourse and (inter)action, and they contribute to the construct of a person's identity; as a result, they lead the person to define him/herself through these categories.

(iii) *Uniting science and practice.* A third type of position evident in the first task brings together two perspectives in defining one's professional *I*-Position. For example, Anita and Satu share this positioning in their discussion:

Anita: Theory provides a basis for practical work [...] if one understands and is able to properly internalize the theory or theories of one's own discipline, it will facilitate one's professionalism in many problematic situations. On the other hand, in this connection I can't help pointing out the significance of "tacit knowledge." Not all professional activity or practices are, or can be, based solely on theoretical knowledge; we also need the ability to reflect on events and activities – for some people it calls for a lot of practice, while others seem to have an almost innate ability to act in the right way, even in complicated situations.

Satu: I too have found myself using the phrase "it has been scientifically proven." Always when I use that phrase I find that it gives more weight to what I'm saying and supports my activities: "act in this particular way, because it has been scientifically proven that this alternative is the better one." [...] However, research studies and their findings are not always applicable to practice. And of course we must also keep in mind that what could be called everyday knowledge and experiential knowledge are very important in my own work, in particular, as it is so practically oriented.

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From the students' discourse, we can see how they construct dichotomies: scientific and theoretical knowledge versus tacit, everyday, and experiential knowledge. In taking this position the students draw a distinction between science and practice, but at the same time state that both define what they do in their professions. Here, they readily include different perspectives, despite creating a contrast through the dichotomies. This position acknowledges not only the value of scientific knowledge, but also the fact that their own work practices are not always based on research knowledge, being largely built on experience and everyday knowledge. Each student includes the perspectives of both practice and science in positioning the self as a professional self. Viewed in this light, scientific and practical knowledge can be seen as separate (cultural models), but as complementary to each other within a person's professional activity. Through their discourse, the students outline the notion that they need these different guiding frameworks in their professional activity.

Even though scientific and practice-oriented positions seem to be in harmony in the students' discourse, Anita's internal dialogue subsequently brings up issues that challenge her scientific position:

Anita: Recently, while working at the hospital, I have had to reflect on some fundamental issues in my own field of science (how to describe the professional foundation for new employees – how does an active rehabilitation approach differ from that of nursing or medical science, pedagogy, or other fields of science?).

Although there is already some research-based knowledge available in my field, I still feel I am representing a field (action therapy) that is in its infancy as seen by representatives of other scientific fields. Sometimes even my own faith tends to wear thin.

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Anita sees that her own field of science, action therapy, is in a lowly position in terms of the dominant research practices in her work environment at the hospital, and this seems to undermine her professional confidence. Subsequently, Satu acknowledges Anita's position and relates it to a working environment that both students share:

Satu: I decided to respond to your comments, because I have to ponder the same issues as you did while I'm working at the hospital. You brought up tacit knowledge, which I also referred to in my own commentary, though using a slightly different term. I understand well what you mean, and tacit knowledge is really important and it grows along with one's years of doing the work.

In her discourse, Satu acknowledges their similar perspectives and also the shared work environment – a hospital – as a uniting element in sharing an *I-Position*. This notion is also supported in Anita's reply:

Anita: Thanks, Satu, for your feedback – fortunately there are colleagues, other rehabilitation professionals, who often provide support in the “hard” world of medicine. Shared reflections and discussions give one the strength to plod on once again – at times even to tilt at windmills.

This comment by Anita repeats the internal conflict evident in the earlier example. She characterizes medicine and her work environment through phrases such as “hard world” and “tilting at windmills,” thus implicitly positioning herself and other “rehabilitation professionals” as excluded from the values represented by this “hard world” with its situated meanings (Gee, 2010). The hard world of medicine represents the dominant collective voice, and it seems that in this world Anita's personal voice or alternative collective voice (the field of action therapy) is in tension with the dominant voice. Thus, in Anita's self, various collective voices – which

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represent different value systems, beliefs, norms, and places (a hospital) – seem to be in conflict. Anita’s own idea of practicing action therapy does not fit the “hard” world of medicine and the values connected to this world. Anita also expresses her appreciation of discussions with colleagues and their support, including Satu’s current feedback, recognizing their shared (identity) work which can encompass “tilting at windmills.”

Positioning different approaches to science

In the remaining tasks, the students reflected on their experiences in the light of the course material. Hence, the philosophical reading material served as a resource for making sense of their own experiences and defining *I*-Positions. In tasks 2–4 the assigned texts dealt mainly with themes such as the essence of science, and the history of science. As a consequence, whereas the first task had elicited general student discussion on the nature of science, in these latter three tasks the reading material seemed to promote construction of the dichotomies between different approaches, and between science and pseudo-science.

(i) Against the dominance of a single position. In the following extracts, Nea and Anita are discussing multidisciplinary research as a way to understand their field:

Nea: I think that multidisciplinary research is the only appropriate way to understand one’s own field of science in its entirety. Segmental research is just a part of the truth and we should therefore be careful when interpreting and applying the results of segmental studies. In gerontology, an example of segmental research would be biogerontology, that is, studies in which for instance various test animals are used to examine the effects of aging on tissues. Aging is a highly individual process and

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therefore tissue measurements do not tell the whole truth about functional ability and life expectancy, for instance.

Anita: I agree with you that multidisciplinary research in health sciences (gerontology, physiotherapy, action therapy, etc.) is called for, because cellular research based on natural science or experiments conducted under laboratory conditions do not give sufficient knowledge for clinical work. When today's key phrase in rehabilitation is "to enable participation" – in action therapy "by meaningful activities to support participation in daily activities, playing/studying and free time, in addition to resting" – quantitative research alone will not give us information on how we could provide the best research- or evidence-based rehabilitation. In addition to this we also need meaningful, qualitative information on health promotion, good rehabilitation practices, and so on.

By taking a similar position on the need for multidisciplinary research in their respective fields, Anita is constructing a *We-Position*. In addition, instead of using the pronoun *I* as an indicator of the personal position in her discourse, Anita uses *we* as if to highlight the collective position of action therapists and other professionals in rehabilitation. In supporting their view on the need for multidisciplinary research, Anita and Nea are arguing against the use of one single approach in their field of science. The words the students use, such as *segmental research*, *test animals*, *cellular research*, *tissue measurements*, *experiments*, and *laboratory conditions* are part of the social language of natural sciences and quantitative research. However, this approach alone, with its related cultural models, is seen as insufficient to define or explain the processes of aging or rehabilitation, as defined by the students through their discourse. Terms such as *individual process*, *meaningful activities*, and *meaningful, qualitative information*, which belong

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to the social language of human sciences and to qualitative research, are used to support the need for another kind of view in evaluating functional ability or in establishing good rehabilitation practices.

Within their discourse, the students thus construct dichotomies between two ways of thinking and doing. They imply that quantitative and natural science approaches are the dominant voices framing research and work in their fields (i.e. gerontology, rehabilitation). From the positions of practicing their professions, the students seem to be against the dominance of one voice, viewing qualitative research and human sciences as just as important for research and work in their fields. This notion is explicitly supported later in Nea's discourse:

Nea: In my own field of science, gerontology, I have perceived that quantitative research is more highly regarded than qualitative research, due to its nature as "strong medicine." However, not everything can be observed or measured without any ambiguity, and for this reason qualitative research definitely has a role to play in the human sciences.

The students' discourse appears to reflect a major debate (i.e. Conversation, see Gee, 2010) between different scientific approaches. It would seem to have a history in the scientific and work communities or institutions to which the students belong. The internal conflict evident in the first task is at least partly externalized as a conflict between different approaches to science, and as resistance to the dominance of voices that appeal to the natural sciences and to quantitative research in the students' fields of work and science.

(ii) *The boundaries of (natural) sciences are too narrow.* Another tension evident in the students' discourse is related to the boundary between science and pseudo-science. Aino, Niina, and Tiina pay particular attention to this issue:

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Aino: This week, I've been reading texts from Optima and on paper, and frankly speaking I feel that my head is somewhat overloaded. Really, one no longer knows what to think about an issue, and now one questions one's own work, science, and research and whatever it was, and I cannot make any sense of this, there are simply too many ideas. So I decided to look once again at this "what is science" issue, on the basis of Niiniluoto's article, because it has most relevance to me personally. I have always considered myself a type of person who is very much oriented to science and especially to natural science, and who is somehow schematic and mathematical. For this reason, it feels somehow overwhelming to question everything now. Admittedly, at the same time, really interesting too. What's hard for me is that one can keep elaborating the idea endlessly and never reach a solution.

At the beginning of her text, Aino explicitly describes the inner tension and confusion she faces when she reads the philosophical course material. This leads her to question her own "work, science, and research." Again she voices and categorizes herself as "a type of person who is very much oriented to science and especially to natural science," and it seems that from that *I-Position*, she finds herself facing a challenge when she is introduced to fundamental questions concerning the essence of science. It seems that her orientation to natural science (according to her repeated self-categorization) represents a dominant voice adopted from authorities in her work and study environment. According to Linell (2009), an authoritarian voice often resembles cultural assumptions that the individual does not question, with the result that once the ideas of this voice are internalized, adherence to them often becomes a kind of self-discipline. Aino's repeated categorizations of herself as mathematical, numerical, and schematic can also be seen as based on a cultural model that she constantly leans on in interpreting (new) situations (Gee &

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Green, 1998). However, it seems that when Aino is introduced to texts that offer alternative conceptions, her beliefs pertaining to her “natural science-oriented” *I*-Position become questioned. Some of the presented texts violate the “typical story,” the theory, or the figured world (Gee, 2010) of (natural) science that Aino has leant on. Later in her internal dialogue, this tension is externalized when she juxtaposes the voices of Oriental and Western medicine and questions the dominance of the voice of Western science:

Aino: So, what stand should we take on Oriental medicine, for example?

Acupuncture has been proven to have medical effects, but what this is based on is unknown. Are we thus already dealing with pseudo-science, or where is the dividing line? Oriental medicine treats a person as a whole and it takes the psyche into account more intensely than Western medicine. The effect of the psyche cannot be measured or questioned, yet it is a fact. To what extent is getting well based on what our society considers appropriate treatment? In Western countries, we are used to thinking in a different way compared to the Orient. However, along with globalization, sciences and pseudo-sciences are mingling and changing. In my opinion, we should also remain open to taking into consideration matters that we regard as pseudo-science, and to looking at them with the same interest that we are able to show towards “our own science.”

It seems that when Aino is introduced to ideas that do not support her current beliefs, these beliefs become questioned and negotiated in her internal dialogue. Aino questions and re-negotiates the collective voice of Western society she has adopted (“in Western countries, we are used to thinking”) considering it to be too narrow a perspective (“Oriental medicine treats a

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person as a whole...”). Niina takes a similar position in her account of a personal experience related to her studies:

Niina: I agree with you on pseudo-sciences: whether people should begin to consider them more widely and without much prejudice, since something new could emerge from there to be studied and thought about. On Fri and Sat I was once again studying in Kuopio and attending a seminar on summarized texts. I acted as an opponent to a student whose summary concerned occupational indoor air problems and the approach was psychosocial. We know that indoor air problems are complicated and arouse a variety of feelings. Often measurements fail to identify anything causing the symptoms, but people just keep having the symptoms. Often the measured targets have been wrong, perhaps, but often in the background there are also attitudes and experiences related to the investigation process, and these were clearly present in this summary as well. So, what factors actually lead to a successful investigation of indoor air problems and, then again, how do people end up with a slow and unsuccessful process? The result was that in the process one ought to take into account human and social factors. Are these issues science or not? I think this is the same thing that you took up: “The effect of the psyche cannot be measured or questioned, still it is a fact.” Isn’t it one foundation of science that “on top of, or to replace” old knowledge, people find new knowledge and also dare to use it?

It seems that in the work, science, and study communities that the students have been involved in mostly deal with research pertinent to natural science, and that the perspective is mostly physiological and physical. Their discourse suggests that research dealing with “a person as a whole” or “the psyche” (Elina) or with “human and social factors” (Anna) has a minor

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position, or is even regarded as pseudo-science in their scientific positioning. For example, Anna asks “Are these issues science or not?” The inner confusion of the students thus results from questioning the voice of a generalized other, or an authoritative voice that they have adopted. They see this dominant perspective (e.g. Western medicine, “our own science”) as too narrow, and as representing “old knowledge,” when viewed from a position that makes personal sense here-and-now, or from the position of another perspective (for example, Oriental medicine). In her comment Tiina seems to share this position: she explicitly criticizes the dominant research practices of the (dominant) academic community on the grounds that it suppresses a wider and more open-minded perspective:

Tiina: I, too, have thought about the distinction between science and pseudo-science and also about the kind of losses there might be in always choosing the investigative method proven by studies conducted in the past. So shouldn't we really be more open-minded and search for new paths?... In my opinion, the problem is ultimately that the academic community seems to regard “scientific anarchy” as less prestigious than research that is able to point out causal relationships and statistical predictions yielded by traditional means.

The examples show that when confronted with different ways of thinking, the students reflect on and become aware of the cultural models and underlying voices in their (collective) thinking and practices.

Constructing a unity-in-diversity *We*-Position through heterodialogue

In the fifth task, the students were introduced to two philosophical texts representing two different points of view as regards human and natural sciences. Thus, Varto (1992) emphasizes

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the radical differences in the basis and methodology between natural sciences (labeled as *exact* sciences) and the human sciences (labeled as *strict* sciences). By contrast, Raatikainen (2004) finds many similarities in the two scientific approaches, including similarities in research practices. Through the texts, the students engaged in and continued the major Conversation (Gee, 2010) between different approaches to science. This is explicitly acknowledged by Nea:

Nea: I read Varto and I thought, here we are again faced with the fundamental questions – the debate between two methodologies continues. However, the question is apparently about two different ways of understanding the world. In the discussions in my own field, these very same things are pondered and a division is made between “hard” and “soft” sciences.

(i) *Texts as supportive or as providing counter-positions.* The students were engaged in *heterodialogue* (Linell, 2009) with the ideas found in the texts. This dialogue could thus bring forward resources for strengthening their *I-Position*, whether through the support provided for their ideas, or through a willingness to contradict the notions presented in the reading material (cf. ventriloquation, Wortham, 2001). In the next example, Anita and Anni use Varto’s basic idea – of separating out different scientific approaches – as a counter-position to their own holistic view (Linell, 2009). Thus, they reinforce their own position by *differentiating* themselves from Varto’s position (Wortham, 2001):

Anita: I’m still thinking about Varto’s rigorous dichotomy between exact and strict sciences. In my opinion, both “orientations” are needed in human sciences, because for example in health sciences and social sciences one is well justified in studying phenomena that affect the reasons for human health/illnesses and participation (from the viewpoint of natural science), but on the other hand, it is important to pay special

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attention to people's experiences, in relation to meanings and qualities from the viewpoint of health, illness, and participation. We need exact, technical expertise and knowledge – not forgetting a human, nurturing, and caring approach, as well.

Anni: I'm thinking along the same lines as you in that in the human sciences, health sciences, and action therapy, we need views and a research methodology from both exact and strict science. For health and social sciences, for example, you gave a good description of the kinds of matters for which we need the methods of exact science and those where we need strict science. Both these views/research targets are important in this field of science. I think that Varto draws too sharp a distinction between these two types of science (as mentioned already in previous writings). So, personally I am in favor of a more moderate view that allows for both research orientations.

The above dialogue represents a *We*-Position that can be called a unity-in-diversity position. It is one that all of the students seemed to share at the end of the course. Sharing this position, they argued for the equal significance of human and natural sciences, and for equal weight to be given to strict and exact sciences. This they saw as forming a basis for their professional practice and as constituting part of how they perceived and made sense of their field of science. In their *I*- and *We*-Positioning, they drew on different approaches with their distinct characteristics (encompassing diversity) to create a holistic view that included both exactness and strictness (encompassing unity).

(ii) *Refining one's position through conceptualization.* In the following discourse, Tia uses the permissive approach presented in Raatikainen's text to support a unity-in-diversity position (Linell, 2009). This example also highlights the role of texts as resources for refining one's

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position through conceptualization (Arvaja, 2012). The texts helped the students to conceptualize and construct their positions through outlining definitions of different scientific approaches. Tia uses Raatikainen's text (its concepts and its definitions of different approaches) in constructing her *I-Position*:

Tia: I can't see physiotherapy as separate from either scientific domain, in so far as it is important and necessary in physiotherapy to make use of research from both disciplines. As Raatikainen says, human physiological and biological qualities set certain preconditions and produce various general tendencies. For their part, natural sciences, such as brain research, provide illuminating knowledge concerning humans and they help us better understand ourselves/humans. But because a physiotherapist works with people, it is not sufficient that we know about anatomy and physiology or that we make use of medical research into various illnesses; in other words, that we draw on natural science. We have to account for the whole human being, a person as a unique being; cognition, psyche, mood, motivation, and so on. For us, it is not enough to have knowledge and research merely on how muscular strength develops; we also need to understand some background on how we can get a person to learn, find motivation, or how a person's psyche or mood or cognition comes into play. Thus, it is necessary to draw on the human sciences. The basic idea of a sympathetic human science is the notion that human subjects and communities need to be studied from their own point of view. In the study of humans, one must take into consideration the rationale for one's activities and the actor's own perspective. So, depending on what is studied, it would also be useful in physiotherapeutic research to draw increasingly on qualitative methodology beside the quantitative one.

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Unfortunately, at least my impression and view is that the leading journals in the field publish qualitative studies only very rarely. People still lean on and believe in quantitative research and in knowledge obtained only in this way.

In Tia's discourse, the emphasis is on the *We*-Position, which she explicitly expresses by using the pronoun *we* in her discourse. She identifies herself as part of the professional group of physiotherapists (*We*) and takes a unity-in-diversity position, emphasizing the importance of taking into account "the whole human being" including both "physiological and biological qualities" and "cognition, psyche, mood, motivation." She relies heavily on Raatikainen's ideas in supporting and constructing this position (Linell, 2009). Thus, she ventriloquates (evaluates) the voice represented by *identifying* with it (Wortham, 2001). By using phrases such as *we have to account for, for us, it is not enough, and we also need to understand*, she adopts the voice of the physiotherapists (*We*-Positioning) and defines what they are, do, and think (Gee, 2010). However, at the end of her discourse, Tia argues that this position is not supported in the physiotherapists' scientific community. In quoting Raatikainen's text she first of all speaks in favor of sympathetic human sciences and of the necessity of taking a participant's perspective in studying humans. In relation to this position, she argues in favor of qualitative research, but critically points out that it still has a minor position within physiotherapeutic research.

(iii) *The struggle between voices*. In the following dialogue, Anita and Aino join in, sharing the unity-in-diversity position:

Anita: You're discussing the utilization of the perspectives of human and natural sciences in your own work on the basis of Raatikainen's article. Good reflections from both of you [Tia and Satu]. In my own field as an action therapist, I see this issue very largely in the same way. I think that in health and social sciences, there is

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good reason to study phenomena that affect the reasons for people's health/illnesses and participation (from a natural science perspective), but on the other hand, it is important to pay attention to people's experiences, meanings, and characteristics from the perspectives of health, illness, and participation. In one's work one often comes across merely what, for example the referring body (doctors) value and appreciate (research consistent with natural science; unfortunately).

Aino: Yes, indeed, this is precisely the way I see it in physiotherapy and in my own work. The problem just lies specifically in the fact that, for example at work people place too high a value on the views of natural science. One has to measure mobility and muscular strength, and so on and compare the results and assess effectiveness in that way. [...] Another issue I face at work is the compilation of statistics. If I spend time in the ward discussing with a patient, talking about goals and motivation, listening to the person and evaluating her emotional state, without performing actual physiotherapy, meaning muscular or mobility or functional exercises, can I then record the visit as a physiotherapeutic visit? Since I didn't actually perform any therapy, but since much time was spent and after the discussion the patient is likely to be more motivated to engage in rehabilitation and more cooperative when we start actual training. I look after many patients with wounds and burns, which are often painful. A thorough discussion and program laid out for the therapy has often been a good thing and more effective than engaging in actual therapy right away. The only problem is that I really can't just mark on my daily nursing record sheet "discussed therapy." At that point one is liable to cheat and include, say, a stretching activity or

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a quick final inspection. That's how it is; the emphasis is too much on natural science.

The above dialogue can be seen as an example of the internal sharing of an *I*-Position (Hermans, 2001). The students recognize in themselves and in others the same position in relation to different scientific approaches and their role in their professions. Through a dialogue, they then construct a *We*-Position. However, Anita and Aino also acknowledge that their unity-in-diversity position is not supported in their work communities. In Anita's and Aino's discourse, it is evident that they experience a contradiction between their own values and the values ("what the doctors value") and practices ("compilation of statistics") of the work community. Thus, Anita and Aino share a view on the dominance of natural sciences, and they both describe work practices that reflect and support this dominance. In the same vein, Tia mentions the dominance of quantitative research over qualitative approaches in the publications of her field. In each case, the *I*-Positions (as an action therapist and as physiotherapists) are in conflict with some of the prevailing practices, norms, and values in the respective workplace or science communities. Thus, even though their discourse is based on agreement and shared viewpoints in general, they share the same critical position toward the dominance of certain voices, with their preferred practices, norms, values, activities, beliefs, and artifacts.

The students' external dialogue reveals a struggle between their professional/personal voice and the authoritative voice in their work community. In other words, the students are engaged in collective criticism against the authoritative voice they recognize in their work and related science practices. Here, others (doctors) come to function as defining positions regarding *what is not Me*, and practices (such as the compilation of statistics, publishing practices) emerge as defining the practices that *I do not agree with* (Akkerman & Meijer, 2011; Gee, 2010;

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Wortham, 2001). Through the conceptions voiced by the students, one can interpret strong support for the view that the technical-rational model (Tsang, 2007) is inappropriate (as a cultural model) for professional practice in which there is a need to take into account the patient as a whole person, i.e. not merely the body, the anatomy, or the physiology, but also the mind; feelings, motives, and values in inter-personal interactions. For the students in the study, this also meant incorporating the patient's voice and perspective, that is, the patient's experiences and subjective meanings.

(Dis)continuity in the *I*-Positions

An interesting finding concerning Aino's discourse was that while in the first task she categorized herself as a natural science type of person – one who has adopted the activities, practices, values, norms, and beliefs pertaining to the natural sciences dominant in her work and study communities – at the end of the course she criticized those values, norms, and practices. However, as can be seen from the examples, Aino was at various points in the course engaged in an internal dialogue in which voices from different perspectives met. This exemplifies how – when one engages in identity talk that includes reflecting on one's own beliefs, values, and practices (i.e. doing, being, and thinking) – these voices become explicit and re-negotiable. A change in Aino's *I*-Position is explicitly stated in her last written text (task 6):

Aino: At least for me this course has taught me a quite different way of thinking for doing research and has broadened my approach to science in general. It seems that I started from Sharply positivistic notions and ended up with a fairly broad and open view on the importance of qualitative research and human sciences, for example. It's good to stop and reflect on things and their meanings every now and then. At work

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one is often measuring just for the fun of it and it has no significance, in the end, for the patient let alone for science. Actually, it may have been the most important lesson for me in this course; to consider what truly significant science actually is. It is by no means about angular degrees and instruments, but about consideration of causal relationships more broadly and with consideration given to humans and interaction. Although it sometimes feels that the thinking was really tangled, in the end one must say that this has been a good process. Thanks for it!

Aino's statement clearly demonstrates how the matters discussed, read, and written about in the course had an impact on the *Me*. Aino implicitly gives her view that what she thinks now is different from what she thought before, thereby indicating re-negotiation of an *I*-Position: "I started... I ended up..." As previous examples have demonstrated, Aino constantly voiced and positioned herself as being "a natural science type." However, exposure to diversity via the different approaches challenged and changed her scientific and professional *I*-Position. It seemed that in this process she lost the "sense of dogma" that characterized her earlier conception of science, and that she now saw science as negotiated and changeable (cf. Ligorio, 2010, p. 101). She became aware of the cultural models and related practices (e.g. measuring) guiding her doing and thinking. By changing her *I*-Position, she created new meanings and consequently arrived at a new theory of the figured world of science (Gee, 2010) that guided her thinking and believing.

The importance of acknowledging different perspectives and questioning the authoritative voice (the "given from above" voice) is also highlighted in Nea's comment:

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Nea: The course awoke a desire to think about things from different perspectives without agreeing with one correct perspective given from above. Through the course, this was manifested in thinking about the differences between human and natural sciences.

Anita, on the other hand, is an example of a student who strengthened her *I*-Position during the course. Throughout the course, Anita (like many other students) highlighted the importance of different scientific approaches in positioning one's Self as a professional or as a student of health sciences – this despite the fact that her internal dialogue revealed a tension related to the minor position of her own field in the “hard world of medicine.” Exposure to the course texts (in which there were views consonant with those held in her own occupation, which she saw as having a low status) actually seemed to strengthen her position. In her writing below, she mentions an aspect that could in the future provide a solution to the personal and collective tension evidenced in her writings:

Anita: On the other hand, I've been thinking myself, having now studied philosophy a bit, that we probably won't benefit very much if we consider things strongly through contradistinction – or if we can find consensus only once we examine different fields of science as fragments, as parts, and thereby succeed in finding pieces from which we can, by combining the best aspects, come to the conclusion that both strict and exact sciences are needed in this world.

Anita seems here to be arguing against the mere juxtaposition and isolation of different approaches. Ho and colleagues (2001) suggest that the self has a tendency to organize and seek unity among different voices involving the dialectic of unity and diversity. For the dialogical self, new meanings and possibilities emerge through achieving a dialectical synthesis, unity with diversity. This tendency seems to be present in Anita's discourse.

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Even though Aino was the only student whose scientific *I*-Position clearly changed during the course, all the students seemed to refine their scientific *I*-Position by conceptualizing their experiences in the light of the philosophical knowledge they were exposed to, and through considering the various voices, and cultural models underlying their thinking. Hence, by providing a forum for “identity talk” (Cohen, 2010), the writings, discussions, and reflections around the learning materials gave an opportunity to refine, strengthen, and reconstruct the students’ own *I*-Positions. In other words, they provided the students with a forum for the recognition and negotiation of their disciplinary and professional identity.

DISCUSSION AND CONCLUSIONS

In accordance with the dialogical approach, a readiness to acknowledge the students’ own lives and experiences as resources for learning can lead to a learning situation in which the (institutional) knowledge provided by the teacher becomes a mediating tool for understanding those lives rather than an end in itself. When the health science students were prompted to use their professional and discipline-related experiences as a resource in interpreting different philosophical approaches, they moved towards a discourse in which they were able to reflect on and analyze these experiences. They engaged in *reflective identity talk* (Cohen, 2010) and *recognition work* (Gee, 2010) through which they could reason and share beliefs, values, activities, practices, and conceptions associated with their discipline and work. In so doing they were able to make themselves and their actions visible to one another (Gee, 1999), and hence to express and construct their *I*-Positions (Akkerman et al., 2012). Through their discourse, the students built situated meanings of being and doing as a health science professional or as a student of health sciences.

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In the students' *I*-Positionings, there were struggles, integrations, and shifts between different positions and voices. These were closely related to the tensions between different Discourses, manifested as a debate, i.e. Conversation (Gee, 2010) in the students' discourse. Throughout the course, it seemed that the contrastive pattern the students used in discussing different approaches to science served as a resource for making explicit and critically evaluating the contradictions they perceived with regard to their work and discipline. This also facilitated conceptualization of their professional and discipline-related experiences. By analyzing their experiences in the light of different approaches and new perspectives, made visible through the philosophical texts, the students became aware of different voices and value systems which underlay their thinking and activities, and which were liable to cause tensions in their professional and scientific positioning.

It was possible to identify multiple theories and cultural models (Gee, 1999) that the students made visible through their discourse. The possibility to reflect on these (often taken-for-granted) cultural models made them explicit and re-negotiable. This provided possibilities to negotiate, strengthen, refine, and re-construct the students' own professional and scientific *I*-Positions. Here one could observe how making one's understanding explicit and reviewing current practices and conceptions in the light of new knowledge led to new awareness, and to more refined or wider perspectives. For some students the process went further, leading to new identity constructions (Akkerman & Bakker, 2011).

Through the students' discourse, it became apparent that there were several co-existing third parties and others that played a role in defining the students' professional and discipline-related identity. A number of different entities were intertwined in their sense-making processes, including in particular study-related experiences (such as evidence-based research), general

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discipline-related perceptions (such as publishing practices), work experiences (dominant practices), and the voices of the patients, places, and institutions (such as a hospital). All of these worked to define the students' *I*-Positions and identities, i.e. they constituted "others," which (together with their related voices) contributed to the shaping of *I*-Positions.

It seemed that the world of education and institutionalized practices at work, with its emphasis on physical activity, anatomy, biology, and physiology, did not give the students an adequate frame to interpret their encounters with patients. The personal sense of meaning they had derived from everyday encounters with patients – in other words their practical wisdom (Tsang, 2007) – was in contradiction with the "official frame" (cf. Rajala & Sannino, forthcoming) and with the authoritative voice (Linell, 2009). However, despite the conflicts and minor positions that some students felt in their positioning, the students constructed and reflected a unity-in-diversity *We*-Position, in which they stressed the equal importance of different approaches in defining themselves as professionals and as students of health sciences. Thus, they were able to construct a Discourse of health science professionals and students (Gee, 2010). This was done through positioning (voicing and evaluating) different (relevant) voices in the social world with respect to one another, and through taking their own (*I*-)position with respect to these voices (Wortham, 2001).

Altogether, it seemed that the reasoning tasks were able to elicit an internal dialogue, in other words, negotiation between different *I*-Positions of the self, or a heterodialogue with the texts (Linell, 2009). This was manifested in tensions and contradictions in the students' overt discourse. When the students were discussing their experiences, their external dialogue was mostly harmonious and characterized by sharing, acknowledging, and adopting a similar position. However, even though the students were not engaged in argumentative talk (which is

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often regarded as necessary for collaborative learning), it can be suggested that their external dialogue had an important role in their discussion and learning. Tsang (2007) sees a contrast between internal dialogue, which has a “self-generative capacity” leading to new possibilities for thought and action, and external dialogue, which may be essential for the validation of one’s own ideas. Phenomena of this kind emerged in the present study, in which the views of others seemed to shed light on various inner tensions and to add weight to a particular option in settling inner struggles. Through sharing and constructing a *We-Position*, the students strengthened their professional identity. The way of defining one’s individual identity in the discussions was based not only on identifying with similar positions, voices, or views, but also on differentiating oneself from the voices of those who “are part of what I am not” (Akkerman & Meijer, 2011, Wortham, 2001). This kind of contrastive discourse was targeted against the voices of different others – other professional groups with which the students were working, and the authoritative voice behind practices and norms in the workplace. Thus, in their shared discourse the students questioned, criticized, and challenged various third parties, voices in the texts, and generalized others, even though their external dialogue remained harmonious. It can be said that the students shared a similar professional identity through recognizing the similar values, beliefs, and practices present in each other’s discourse.

The pedagogical design of the course was such that the issues addressed were important, meaningful, and relevant from the students’ own perspective. Within the course the students were prompted with special “dialogic provocations” through the reasoning tasks. These supported their “ontological engagement,” which is important for dialogical learning (Matusov, 2011, p. 115). The study demonstrated that the texts were important resources in introducing the students to different voices, and that these voices served as sources of tension. The texts seemed

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to offer the students new cultural models, which brought fresh values, perspectives, and assumptions to the situation, and which served as tools for making sense of experiences and re-negotiating their situated meanings.

As a general observation, the ability to reflect on fundamental questions relative to professional practice seemed to promote new awareness and professional self-understanding (Alsup, 2006). As far as professionals and students of health sciences are concerned, engagement in more explicit talk on professional identity can also be seen as essential in strengthening the voice (Cohen, 2010) and agency (Lipponen & Kumpulainen, 2011; Vähäsantanen et al., 2009) of those concerned, in the context of their respective communities.

The online environment provided an ideal context for the students' reflective discourse, which combined institutional and personal knowledge. Linell (2009) has argued that some communication types favor reflective processes more than others. Reflection presupposes that one can take an observer's role in the flow of discussion. One advantage of an asynchronous discussion forum was that it supported such reflective processes. It gave time to observe and reflect on ideas – whether one's own or expressed by others – due to the fact that these were readily available during the entire learning process (Wegerif & De Laat, 2011). It thus appeared that the online environment used in the course provided a supportive context for reflection and identity discourse. It is true that reflection can, generally speaking, be enhanced merely by giving adequate time and space for it. However, for the purposes of learning as an identity work, there are clear advantages in providing specific opportunities for students to reflect on personal experiences, and thus engaging them in identity discourse. Moreover, as Wortham (2001) argues, narrative (e.g. telling one's life experiences) embodying the process of positioning has *per se* the power to transform the self. This implies that in order to support meaningful, "horizontal"

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learning (Akkerman & van Eijck, 2011), the principle of personalization could well be applied to designing learning activities and guiding pedagogical choices at all educational levels, and in different learning contexts (e.g. Ligorio, 2010; Rajala & Sannino, forthcoming).

Even though the study demonstrated the value of “dialogical provocations” in promoting the (re)negotiation of a professional sense of self during a single university course, one must emphasize that the dialogical self is negotiated in many other ways, including everyday social and socio-cultural encounters (e.g. Mol, 2002). Hence, future studies could look closely at *I-Positioning* as it occurs within the ongoing social and organizational life of professionals, seeking to shed light on how the professional sense of self is negotiated between the individual and the social world in everyday activity (Billett, 2006; Mol, 2002).

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