

Experiences as Resources for Sense Making: Health Education Students' I-positioning in an Online Science Philosophy Course

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Abstract: This study on dialogical learning explored how different philosophical approaches and reflections on these issues became a resource for health education students for understanding their work and discipline-related experiences. Especially, the focus was on exploring what "I-positions" the students constructed, and how different "voices" encountered in the students' discourse. The subjects, 11 health education students, attended an online course on the philosophy of science in the context of higher education. In order to study students' internal and external dialogue in terms of analyzing multivoicedness in their sense making process, a discourse analysis was used. Results showed that by reflecting their experiences in the light of different scientific approaches the students became aware of the different voices that underlie their thinking and activities and seemed to cause tensions in their professional positioning. This resulted in refining, strengthening and re-constructing their professional and scientific I-positions, and constructing a We-position.

Theoretical background

The dialogical perspective on learning and instruction has stressed the importance of acknowledging students' personal lives as resources for meaning-making. Building on Dialogical Self theory (Hermans, 2001), Akkerman and van Eijck (2011) talk about I-positions, which people use to express their different voiced perspectives. These I-positions vary within single individuals and are connected to the person's cultural and historical experiences and social relationships. In educational contexts, the fact that students come from various groups, communities and social networks, which are essentially reflected in their different voices and I-positions, should be therefore valued and recognized. One way to nourish students' different I-positions in educational contexts is by encouraging them to use their personal life experiences as resources and subjects for learning (Arvaja, 2012). This can be seen as promoting student identity work through giving personal meaning to learning activities. Therefore, as Ligorio (2010) argues, an educational process should help the students make sense of culture and communities, as well as themselves as active members of these communities.

According to Ligorio (2010), in education the dialogical nature of learning is often related to external dialogue between individuals, whereas internal dialogue within individuals, namely between I-positions of the self, are excluded. As a consequence most analyses and also efforts to promote learning in interaction have typically focused on the talk-in-interaction. Stressing the value of external dialogue only may lead people to assume and insist that learning situations must always be organized around some sort of conversation between individuals. This, in turn, might lead into neglecting the role of individual reasoning and internal dialogue in students' learning activities (Ligorio, 2010; Linell, 2009). However, if we consider learning from a dialogical perspective, it broadens our focus from the situated talk-in-interaction to the wider sociocultural and material aspects, and to the dialogism of the self (Akkerman & van Eijck, 2011).

From a dialogical point of view human sense making processes are profoundly interactional and contextual in their nature (Grossen & Salazar Orvig, 2011; Linell, 2009). Interaction comprises not only talk-in-interaction, but also interaction 'with the world'. Therefore, even a solitary activity, such as thinking, writing, reading, and sense making in general, is also interactional in its nature. More particularly, dialogism stresses the occurrence of several voices within individual persons as they are thinking on their own or being engaged in an external dialogue. This means that the self is based on multivoicedness manifested in expression of various and heterogeneous voices that have different social and cultural origins (Akkerman & van Eijck, 2011; Grossen & Salazar Orvig, 2011; Koschmann, 1999). The contextual aspect of human sense making highlights the fact that meaning making is anchored in both a physical and sociocultural world. Therefore, human interactions always take place in concrete situations that are mediated by artifacts and institutional rules and norms, for example (Grossen & Salazar Orvig, 2011). This stresses the importance of understanding the characteristic and "framing" of the learning situation in understanding the subject's behavior and discursive activity.

Talking about the dialogical approach to learning Akkerman and van Eijck (2011) speak for horizontal learning seeing "a learner as continuously shifting between different worlds, hybridizing and negotiating insights from different sites". They continue 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 that are part of students' identity and thereby part of their meaning making process. Ligorio (2010), argues that acknowledging students' personal perspectives by giving them a space to voice themselves and their perspectives in the school context can enhance students identity (de/re)construction.

Keeping the above notions in mind, in this study the health education students were encouraged to reflect on their discipline and work experiences when studying the reading material. The texts dealing with the philosophy of science provide different perspectives, “ideological voices” to reflect on one’s own multivoiced experiences. Through the reading material and discussions with one another the students come into contact with several voices (multivoicedness) that provide a context for negotiation and meaning making. Learning occurs when different voices (from different origins) are negotiated in the learning situation. Making learners contrast their own voices or perspectives with several other voices promotes reflective processes that are important for learning (Tsang, 2007). Reflecting individually and together on philosophical texts from the perspective of one’s work related experiences may also provide resources for students’ identity re-negotiations.

This study on dialogical learning explores how the health education students make sense of the philosophical knowledge through their own experiences and positions, and how they see themselves and their activities in the light of this knowledge. Furthermore, the focus is on analyzing what kinds of negotiations occur between different voices encountered in the students’ discourse. This, in turn, targets our attention to learning as identity building. It allows us to explore how the different philosophical approaches and reflections on these issues become a resource for understanding oneself and one’s own experiences, and thereby for identity construction. In sum, the aim of this study was on studying what I-positions the students took and constructed, and how different voices were encountered in the students’ internal and external dialogue during the course.

Methods

Participants and context of the study

The subjects of this study comprised 11 health education students (all female) attending an online course on the philosophy of science in the context of higher education. The students had a job, working as physiotherapists and action therapists, for example, and pursuing additional studies in health sciences, e.g. aiming at teacher qualification in health-education. They were thus studying part-time by distance learning while also working full-time. The students participated in the course from all over the country, and they met only virtually. The course utilized a web-based learning environment consisting of an asynchronous discussion tool, a tool for making text documents, and folders containing course material.

The course consisted of six learning tasks, all of which dealt with historical approaches in the philosophy of science. Each task was a reasoning task where the students were first supposed to read a given text (or texts) dealing with a particular approach within the philosophy of science. In reasoning about the task, the students were asked to use their prior experiences or conceptions about their own field of science or work as resources in interpreting the texts. Based on these tasks, each of the students was first supposed to write an *individual reasoning text*. In the next phase, the students posted their individual writings onto a shared web-based (asynchronous) discussion forum, and their task was first to read each other’s writings and finally to have a *shared discussion* based on these.

Data sources and analytical approach

One type of data consisted of students’ individual writings based on the reasoning tasks. There were altogether 66 writings. The other data consisted of shared asynchronous discussion postings. Across the six tasks, there were altogether 52 such discussion postings that commented on other’s writings or responses.

In order to study students’ internal and external dialogue in terms of analyzing multivoicedness in their sense making process, a discursive approach is necessary (Gee, 1999; Gee & Green, 1998). Discourse analysis is an analysis of social language, not an analysis of language per se (Gee & Green, 1998). According to this approach, language is seen as a socio-cultural practice and social resource of groups, and the focus of analysis is basically on what the participants accomplish through their discourse rather than on the linguistic forms or functions used as such. This allows for studying social meanings embedded in discourse as well as examining the cultural models, social and discourse practices that the participants draw on in learning and making sense of new situations. In this study, particularly the feature that the students are encouraged to discuss and reflect on their work and discipline related experiences is supposed to elicit discussion with the transpersonal dimension of the self (Grossen & Salazar Orvig, 2011). Therefore, zooming into the students’ discourse reveals how they position and see themselves through and in relation to their work, study and scientific communities, and how they display the norms, values, and beliefs attributable to these communities and/or to their Self.

In analyzing the individual writings and discussion postings around and about the learning tasks, the first thing to do was to extract from the data those work-, study-, and discipline-related experiences that were made discursively relevant (Linell, 2009) in interpreting and making sense of the phenomena under reasoning. These “tellings of personal experience” (Ochs & Capps, 1996, p. 21) were manifested in explicit discursive references to *texts, people, discourses, contexts, practices, activities, values, norms, and conceptions* related to the students’ work, studies, or discipline. These data segments, consisting of thematic meaning units or episodes

were separated upon further analysis. Then, a more intense focus was set on those data segments where students were expressing their I-positioning that depicted a personal tendency of thinking or doing (Akkerman et al., 2012). The analysis focused on what kinds of I-positions the students constructed and reflected and how these were related to other positions and voices that emerged in the course through different resources, such as the philosophical reading material, other students' contributions, and other "third parties".

Results

This section sums up the different I-positions found in the analysis of the students' discourse including both the individual writings and discussion around these writings. When it comes to interpreting the findings, attempts are made to illustrate the dialogicality of the I-positions, and the encounters of different voices (multivoicedness) in the student discourse. The section is divided into four themes that form a narrative of the course, serving also as a timeline that enables tracking possible continuities, changes and developments in the students' I-positions. For the purposes of this paper the presentation of the findings is particularly focused on exemplifying one of the students', Aino's, internal and external dialogue.

The role of science in defining one self

In the beginning of the course the most of the students define themselves as professionals whose work is strongly based on research, theories and scientific knowledge. The following example represents this position:

Aino: "Correctly and well conducted studies are of primary importance in my own work, for instance, and I always try to find an explanation for what I am doing, so that I can plead to "research-based knowledge". So there's great confidence in research."

In the example above Aino describes how research based knowledge is manifested in her everyday practices and guiding her actions and thinking in everyday work. Therefore, through her discourse it seems evident that scientific I-positioning is a strong part of her professional self. In the study, theories, frameworks and research-based knowledge can be seen as third parties that play a significant role in defining the way students think and act in their professions. Therefore, the way of seeing their activity through "science" can be seen as a relatively stabilized perspective in the professional self. This position highlights the transpersonal dimension of the self. In other words, positions within the self are not solely personal but connected to the social groups or communities (generalized other) that set rules, norms and beliefs in Me.

While the student discourse portrays a professional whose work is highly defined by scientific knowledge and theories, there are also traces of internal dialogue that questions the dominance of science in positioning oneself. The next dialogue between Aino and Niina is an example of a situation where the students are shifting between positions in their internal dialogue:

Aino: "We can think that in physiotherapy, for instance, the reliability of the therapies applied need to be proved scientifically before they can be used. This, I think, is just for the reasons of effectiveness and safety. And also for the reason that the particular field of science becomes better known and gains 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 were scientifically proven, does it make any difference, then? 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 raises another perspective for succeeding in a therapy process. 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 her inner dialogue seems to contain several 'voices' (Linell, 2009). Therefore, despite a strong research-orientation in her work, Aino questions the dominant role of science in defining the therapy process by taking up a patient's perspective, thereby accounting for the patient's personal voice. This situation illustrates how there are two points of views struggling within the same person. Later in the same writing Aino categorizes herself as a mathematical and numerical type:

Aino: "I am such a mathematical and numerical type myself that sometimes at work I have had to consciously broaden my views from staring at gauges. Do angle degrees make any difference for the end result in terms of the patient's functioning? Sure they do, but they need to be used together with broader thinking."

This self-categorization is a mark of a transpersonal self (Grossen & Salazar Orvig, 2011) through which Aino relates her activity to certain kind of science (but not the other). However, she questions her own activity “staring at gauges” in her internal dialogue. Her internal dialogue reveals that she finds this positioning as too narrow; “I have had to consciously broaden my views”. The inner confusion manifested in Aino’s internal dialogue is supported by Niina’s telling of personal experience from her own work:

Niina: “Aino, you took up an important issue about the effectiveness of therapy. Just how many intervening factors there are, considering human-related research! This week at my work again I got to find several times the fact that no matter how strictly according to the rules of science/knowledge you worked (i.e. as a therapist), human mind is always taking you by surprise. Indeed, what an impact does the psyche have on recovery! Once the “core” of a person is all right, many other things will settle and improve. Often my clients ask about so-called alternative treatments of different kinds (massage of neural pathways, zonal therapy, etc.). As you know, conventional medicine does not acknowledge these alternative treatments, so there is no so-called research evidence for these. Yet, some clients have got help from these, would this be worth noting after all?”

Niina grasps Aino’s internal dialogue and continues her discourse in 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 dialogue. Also in Niina’s internal dialogue there are traces of conflicting I-positions. She sees a contradiction between “the rules of science” and the unpredictability of the “human mind”. Furthermore, as in Aino’s case, also in Niina’s internal dialogue there is a struggle between her own faith in science and the client’s different perspective. Therefore, Aino and Niina are both voicing a patient’s/client’s perspective. Even though they position science as a strong part of Me, they also define themselves as practitioners whose work with patients is defined by their interpersonal encounters with them, and cannot be solely defined by the rules of science. In their personal tellings they define these encounters as unpredictable, subjective and situated and hence opposite to what they see science to be. In this way the students question the authoritative voice (the rules of science) that dominates and defines their activity as physiotherapists. Furthermore, we can see that their I-position shifts from strong faith in science to questioning the meaning of science. This demonstrates well their inner struggle when facing fundamental questions relative to their professional practice. According to Markova (2006), internal dialogue usually involves personal issues that require reflection and evaluation of one’s own and other people’s behavior, both past and present. It can be seen as an attempt to solve a person’s inner conflict between different ‘voices’. This can also be seen as a struggle between the 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 that may contradict with the collective position. Therefore, there is a tension between the students’ social position, outlined by societal definitions and expectations, and the students’ personal position.

A frequently used device in the students’ discourse was categorization. In the next example quite opposite to the “reliance on science” position that most of the students took in their discourse is a position where the emphasis of science is questioned. In her comment Nea indirectly criticizes others’ (physiotherapists) strong need to define their own field as science-based. In doing this she uses we-categorization including herself to the same collective (collective self, cf. Hermans, 2001), as if to soften the criticism toward the others:

Nea: “I wonder if we physiotherapists have a particularly strong need to prove our field as more scientific, so that people just wouldn’t include it to the so-called scam treatments? I haven’t heard very many physicians, nurses or, say, social workers to ponder whether this and this treatment was scientifically investigated and effective. As far as I understand, not many of the present generally used treatments/therapies/interventions have been studied exhaustively, not more than any other – if I recall it right, of medicines only penicillin has a ‘clean record’.”

In her criticism Nea emphasizes the categorization by distinguishing physiotherapists from physicians, nurses and social workers, who according to her observation do not speculate whether the treatment is based on scientific research. She also brings forward the idea that many of the things bearing influence in their work have not been (thoroughly) investigated. Aino answers Nea’s criticism by acknowledging the role of education in defining their (physiotherapists) thinking and acting as “evidence-based”:

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

Like Nea, Aino uses we-categorization in her positioning. 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 in defining their professional self. Therefore, leaning on evidence-based research stressed in education is regarded as a culturally correct activity for a physiotherapist and as such as a norm of generalized other. Evidence-based research can be seen as a part of a professional genre, which consists of activities with a history in their educational and work community. The term evidence-based, which is constantly used in many students' discourse, is therefore part of a social language or professional jargon of the students' communities. Aino also categorizes physiotherapists as a certain kind of "human type" with certain qualities. In this way she integrates the professional self with the personal self. In a way Aino defends her ideas presented before by relating them to the generalized other, which has become part of Me (a physiotherapist) or We (physiotherapists). Through these categorizations the students build their professional identity; on the one hand the categorizations define what they are, but also what they are not. Therefore, these categories have a social origin and are based on activities and practices in the students' educational and work communities. According to Grossen and Salazar Orvig (2011), (institutions and institutional) categories are kept alive through discourse and interaction and contribute to the construct of a person's identity and as a result lead the person to define him/herself through these categories.

The examples show how students make sense of the meaning of science in their work by referring to their experiences and past activities and practices. In their discourse the students construct different positions to science. Furthermore, there are struggles, integration and shifts between different voices and positions in the student discourse. The examples illustrate how the dialogical self is polyvocal, taking up different positions in internal and external dialogue, and may therefore appear quite fragmented at times. In particular, the examples highlight the role of institutions in the construction of the self. The examples demonstrate how science, education and work practices are all third parties or generalized others that define the students' beings and doings as professionals. On the other hand, they are also challenged, which is manifested in internal dialogue between different voices and perspectives. The discursive space between the students seem to arise mostly from their shared or similar experiences and perceptions and acknowledging the same position.

The boundaries of (natural) sciences too narrow

Aino: "In this week I've been reading texts from web and on paper, and frankly speaking I feel that my head is somewhat overloaded. One doesn't really know anymore what to think of what issue, and now one is questioning one's own work and 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 more at this 'what is science' issue, on the basis of Niiniluoto's article, because it bears most relevance to me personally. I have always considered myself a type very much oriented to science and especially to natural science, and being 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."

In the beginning of her text Aino explicitly describes an inner tension and confusion she is facing when reading the philosophical course material. This results in "questioning one's own work, science and research". Again she categorizes herself as "a type oriented to natural science", and it seems that from that position she is facing a challenge when being introduced with fundamental questions of the essence of science. It seems that her orientation to natural science (according to her constant self-categorization) represents a dominant voice adopted from authorities in her working and study environment. According to Linell (2009), an authoritarian voice is often like cultural assumptions that the individual does not question and once the ideas of this voice are internalized it often becomes a kind of self-discipline. However, it seems that when Aino is introduced with texts that offer different perspectives or alternative conceptions her beliefs pertaining to her "natural science oriented" position becomes questioned. Later in her internal dialogue this tension is externalized and she juxtaposes oriental and western medicine and questions the dominant voice of western medicine:

Aino: "Oriental medicine treats a person as a whole and takes the psyche more intensely into account than western medicine. The effect of the psyche cannot be measured or questioned, still it is a fact. How much is getting well based on what our society considers appropriate treatment? In western countries we are used to think in a different way compared to the Orient. Along with globalization, sciences and pseudosciences are mixing and changing, however. In my opinion we should remain open to take into consideration also matters that we regard as pseudoscience, and look at them with equal interest to what we are able to show toward "our own science"."

It seems that when Aino is introduced with ideas (voices) that do not support her current beliefs (an authoritative voice adopted) these beliefs become questioned and negotiated in her internal dialogue. It seems that in her particular work, science and study communities Aino have been involved mostly with research pertinent to natural science, and mostly from the perspective of physical activity. The research dealing with the psyche, therefore, seems to be in a minor position or in a position of the pseudoscience in her scientific positioning. The inner confusion that Aino faces is, therefore, a result of questioning the voice of a generalized other or authoritative voice she has adopted. She sees this dominant perspective as too narrow from her personal position or from the position of another perspective (e.g. oriental science). The examples show that when confronted with different perspectives and ways of thinking, the students also reflect and become aware of the underlying voices in their (collective) thinking and practices.

Constructing holistic We-position through heterodialogue

At the end of the course the students' are introduced with two philosophical texts representing two different points of view as regards human and natural sciences. In his text Varto emphasizes the radical difference in the basis and methodology between natural and human sciences, whereas Raatikainen finds a lot of similarities in their scientific approaches and research practices. On the one hand, the texts seem to help the students to conceptualize and construct their positions through providing definitions and qualities of different scientific approaches. On the other hand the students are engaged in *heterodialogue* (Linell, 2009) with the ideas stated in the texts, which serve as resources for strengthening the students' position either by supporting (Raatikainen) their ideas or by contradicting (Varto) some notions presented in the reading material. Through Varto's and Raatikainen's texts, the students construct a 'holistic' We-position, where they acknowledge the equal significance of human and natural sciences, qualitative and quantitative research as well as strict and exact sciences in their professions. Next example represents this position:

Anita: "You're discussing [Satu and Tia] the utilization of the perspectives of human and natural sciences at your own work on the basis of Raatikainen's article. Good reflections from both of you. In my own field as an action therapist I see this issue very largely in the same way. At work one just often comes across with 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 for my own work. The problem just lies specifically in that, for example, at work people have too high regard for the views of natural science. One has to measure mobility and muscular strength etc. and compare the results and assess effectiveness in that way. [...] Another issue I face at work is compilation of statistics. If I spend time at the ward discussing with a patient, talking about goals and motivation, listening to the person and evaluating her emotional state, without performing actual physiotherapy i.e. muscular or mobility or functional exercises, so can I then record the visit as a physiotherapeutic visit? As I didn't actually perform any therapy, but as 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. [...] There's only the problem that I can't really mark on my daily nursing record sheet just that 'discussed about therapy'. Then one will cheat and take say a stretching or a quick inspection in the end. That's how it is; the emphasis is too much on natural science. :)"

The above discussion thread can be seen as an example of internal sharing of an I-position (Hermans, 2001). The students recognize in themselves and in others the same position as regards different scientific approaches and their role in their professions. Through a dialogue they construct then a We-position. Even though Anita and Aino take a similar 'holistic' position as Satu and Tia, they also acknowledge that this position is not supported in their work communities, and in the dominant practices, norms and values of the 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 the view about the dominance of the natural sciences and describe work practices that reflect and support this dominance. Therefore, their positions as an action therapist and physiotherapist are in conflict with the prevailing practices in their workplace. Thus, while their discourse is based on agreement and shared viewpoints in general, they also share the same critical position toward their work practices. 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 in what is not Me and practices (compilation of statistic) as defining practices with which I do not agree (Akkerman & Meijer, 2011). Hence, through these conceptions that the students voice one can interpret a strong support for the view that the technical-rational model (Tsang, 2007)

is inappropriate when it comes to their professional practice where they need to take into account not only the body but also the mind; feelings, motives, and values in inter-personal interactions.

The (dis)continuity of the I-positions

An interesting finding concerning Aino's discourse is that while throughout her discourse she categorizes herself as a natural science type - as a person who has adopted the practices, norms and beliefs of natural sciences dominant in her work and study communities, yet, at the end of the course she ends up criticizing those practices. However, as we can see Aino is engaged in an internal dialogue at various points of the course, where different voices from different perspectives meet. Therefore, by engaging in reflective talk in which one can reflect on one's own beliefs, values and practices, these become explicit and re-negotiable. A change in Aino's I-position is also explicitly stated in her last writing:

Aino: "At least for me this course has taught a quite different way of thinking for doing research and broadened my approach to science in general. It seems that I started from Sharply positivistic notions and ended up in 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 one is often measuring just for the fun of it and it bears no significance, after all, to the patient let alone for science. Actually it may have been the most important lesson for me in this course; to consider what really significant science is. It is by no means about angle degrees and gauges but consideration of causal relationships more broadly and consideration of humans and interaction. Although it sometimes feels that thinking was really tangled, in the end one must say that this has been a good process."

Aino's statement clearly demonstrates how the things discussed, read and written in the course had an impact on "what I am". Aino implicitly states that what I think now is different of what I thought before, therefore indicating re-negotiation of an I-position. As previous examples demonstrate, Aino constantly categorized herself as being "a natural science type". However, exposure to the diversity through the different approaches and perspectives challenges and changes her scientific I-position. It seems that in this process she loses "the sense of dogma" that characterizes her earlier conception of science, and she now sees science as negotiated and changeable (cf. Ligorio, 2010).

In the course all the students refined their scientific I-position by conceptualizing their experiences in the light of the philosophical knowledge, and through considering and becoming aware of the various voices underlying their thinking. Therefore, providing a forum for 'identity talk' (Cohen, 2010), the writings and discussions and reflections around the learning materials gave an opportunity to *strengthen, refine and reconstruct* one's own I-positions. In other words, they provided the students with a forum for the recognition and construction of their disciplinary and professional identity.

At the end the criticism toward the dominance of science in general in the first task is refined into criticism toward the dominant position of quantitative research and natural sciences as well as toward the emphasis on physical aspects in their work and discipline. Hence, now the internal conflicts that the students highlighted in their earlier discourse are explicitly stated and conceptualized, and their origin is understood. The students recognize the tension between different value systems that is reflected in their professional practice.

Discussion and conclusions

Supporting the students' agency by acknowledging their own lives and experiences as resources for learning can lead to a learning situation where the (institutional) knowledge provided by the teacher becomes a mediating tool for understanding those lives rather than being an end in itself. The analysis revealed that the philosophical knowledge seemed to serve as a resource *through* which the students learned also about their own 'lives' and not only *about* the philosophical knowledge content. Prompting the students to use their professional experiences as a resource in interpreting the different approaches described in the philosophical texts led them into a discourse where they were able to reflect on and analyze their work and discipline related perceptions. By engaging themselves in reflective talk (Cohen, 2010), through which they could reason and share beliefs, values, and practices associated with their professional identity, the students made visible to one another who they are and what they are doing (Gee, 1999). Making one's understanding explicit and reviewing the current practices in the light of new knowledge led to new awareness and, for some students further to refined and wider perspectives and new identity constructions.

Throughout the course it seemed that the contrastive pattern the students used in discussing human and natural sciences as well as qualitative and quantitative research helped them understand the philosophy of science and its different approaches. It also served as a resource for making explicit and critically evaluate the contradictions they perceived with regard to work and science, and also facilitated conceptualization of their

professional and study-related experiences. By analyzing their experiences in the light of different scientific approaches the students became aware of the different voices and value systems that underlie their thinking and activities and seemed to cause tensions in their professional positioning. This provided possibilities to strengthen, refine and re-construct their own professional I-position. Therefore, the study showed how material resources such as texts can be meaningful in introducing the students with different voices, and how these can be a powerful resource for their meaning making and identity negotiation processes.

Altogether, it seemed that the reasoning tasks were able to raise internal dialogue, that is, negotiation between different I-positions of the self or 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, the nature of their external dialogue was mostly harmonious and characterized by sharing, acknowledging and taking the same position. However, even though the students were not engaged in argumentative talk, which is often regarded as necessary for collaborative learning, it can be argued that their external dialogue had an important role in their discussion and learning. According to Tsang (2007), while internal dialogue has a "self-generative capacity" leading to new possibilities for thought and action, external dialogue can be seen as essential for the validation of one's ideas. For example, in this study the views of others seemed to shed light on some inner tensions and add weight to a particular option in settling the inner struggles. Through sharing and constructing a We-position the students strengthened their professional identity. The way of defining one's own identity in the discussions was based not only on identifying with similar positions or shared views, but also on differentiating oneself from those who "are part of what I am not" (Akkerman & Meijer, 2011, p. 315). This kind of contrastive discourse was targeted against different "others". In their shared discourse the students' were questioning, criticizing and challenging different 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.

It can be argued that the online environment provided an ideal context for the students' reflective discourse that combined institutional and personal knowledge. In the online environment the students' writings and related discussions, were available for elaboration and reflection at any time. 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 the occurrence of such reflective processes. It gave time to observe and reflect on one's own and others ideas, as these were readily present and available for the whole process of learning. Therefore, the online environment used in the course provided a supportive context for reflection and identity discourse.

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