Building understanding of the philosophy of science through immediate and mediated resources

Maarit Arvaja
University of Jyväskylä, Institute for Educational Research, maarit.arvaja@jyu.fi

Abstract

In order to analyze individual and collaborative learning we need to move from analyzing structures of talk separated from their contexts toward a more contextualized approach for studying learning. This means that in addition to studying cognitive aspects of discourse, we also need to explore how socio-cultural aspects mediate students' discursive activity. The aim of this paper is to explore a contextualized process of students' individual (individual writings) and shared (shared discussion) meaning-making activities during an online philosophy course. Through the 'sociocultural' discourse analysis the focus was on studying how different resources were used in building understanding within the philosophy of science and what kind of understanding the students constructed and reflected through these resources. The results provided insights into different immediate and mediated resources that guided and framed the building of individual and shared understanding. Prior work and discipline-related knowledge or experiences (health sciences) provided the students with mediated resources for understanding the philosophical texts through applying, forming conceptions, or critically evaluating the philosophical knowledge presented in the texts based on their prior social, personal, and cultural knowledge. Students used other students as immediate resources by referring to other students' writings or discussion in elaborating the theoretical conceptualizations further, or they were engaged in building common understanding by sharing their similar work or discipline-related experiences and conceptions or sharing 'collective criticism' toward their own work practices or practices related to their own scientific fields. The asynchronous discussion tool used in the course served as a resource that enabled students to get to know and learn from one another's writings, even though it did not necessarily lead to co-construction of knowledge or sharing of experiences. The resources used also reflected the values, attitudes, conceptions, norms, and practices related to the students' personal, social, and cultural knowledge. Sharing experiences with other students and building on one another's thoughts as well as using one's own experiences as resources in interpretation of the philosophical texts seemed to offer tools for understanding, conceptualizing, and critically evaluating both the philosophical themes studied and the practices of one's own work and those of the science community.

Keywords

Collaborative and individual learning, contextual resources, discourse analysis

Theoretical background

As Wells (1999) states, greater recognition should be given to the central and formative role of language in education. What should be stressed is, namely, the role of linguistic discourse in meaning-making and mediating knowledge, values, and beliefs of the communities the students and teachers participate in and 'bring along' to new contexts and situations. While much of the work of analyzing collaboration in online contexts has concentrated on the structures or nature of talk from a 'productive discussion' perspective (e.g. Weinberger & Fischer, 2006), less attention has been paid to discourse and the purposes it accomplishes in its specific context. Studies focusing on productive discussion have approached the processes of collaboration mostly from a cognitive perspective by examining the amount and types of productive talk that occur. However, in order to analyze both the individual and the collaborative learning we need to move from analyzing structures of talk separated from their contexts toward a more contextualized approach for studying learning. This means that in addition to studying socio-cognitive aspects of discourse, we also need to explore how material and socio-cultural aspects mediate students' discursive activity (Black 2007). However, in CSCL research, studies that focus on how different immediate and mediated contexts or aspects of a situation are reflected and manifested in students' discursive activities are still rare (but see, e.g. Staarman, Aarnoutse & Verhoeven, 2004).

ISBN 978-1-86220-225-2

This study builds on the notion of contexts and situations as being socially constructed (Gee & Green, 1998; Linell, 1998). According to this view, a context is not a predefined or objective environment, but only includes those contextual dimensions which are or become relevant to the participants in the discursive activity. This approach targets attention both to the historical and the dynamic nature of discourse (Mercer, 2008). The historical nature of discourse points to the fact that discourse mediates and is mediated by the historical, institutional and socio-cultural context. For example, the students may draw on some past experience or prior knowledge that is used as a resource for building understanding in the present situation, or discourse may reflect certain norms, values, and expectations - those socially valued ways of thinking and acting in the present or other contexts related to students' communities (of practices) (Wells, 1999). This personal, social and cultural knowledge can be called *mediated and abstract resources* (Linell, 1998) *or aspects of situation* (Gee & Green, 1998) that are reflected and constructed through participants' discursive activity. *Immediate and concrete resources or material aspects of situation*, in turn, refer to immediate environment which includes, for example, physical spaces, persons, objects and artifacts that are present (potential resources) or referred to (relevant resources) in discourse. Also a previous text, discussion or speech turn can serve as a co-text (Linell, 1998), as a ground and resource for building on one another's reasoning. This dynamic nature of discourse shows how discourse emerges and speakers' contributions are contingent on what the other speakers say (Mercer, 2008). Thus, tracking individual and collaborative meaning-making requires analyzing discourse through extended dialogues, and through identifying intertwined past and new knowledge, meanings, and understandings.

The aim of this study was to explore a contextualized process of students' individual and shared meaning-making activities during an online philosophy course. The particular focus was on studying what contextual resources mediated and how they were used in building understanding within the philosophy of science. Also the focus was on studying what kind of understanding (e.g. knowledge, values) the students constructed and reflected through these resources.

Method

Participants and context of the study

The participants in the study were 11 health science students (all female) studying the philosophy of science in an online course in the context of higher education. Nine of the students were involved in working life, as physiotherapists and action therapists, for example. The other two students were doing their basic studies on health sciences. The students studied in an Open University course. They had no other shared teaching, they participated in the course from all over the country, and they met only virtually. The task consisted of five sub-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 philosophical text/s dealing with a philosophical approach within the philosophy of science, such as positivism, realism, or constructivism. Then each of the students answered the question/s regarding the text. In answering they were supposed to use their prior experiences or conceptions about their own field of science or work as resources in reasoning the task. Then the students posted their individual writings into a shared web-based (asynchronous) discussion forum. After this, their task was to read one another's writings and finally to have a shared discussion based on these writings.

Data collection and analysis

The students' individual writings about the course themes and their shared discussions around those themes were analyzed through a 'socio-cultural' discourse analysis (Mercer, Littleton & Wegerif, 2009). Gee and Green's (1998) discourse analysis and Linell's (1998) dialogical approach to communication offered valuable conceptual and analytical tools for researching collaborative activity from a socio-cultural perspective. These approaches focus on the dynamic and interpretive nature of participants' actions and discourses, and how through these actions and discourses the participants both construct and reflect the context of their activity (Gee & Green 1998; Linell, 1998). Language is seen as a socio-cultural practice and social resource of the group, and the focus of analysis is more on what participants accomplish through their discourse rather than on what the form or function, as such, of the language is. Particular interest was on analyzing the resources (Linell, 1998) or aspects of a situation (Gee & Green, 1998) that the students used and reflected in their process of meaning-making and how these resources were used for understanding and making sense of the philosophy of science. Another focus of the analysis was on detecting what the students constructed, accomplished, and reflected through the discourse.

ISBN 978-1-86220-225-2

Results

Resources for understanding

The main resources were the *philosophical texts* that served as a basis for doing the five different sub-tasks. Philosophical texts consisted of articles, book chapters or texts from the Internet which served as theoretical background material for the task. In their discourse the students drew on various other resources in building understanding of the philosophy of science. In this paper the particular emphasis is put on *work experiences, work/study community, field of science as resources,* and *others as resources*, because these were clearly the main resources for building an understanding of the philosophy of science and interpreting the philosophical texts that served as course material. In using *work or discipline-related knowledge and experiences* as resources the students referred to their own work/study experiences, for example as an action therapist or health education student, or practices in their workplace or scientific community that were used in meaning-making in their individual writings. These references can be regarded as socio-cultural knowledge which reflects the personal, social and cultural knowledge, such as prior knowledge, experiences, institutional norms, and values, as well as identities reflected or applied in the situation (Gee & Green, 1998; Linell, 1998). When students used *other students* as resources, they referred to other students' writings (individual texts) or thoughts presented in the shared discussion. These references can be called co-text (Linell, 1998) as the students used the previous texts and discourses as resources in the "new act of sense making" (p. 132). In analyzing how students used their own work/discipline as resources for interpreting and understanding the philosophical texts, students' individual writings (n=55) were used as a basis for the analysis. In analyzing the others as resources, in turn, only the shared discussion (n=42) was used in the analysis. Next the different ways in which these resources were used and reflected is demonstrated through empirical examples.

Work experiences, work/study community, field of science as resources

Prior knowledge and experiences used as resources demonstrate the historical nature of discourse (Mercer, 2008). They show how past socio-cultural knowledge is used for understanding the present context of activity. Next, different ways of using prior work or discipline-related experience and knowledge as resources in interpreting philosophical texts in individual writings are presented.

Applying
In this type of discourse the students used their work-related experiences or their prior knowledge regarding their own field of science as resources in understanding and interpreting the philosophical text(s). In the next example, the student applies the knowledge of the development of the philosophy of science to her own discipline. This serves as a tool for understanding the development of science from her own perspective, that of health sciences:

> Example 1
> Nowadays one talks about a positive conception of health which emphasizes experiencing health in its different forms. We have moved from the illness-centered conception of health created by natural sciences toward a more holistic positive conception of health [...] Biomedical research can be criticized for its mechanistic conception of the world, yet more room has been given to the hermeneutic approach. Health and illness are also culturally constructed after all. (Tiina*)
> * = *all names are pseudonyms*

Knowledge of one's own field of science or work was also applied for understanding theoretical concepts. In the next example, theoretical conception, causal explaining is applied to the student's own work and discipline, ergonomics:

> Example 2
> In ergonomics [...] Causal explaining, in turn, is explaining the relationship between the cause and effect. In this way you can anticipate some events. Causal explaining necessitates the anticipation. […] In ergonomics causal explaining can be thought of, for example, like this: Static work position or too high worktop cause upper limb workload. You search for an answer by asking why this has happened. The main task of work healthcare is to prevent work related disadvantages. For this reason causal explaining is made use of in everyday work, and on this knowledge base we

ISBN 978-1-86220-225-2

ground our own activity, that is, why you should take notice of right lifting techniques, healthy ways of living, etc. (Niina)

In applying theoretical knowledge of causal explaining to own work, Niina is reflecting the norms and practices of her work community, work healthcare. Thus, in interpreting the philosophical text she 'brings along' her community (of practice) and related practices (Wells, 1999); "the main task of work healthcare… made use in everyday work… on this knowledge base we ground our activity."

Supporting or forming conception/opinion
In this type of discourse the philosophical texts either supported students' prior conceptions or contributed to forming conceptions related to their work or discipline. The next example demonstrates how something the student read in the philosophical text *supported* her prior conception about the issue:

Example 3
Heikkinen's and Laine's text is based on phenomenologic-hermeneutic philosophy [...] both the client's and therapist's idea of man and life-world strongly influence the content and experience of "the encounter." I'm fully acknowledging that the dialogical relationship influences the outcome of the treatment/therapy. (Krista)

In the above example, Krista recognizes the meaning of "the encounter" presented in the text through her own work experiences as a physiotherapist. Thus, the text supports the beliefs guiding and influencing her activity as a physiotherapist. In the next example, in turn, the student is *forming a conception* about the relationship of human and natural sciences from the position of her own field, health and social sciences:

Example 4
I think that in health and social sciences it's well grounded to study phenomena which affect the reasons of 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 qualities from the perspectives of health, illness, and participation. (Anita)

Conflict / critique
In this type of discourse students expressed a *conflict* between something they had read in the philosophical text(s) and the conceptions they held through their own work experiences or scientific field. For example, they took a *critical stand* from their own perspective toward something stated in the philosophical text:

Example 5
The traditional view of science seems too rigid and too general an approach from the perspective of a health science student. (Tiina)

In the above example, Tiina is taking a critical stand toward the traditional view of science from the perspective of a health science student. Thus, she evaluates the knowledge in the philosophical text from the point of view of health sciences and the conceptions and values she relates to that field. Also some theoretical conceptions were *evaluated critically*:

Example 6
Looking from the perspective of my own field of science and its history, reductionism clearly narrowed the view of the human and his activity and clearly cannot explain a human's action competence or the meaning that functionality has to humans. In reductionism one also feels that human is only seen as an activity of a nervous system, muscle system, and skeletal system (mechanistic) and not as an active, unique, mental, personal, cultural, social human who has his own history, experience, point of view, values, and aims, which all influence human's action competence. (Anni)

The above example shows how Anni is questioning the principle of reductionism based on her own implicitly and explicitly stated conceptions and values she relates to her work and field of science. In another type of discourse, texts raised a conflict and it was manifested in a critique that was targeted toward practices in the student's own work or perceived research practices, as the next examples demonstrate:

ISBN 978-1-86220-225-2

Example 7
In my own field, gerontology, I have understood that quantitative research is much more valued than qualitative, because of its nature as 'strong medicine.' Everything cannot however be observed and measured completely unambiguously, which is why qualitative research definitely has its place in human sciences. (Nea)

Example 8
The basic thought of sympathetic human science is that a human actor and community have to be studied from their own perspectives. […] Unfortunately, I have a conception that qualitative research is not published in the leading journals of the field [physiotherapy]. We still lean on and believe only quantitative research and research knowledge based on it. (Tia)

The examples above reflect the perceived 'cultural models' (Black, 2007) in the students' fields of science. Thus, in the discourse the students reflect the dominant research practices that guide research activity in their disciplines. Those practices valued contradict what the students' value ("unfortunately").

Other students as resources

Others' writings or discussion as resources for elaboration
In the data presented, one way of using others as resources was related to the type of activity, where the students were developing the philosophical knowledge or ideas presented by others (in individual writings or discussion) further by offering a clarification, different point of view, critique or alternative perspective, thus elaborating others' thoughts. This type of discourse typically occurred in a situation where the students were discussing some theoretical concepts presented in the philosophical texts, as is shown in the next example dealing with the theme subjective-objective truth:

Example 9
Tiina: When science is objective, doesn't it then mean that knowledge and truth aren't dependent on context and person, but there is one truth? This seems logical and meaningful especially in natural sciences, but how about in human sciences? I somehow consider odd the thought that there wouldn't be subjective truth, and truth based on one's own personal experience, which is constructed contextually. In my opinion especially hermeneutics take a stand against a traditional conception of science as it tries to interpret people's activity and meanings. And on the one hand couldn't we then think that truth could be subjective, everyone's personal experience about what happened or self-given meaning to some things…? [*Individual text*]
Krista: If truth could be subjective, how could we find proper everyday solutions from among many subjective truths? In that case, science and research would lose their meaning, isn't that so? [*Elaboration in discussion*]
Tiina: I stayed myself as well to think for a longer time about the essence of this traditional view of science, from the perspectives of objectivity and truth among other things. Now when I read the texts from the next theme, it turns out that the opposite of natural sciences is in human sciences; you don't assume there is an objective truth, but rather you are aiming at understanding subjective meanings. [*Elaboration in discussion*]

The above example shows how Tiina (in her individual text) is reasoning about subjectivity and truth in human and natural sciences. Krista questions Tiina's thoughts by giving a counterargument. Tiina answers and give a clarification by leaning on the philosophical text (concrete resource) that supports her earlier point of view. In the situation Krista's elaboration triggers Tiina to think further the theme objectivity and truth, and Tiina uses the next text as a resource for clarifying the issue for Krista and herself. In the literature, collaboration is often referred to as co-construction of knowledge (e.g. Baker 2002). On closer inspection, the core of this term seems to refer to interaction where the students are *mutually engaged* in solving problems, negotiating understanding, or constructing knowledge. Usually, cognitively high-level language functions such as argumentation, reasoning, asking, and answering exploratory questions feature this type of interaction. In the example above the students are mutually engaged in reasoning by using texts and one another's as resources for thinking and understanding.

Others' writings or discussion as resources for sharing experiences and conceptions

ISBN 978-1-86220-225-2

In the above example, others' writings or discussion were used as a resource for developing the theoretical conceptualizations further. In the next type of discourse, the students were sharing experiences or conceptions on some phenomena on the philosophy of science mostly through their own work or discipline. The discussion was built on an agreement and on supporting others' conceptions. In sharing experiences, students often built their thoughts on several students' thoughts, as the next examples demonstrate:

> Example 10
> *Anita*: You're both [Satu and Tia] reasoning about applying both human sciences and natural sciences in your work [...] As an action therapist I see it in the same way. However, at work you often come across, for example, what the doctors value and appreciate (research based on natural sciences; unfortunately).
> *Aino*: Yes indeed, this is how I see it through my own work in physiotherapy. The problem is that in work you value too much the views from natural sciences. One thing at work is compilation of statistics. If I spend my time with the patient by talking about the goals and motivation without doing exact physiotherapy can I mark the visit as physiotherapy? [...] I didn't do any physiotherapy but after discussion the patient is more motivated to be rehabilitated and willing to cooperate. [...] The problem is that I cannot write on the patient's health report that we have been discussing about therapy. Then we cheat and do for example some stretches or something at the end. This is what it's like; the focus is too much on natural sciences.

The above example demonstrates how the students share an understanding about the nature of their work and its relationship to different scientific approaches. They all share the view that in their work they need the views/methods from both natural and human sciences. The students take the positions of an action therapist and a physiotherapist in grounding their arguments. Thus, they are reflecting their work identities (Gee & Green, 1998) in the situation by expressing the conceptions and values that guide their work. According to Wells (2007), in new situations one might apply multiple identities originating from various communities of practice whose values and scripts define our identities. However, the examples also demonstrate that the students experience a contradiction between their own values and the values ("what the doctors value") and norms ("compilation of statistics") of the work community. Thus, the students also share the view of the dominance of the natural sciences through describing work practices that support that domination. Even though the students' discourse is based on agreement and sharing a point of view, they share a same critical position toward their work practices.

Sharing similar experiences and 'the sense of similarity' can be seen as signs of *togetherness* (van Oers & Hännikäinen, 2001). The sense of togetherness creates and maintains the positive social and emotional atmosphere that enables also (productive) conflicts to occur in the discourse without breaking it (e.g. elaboration). Also difficulties that the students shared during the course contributed to the creation of togetherness, as this example from the first task demonstrates:

> Example 11
> *Tiina*: I admit that when I read the texts for most of the time I'm "out". I have been reading for a couple of days Niiniluoto's text trying to figure out the concept of science, the essence of truth […] This is challenging, but not impossible.
> *Marjo*: Tiina, it is great that you were brave enough to tell about your "being out". I have waited for others to act, because I've not been able to understand, either. But I believe, as you do, that you can figure out something about the philosophy of science […] and you can try to understand through the fellow students.

Positive feedback that the students constantly gave about one another's writings also seemed both to create and to maintain the positive orientation and the sense of togetherness throughout the course.

Others' writings as resources for own understanding
In this type of discourse students explicitly stated that reading others' writings had made them better understand some philosophical conception, idea or theory; for example:

> Example 12
> I also read Raatikainen's article and when I read your text I got a new perspective and it made my thoughts clearer, too. (Satu)

ISBN 978-1-86220-225-2

Example 13
Great text, Krista. I got concrete help for myself. You told in a fine way about the conceptualization, which was not easy to understand. (Tiina)

In the above instances, the students explicitly express that the other students' individual writings had helped their own understanding by giving a new perspective or clarifying their thoughts, for example. Sometimes these statements also resulted in elaborating the subjects further. All three different types of using others as resources represent different ways in which others' texts or text-based discussion were used as a co-text, as resources in the "new act of sense making" (Linell, 1998, p. 132). This demonstrates the dynamic nature of discourse (Mercer, 2008) where the students' sense-making is contingent on what the other students have said or written. Through these different ways the students were cognitive, social and emotional resources for one another. The students not only built together an understanding about the philosophy of science and different historical approaches, but also shared personal, social, and cultural knowledge and experiences (Gee & Green, 1998).

All the examples presented in this paper reflect both implicitly and explicitly the knowledge, values, conceptions, and attitudes the students related to their own discipline or their own work (Wells, 1999). The students seemed to hold a common conception of the need for both human/natural (strict/exact, soft/hard) sciences, and qualitative/quantitative research in their work and field of science (Examples 4, 8, and 11). However, it conflicted with their perceived work (Example 11) and research practices (Examples 8 and 9). It seemed that 'constructing contrasts' (e.g. human/natural) was a recurrent discourse pattern in the students' discourses. In the discourse 'constructing contrasts' served as a resource for understanding the history of the philosophy of science and its different approaches. However, it also served as a resource for critically evaluating the experienced contradictions in their work and science practices and as a resource for conceptualizing their work and discipline-related knowledge and experiences. At the same time, it created a possibility for a change, as one of the students stated: "This course has given me a whole new perspective about doing research and widened my perspective about science in general. [...] I started from Strict positivistic thoughts and ended up with a wide and open model of thinking, for example, about the importance of human sciences and qualitative research."

Next, Table 1 presents the frequencies of the different ways of using prior knowledge and experience (individual writings) and others (shared discussion) as resources in understanding the philosophy of science. Different ways of using resources can exist in the same message; for example, student may use both applying and critique in her individual writing.

Table 1: The frequency of different ways of using resources in individual writings and shared discussion.

	Individual writings % (n=55)	Shared discussion % (n=42)
Applying	42	-
Supporting/forming conception	35	-
Conflicting/critiquing	35	-
Elaborating	-	52
Sharing experiences	-	48
Supporting understanding	-	24

As can be seen from Table 1, in individual writings the most frequent way of using one's own work or science related experiences and knowledge as resources was applying (42%). Supporting and forming conceptions as well as critiquing were as frequent (35%). The most frequent way of using others as resources was elaboration (52%). However, sharing work or discipline-related experiences or conceptions were nearly as frequent (48%) in students' shared discussions. If we think about sharing experiences, in this kind of discourse students also used work/science experiences and conceptions as resources in their shared discussions. Thus, in the whole course using one's own experiences was a quite frequent discursive activity. Elaborating and critiquing as discursive activities can both be described as exploratory in their nature, because in these activities students were engaged in high-level reasoning, such as critical evaluation, offering alternative perspectives, and questioning other's ideas or asking questions, for example. Thus, from the learning point of view, using prior knowledge and experiences as well as others as resources in the course was able to trigger reasoning.

ISBN 978-1-86220-225-2

Discussion

This study focused especially on exploring how the students constructed and reflected individual and shared understanding of the themes addressed during the philosophy course through using their previous experiences and knowledge as well as one another as resources. The results provided insights into immediate and mediated resources or aspects of a situation (Gee & Green, 1998; Linell, 1998) that guided and framed the building of individual and shared understanding. Prior work and discipline-related knowledge or experiences provided the students with resources for understanding the philosophical texts through applying, forming conceptions, or critically evaluating the philosophical knowledge presented in the texts. In their discursive activity, students used other students as resources by referring to other students' writings or discussion (co-text) in elaborating the theoretical conceptualizations further, or they were engaged in building common understanding in sharing their similar work or discipline-related experiences and conceptions or sharing 'collective criticism' toward their own work practices or practices related to their own scientific fields. The asynchronous discussion tool used in the course served as a resource that enabled students to get to know and learn from one another's writings, even though it did not necessarily lead into co-construction of knowledge or sharing of experiences. In discourse the students also reflected the values, attitudes, conceptions, norms, and practices related to their personal, social, and cultural knowledge (Wells, 1999). Sharing experiences with other students and building on one another's thoughts as well as using one's own experiences as resources in interpretation of the texts seemed, thus, to offer tools for understanding, conceptualizing, and critically evaluating both the philosophical themes studied and the practices of one's own work and science community.

The notion of contextual resources was used as a tool in evaluating how the students interpreted and made use of available resources, and on the other hand, how the resources used supported students' meaning-making. In addition to resources, the notion of intertextuality provides another conceptualization for understanding how the students drew on past texts, contexts, and discourses in constructing the present ones (e.g. Staarman, Aarnoutse, and Verhoeven 2004). Often the analysis of collaborative interaction, e.g. in the socio-cognitive research tradition, is interested in analyzing the dynamic aspect of discourse, e.g. communicative or strategic functions of utterances, leaving out the historical and intertextual nature of discourse (Mercer 2008).

References

Baker, M. J. (2002). Forms of cooperation in dyadic problem-solving. *Revue d'Intelligence Artificielle, 16*(4-5), 587-620.

Black, L. (2007). Analysing cultural models in socio-cultural discourse analysis. *International Journal of Educational Research, 46*(1-2), 20-30.

Gee, J. P. & Green, J. L. (1998). Discourse analysis, learning and social practice: A methodological study. *Review of Research in Education, 23*, 119-169.

Linell, P. (1998). *Approaching dialogue. Talk, interaction and contexts in dialogical perspectives*. Amsterdam: John Benjamins.

Mercer, N. (2008). The seeds of time: Why classroom dialogue needs a temporal analysis. *The Journal of the Learning Sciences,* 17(1), 33-59.

Mercer, N., Littleton, K., & Wegerif, R. (2009). Methods for studying the processes of interaction and collaborative activity in computer-based educational settings. In K. Kumpulainen, C. Hmelo-Silver & M. César (Eds.), *Investigating classroom interaction*. Sense Publishers.

van Oers, B. & Hännikäinen, M. (2001). Some thoughts about togetherness: an introduction. *International Journal of Early Years Education 9*(2), 101-108.

Staarman, J. K., Aarnoutse, C. & Verhoeven, L. (2004). Connecting discourses: Intertextuality in a primary school CSCL practice. *International Journal of Educational Research, 39*, 807-816.

Weinberger, A. & Fischer, F. (2006). A framework to analyze argumentative knowledge construction in computer-supported collaborative learning. *Computers & Education,46*, 71-95.

Wells, G. (1999). *Dialogic inquiry. Toward a sociocultural practice and theory of education*. New York: Cambridge University Press.

Wells, G. (2007). Who we become depends on the company we keep and on what we do and say together. *International Journal of Educational Research, 46*(1-2), 100-103.

ISBN 978-1-86220-225-2