FROM MULTIPLE PERSPECTIVES TO SHARED UNDERSTANDING: A SMALL GROUP IN AN ONLINE LEARNING ENVIRONMENT

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http://www.tandfonline.com/doi/abs/10.1080/00313830701786677

doi:{ 10.1080/00313830701786677 }

Please refer this manuscript as:

From Multiple Perspectives to Shared Understanding: A small group in an online learning environment

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The aim of this study was to explore how learners operating in a small group reach shared understanding as they work out joint research questions and build a theoretical framework and to identify the resources and tools they used in the process. The learners’ own interpretations of their group activities and learning were also taken into account. The data, consisting of group discussions and the documents produced by the group, were subjected to a qualitative content analysis. The group members employed a variety of resources and tools to exchange their individual perspectives and achieve shared understanding.

Summaries of relevant literature laid a foundation for the group’s theoretical discussions. Reflective comparisons between their book knowledge and their personal experiences of online interaction and collaboration were frequent, suggesting that such juxtapositions may have enhanced their learning by intertwining the content to be mastered and the activities entailed by this particular content.

Keywords: Computer-supported collaborative learning; Knowledge building; Peer interaction; Shared understanding
Introduction

Computer-supported collaborative learning (CSCL) has attracted growing interest in higher education (Strijbos, Kirschner, & Martens, 2004). CSCL can be seen as a promising way of promoting teaching and learning practices in educational settings (Lipponen, Hakkarainen, & Paavola, 2004). At its best, it can enhance interaction between learners, enabling them to share and distribute knowledge and expertise among group members in online learning environments (Strijbos et al., 2004). However, merely offering learners a setting for joint activity does not necessarily lead to a successful learning situation (Kreijns, Kirschner, & Jochems, 2003). Discussions in online learning environments are often superficial, and the discussion threads tend to be short (Joiner & Jones, 2003; Mäkitalo, Salo, Hääkkinen, & Järvelä, 2001; Stahl, 2002).

In other words, knowledge building is a rare phenomenon in online learning environments.

Because of the complexity of the phenomenon, there is a variety of theoretical approaches to CSCL (e.g. Lipponen et al., 2004; Stahl, 2004). However, two main theoretical perspectives on collaboration have emerged, based on Piaget’s (1977) and Vygotsky’s (1978) ideas respectively (see Lipponen et al., 2004). The Piagetian
viewpoint focuses on the cognitive processes of individuals. According to Piaget,
knowledge construction takes place when learners adjust their own cognitive knowledge
structure to the current context by restructuring their knowledge or revising their
concepts or by generating new knowledge. Piaget’s ideas have been adopted by the
socio-constructive approach.

Vygotsky’s (1978) ideas, again, were taken up by the socio-cultural approach,
which highlights the nature of knowledge building and the roles of artefacts in
collaborative knowledge building processes. Therefore, if we are to understand learning
we must explore how people adapt the artefacts of action and thinking available in their
own culture and society (Säljö, 2001). According to Stahl (2005), socio-cultural
perspectives indicate that learning and cognition are possible both at the level of groups
and communities and at the level of individuals. The approach taken in this study is
based chiefly on Vygotsky’s ideas of collaboration, which foreground interaction
between learners and the ways in which they build shared understanding and knowledge
by using different artefacts and resources.

Learners engage in collaborative activities because they want to produce
something as a means of achieving cohesive explanations based on previously
exchanged contributions and integrate concepts and relationships as a means of solving
a problem or problems or creating or finding out something (Koschmann, Kelson,
Feltovich, & Barrows, 1996; Roschelle & Teasley, 1995). According to Dillenbourg
(1999), building and maintaining common ground of some kind is a precondition of
successful collaboration among learners. The concept of common ground is used to
explain how individuals can share multiple meanings and understandings (Stahl, 2005).
The personal understandings of several distinct individuals must be articulated when
producing shared understanding through, for example, discussion about, negotiation
over and acknowledgement of a range of differing views (e.g. Barron, 2000; Beers,
Boshuizen, Kirschner, & Gijselaers, 2005; Bromme, 2000; Clark & Schaefer, 1989;
Dillenbourg, 1999; Koschmann, Zemel, Conlee-Stevens, Young, Robbs, & Barnhart,
2005).

Stahl (2004) describes collaborative knowledge building as a cyclical process
where individual perspectives or understandings are made visible. Building a shared
understanding of comprehensible issues involves the expression of individual
understandings by using psychological artefacts such as concepts. In this process,
learners verify and negotiate their individual views so as to reach shared understanding
or group cognition (Stahl, 2005). This negotiated shared understanding becomes the learners’ tacit knowledge, available as a resource for building further new understanding. Thus, building collaborative knowledge involves analysing and elaborating any issues at hand through continuous interpretive processes mediated by linguistic, cognitive, cultural, physical and digital artefacts (Stahl, 2004). This means also that learning is connected with the situation where it happens and that it should not be assessed separately from the context created by the learners in this particular situation (e.g. Koschmann et al., 2005; Chan & van Aalst, 2004).

Mercer (2003) similarly highlights the role of the context in collaborative activities. According to him, learners should themselves build the foundation, the context, for their subsequent joint activity (see also Dillenbourg, 1999). Mercer (2003) argues that the resources available for building a shared context include any knowledge that those involved might have of shared history, to which they can appeal directly or indirectly. Such shared knowledge functions as a common frame of reference; it might consist of a text or book read by the learners or collective remembering where they discuss their past experiences and their past joint activities (Mercer, 2003). Both Stahl (2004) and Mercer (2003) point out that in small-group interaction, as the participants
engage in the complex negotiations that make collaborative knowledge building possible, group meanings become intertwined, in subtle ways, with individual interpretive perspectives.

Barron (2003) has also described collaboration as involving a dual-problem space where learners must engage with and develop a content space (tracking and evaluating their own and other people’s epistemic processes) and a relational space (interactional challenges and opportunities), which are united in three distinct interactional dimensions. In successful collaboration learners firstly address a common task or problem and build knowledge together by drawing on each other’s ideas and elaborating on them. Secondly, the learners are all equally able to contribute to knowledge building by listening to one another’s ideas, acknowledging them and developing them further. No idea is turned down without negotiation and reasoned analysis. Thirdly, during critical phases of the collaborative problem-solving process every learner’s attention should be focused on the task at hand. (Barron, 2000.)

An exploration of how people collaborate on building knowledge and shared understanding must pay more attention to group-level processes of interaction and consider also the contextual features present in computer-mediated learning.
environments (e.g. Crook, 2000; Mercer, 2003; Stahl, 2004). There are some studies that concentrated on investigating collaboration in face-to-face situations or in face-to-face sessions around the computers (e.g. Arvaja, 2004; Barron, 2003; Beers et al., 2005; Jeong & Chi, 1997), but studies which foreground the group as the analytic unit and look at the collaborative group process extending from the beginning to the end of an online learning course as a whole are less common. Koschmann and colleagues (2005) argue that if interactional work is supposed to generate learning, then the process of interaction and the process of learning should be located within the same discourse. In investigations of the relationship between learning and interaction, the felt quality of learners’ experience of the collaborative activities should be studied in more depth (Crook, 2000). Chan and van Aalst (2004) consider that too little attention has been given, in the field of CSCL, to the assessment of learning; moreover, according to them, both the individual and the collaborative aspects of knowledge building should be taken into account in this area.

**Aims**

The purpose of the study was to answer the following questions:
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1) How did the small group, step by step, work out their research questions and what were the collaborative activities, resources and tools that were brought into play in their efforts to frame a set of joint research questions?

2) How did they, moment by moment, build knowledge to underpin their theoretical framework and which of the tools and resources used by them did successfully generate new shared knowledge?

3) What was the quality of the group’s final product as compared to the quality of their group activities?

4) What were the learners’ experiences, that is, how did the group members as a group and as individuals perceive their collaborative activity and learning?

The study was carried out in an authentic teacher education context.

Methods

Participants

This study of interaction between learners in an online learning environment examines student groups who work at distance throughout a whole course. A team of three pre-service English teachers were selected for investigation from among six groups
because the group members worked mainly online. The students in this group attended an online learning course delivered by two Finnish universities, forming a group, at the beginning of the course, on the basis of their similar interests. All three students, Saara, Liisa and Tiina (made-up names), had basic knowledge of computers and the Internet. Saara and Liisa, from the University of Jyväskylä (n=2), knew each other while Tiina, from the University of Oulu (n=1), knew neither of the other two. She was also the only one of the three students who had previous experience of online courses. All were university students of education and English.

Task

The students participating in the online learning course were given the task of formulating joint research topics in the area of culture and communication and forming subgroups which collaborated on carrying out a joint research project. The two-month course opened with a contact session for both of the two teaching groups where they were made familiar with the content and timetable of the course. They were also instructed in the use of the Discendum Optima online learning environment. The learners attended study circles and discussed the main course themes in the online
learning environment. The idea of the study circles was to bring learners with common interests together and organise them into subgroups working on their own research topics. At the end of the course there was a video conference where each group presented their work. The learners also filled out a pre-questionnaire and a final questionnaire.

The Online Learning Environment

The Discendum Optima online learning environment can be accessed over the World Wide Web (WWW). This shared workspace was open to every learner on the course; there they could find all the course information, take part in discussions about the main course themes during the study circle phase, and work in subgroups. When the subgroups had been set up, an empty file was created for each group. The groups were instructed to construct a first page presenting the group members and the group’s research questions. Otherwise the groups were free to create and add different objects, such as discussion forums, Word and HTML documents, tables, photos and so on. They could also use the environment’s chat function, and net meetings were organised whenever the students desired.
Data Collection and Analysis

The research data were gathered during the online course. They consisted of asynchronous written discourse and the documents created by the three student teachers in the subject group. The written discourse data came from three different discussion forums set up by the group members. The first discussion forum, Thought Forum, contained 43 messages, the second one, Talk Time, 88 messages and the third one, Discussion on Theories, 13 messages, giving a total of 144 messages. Of these 144 messages, 115 came from the group members while the rest (29) were produced by other learners and mentors. During the online course the members of the group created 54 different objects, including the three discussion forums, new subfiles, and Word, HTML and PowerPoint documents. Seven learner documents (e.g. Tiina’s mind map, Saara’s response to it, three book summaries, the Project Log and the Final Work) were included in the data analysis, as were the transcriptions of the learners’ chat and net meeting discussions.

The approach adopted was qualitative content analysis, which makes it possible to describe group interactions in a way that captures the dynamic interplay between
participants engaged in long-term collaborative knowledge building and the
construction of shared understanding in an online learning environment and identify the
resources and tools employed by them (see Silverman, 2000). The initial analysis of the
discussion data and the documents involved reading them through a number of times.

For the purposes of this study, two collaborative activities – *framing joint research
questions* and *building a theoretical framework* – were taken under closer analysis.

These two activities were selected because they were significant elements of the group’s
teamwork and collaboration. Barron’s (2000) idea of *three distinct interactional
dimensions* and Mercer’s (2003) idea of *contextual resources* were used as analytical
tools in studying how the learners negotiated joint research questions and how they,
step-by-step, built shared understanding and knowledge. The links between *the group
activities* this involved and such outcomes as *the quality of the eventual group product*
were analysed by comparing instances of similar concepts, terms and ideas occurring in
the different documents. Thus, the aim was also to stress the important role of past
activities in the creation of new artefacts and new contexts (see Stahl, 2002). Further,
the study explored *the learners’ collaborative learning experiences* with a view to
interpreting the meaning that the students themselves attributed to their online learning activity.

**Results**

The group met mainly in the online learning environment, where they worked together, discussed their task, and created and added different documents. Additionally, they had two net meetings. The results section first presents the moment-by-moment decision-making process where the group framed their joint research questions. This process entailed making the group members’ individual perspectives visible and paying joint attention to the relevant issues so as to reach a shared understanding of the research questions. Working out the joint research questions affected also the group’s building of their theoretical framework. Secondly, the section takes a closer look at how the group put together their subject-specific theoretical framework. Thirdly, it illustrates the quality of the group’s final product and the links between its quality and the group’s collaborative activities. Finally, the section discusses the learners’ learning experiences as a team and as individuals.
Working Out the Joint Research Questions

The first message regarding the research questions was sent by Saara and Liisa (see excerpt below). They explain how they interpret the terms “communicating thoughts” and “autobiography”. This contribution is mainly a suggestion about what they are interested in investigating during the course.

[...] What is communicating thoughts? In Finnish it is "ulkoistaa" [externalise] and it could be explained as spelling out one's thinking: that way they become concrete, and one really has to think about her/his thinking and thoughts. The meaning of all this is that it helps the students to understand their own thinking and enables them to observe and comment the thinking of others. This is necessary for an efficient learning experience.

So, this is all we know about communicating one's thoughts now. But, we would like to know more. Our topic for the teacher training proseminar is learners' autobiographies. They are a way to think about one's thoughts and communicate them. What we would like to study from the autobiographies is learning experiences, for example what kind of teaching has been supporting, and what kind has suppressed the student's interests. Another interesting viewpoint into autobiographies is metacognition: conscious thinking about learning and thinking. Writing an autobiography supports metacognition in the way that the learner is encouraged to reflect the learning processes s/he has gone through.

… This project would (hopefully) help us gain some theoretical background for the
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proseminar, but also new viewpoints (in the form of the importance of metacognition and the way communicating thoughts helps metacognition), but it will be also a project of investigating metacognition in virtual learning environments.

Our questions for this project in this initial phase are:

- What is communicating thoughts more exactly?
- What are the benefits of communicating thoughts in terms of learning?
- How can thoughts be communicated?
- How does the Optima environment support communicating thoughts?
- How does Optima support metacognition?
- How does metacognition enhance learning? …

These are our preliminary views - any others are welcome! … […] (Thought Forum: 1.

What is communicating thoughts?)

The two students get a response from Tiina, whose apparent interest in the same issue is indicated by her elaboration of Liisa and Saara’s ideas on the basis of the question “What is learning?”.

[…] Hi there *Saara and Liisa,

do you think I could join your group? There are some very interesting questions that you ask -- what actually is communicating thoughts? and how it can be done? and does this all help people learn? Eventually I might end up asking "what is learning?"

=) […] (Thought Forum: 2. Re: What is communicating thoughts?)
Tiina does not get a reply to her question “What is learning”, but she is accepted as one of the group. After this first exchange the main focus shifts to negotiating about what kinds of documents the group should create; for example, they discuss the idea of keeping a joint research diary and naming it Project Log. This distracts the group members from their basic plan of refining their research questions until Tiina maps out, in a document, the ideas she has developed on the basis of Saara and Liisa’s first contribution regarding the research questions.

*Making individual perspectives visible.* The group members have thus found a new way to share their ideas. Tiina’s suggestion that she display her ideas in the form of a mind map as a separate document is accepted and the document is added to the group folder. Tiina puts down some ideas which she sees as preconditions for communicating thoughts and for learning (Figure I; the document on the left).

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Fig. I about here

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Saara also comments on some of Tiina’s ideas in the separate document (see Figure I; the document on the right). This brainstorming was not made visible in the discussion forum, only in the documents. There were references to Tiina’s mind map in the discussion forum, but they were more in the nature of comments, such as Saara’s message saying that Tiina’s brainstorming is a good start for refining their joint research questions.

Saara writes the other document as a response where she develops Tiina’s ideas further while also raising new questions, but the group does not take up these ideas in the discussion forum. This could interpreted as an indication that they did not need to specify what these ideas meant because they were drawing on the common knowledge that they had accumulated from similar experiences, in this case from a similar educational background (see Mercer, 2003). On the other hand, the other learners might think that these were simply thoughts made visible with a view to developing them further and assume that the learner who presented them was asking for more comments and ideas to serve as a basis for further brainstorming rather than expecting criticism.
However that may be, the ongoing discussion shows that the group members felt that they should focus their joint attention on working out the research questions.

*Focusing joint attention.* The group members believed that they were preoccupied with too many things at one and the same time, such as organising their work, starting to plan what documents and tools they needed to keep track of who is doing what, and deciding how to make their knowledge-building process transparent and visible to the other learners. The absence of one group member (Liisa) may also have disrupted the collaborative activities to some degree. Saara decides to make a suggestion about their future activities which is also a kind of summary of their previous discussion and actions. All the group members agree that they should collaborate on framing their joint research questions. For example, both Saara and Tiina ask Liisa’s opinion in their messages.

**Saara:** [...] Hello there, Tiina and Liisa!

I suggest (and, this is only a suggestion now) that this is how we will proceed with our topic:

1) After seeing Tiina's mind map, I suggest that Liisa and *Saara write their response to it.
2) We start refining our research question based on these thoughts and ideas. Thus, we could discuss here on what we think is important and interesting in terms of "communicating thoughts", …

3) We need to come up with some kind of a forum to keep track of what we are doing -- maybe so that we have a forum for our findings (theories, researches etc -- you guys know what I mean) and discussion about that, and another for the practical "keeping in touch", to know what everyone's doing and what they'll be doing. Tiina, any good suggestions? …

So, this week's agenda is (and hopefully we'll even get further) could be refining our research question. Liisa and I will need to be active.

Let me know if you have any further ideas on how we could work... Liisa, can you get some of your thoughts (maybe for example what you think is interesting in Tiina’s thoughts) to this CT folder on Wednesday? I'll try to do so. And Tiina, as soon as you see our comments, please comment back! Let's try to have a question and a further agenda by Friday? (Thought Forum: 21. What to do next?)

**Tiina:** […] *Saara, that's a good suggestion for a schedule and a goal for this week.

Liisa, how do you feel about it? […] (Thought Forum: 22. Re: What to do next?)

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*Reaching a decision on joint research questions.* The group members reached a shared understanding of a set of joint research questions through a demanding negotiation process which took much time and effort at the beginning of the course. As they worked
towards a decision about their research questions and goals, the learners employed a variety of tools such as the online learning environment’s chat and net meeting functions and various resources such as documents setting out individual perspectives.

*Used Resources in Building Group’s Theoretical Framework*

As previously illustrated, working out the research questions was a critical step which the group members took together, discovering a new and better way of making joint sense of their theoretical framework (see Barron, 2000). In the first network meeting the group decides to start building their shared theoretical framework by summing up the relevant books and creating a special forum for discussing the theory, *Discussion on Theories*. The book summaries were prepared individually, but the next section shows how these multiple individual perspectives were made visible and how the group members collaborated on knowledge building as they pursued shared understanding.

*Book summaries representing individual perspectives.* The learners started to work out their joint theoretical framework by considering the book summaries. Their review of Liisa’s summary (of *Interpersonal Communication* by Sarah Trenholm and Arthur
Jensen, 1992) starts with questions by Saara. Then Tiina opens up a discussion of a summary by Saara (*Inquiry Learning: Overcoming Constraints of Human Intelligent Activity* by Hakkarainen, Lonka, & Lipponen, 1999). She also starts a new discussion thread on her own summary of a book (Säljö, 2001) about the socio-cultural approach. Thus, the summaries prepared individually by each group member were then discussed online by the group as a whole.

For example, Liisa’s summary of Trenholm and Jensen’s *Interpersonal Communication* (see the next excerpt) makes Saara ask a number of relevant questions about Liisa’s outline of the phenomenon of communication and about whether the group members themselves have, consciously or unconsciously, taken on different roles while working in the online learning environment. She suggests to Liisa comparing face-to-face situations with online learning situations. She also points out that communication is an important element of the course they are attending.

[…]…Now that you've read your book, can you say something about our communication here. For example, are the roles similar as in (i suppose this book handles) F2F situations? How do we feel about our roles -- do we think we are dominant even though we aren't or...? All in all, do you think that we can apply these theories of F2F situations in this kind of virtual situation?
I think that this book was probably a really good one to read, since communication is probably the most important single aspect of this project: we rely completely on what we see and read here, this whole project is a one big communication event (if you see what I mean)! […] (Discussion on Theories forum: Message 3. Communication here.)

The group members were making a connection between their own experiences of online communication and the factual knowledge presented in the book. Such an approach might have arisen from their interest in reflection on learning experiences, but it might also have helped them to reach shared understanding, as the following excerpts show.

*Referring shared history.* In another contribution Tiina asks her fellow learners to consider whether they are able to record their learning process and whether it is, in general, possible at the university level for students to focus on the process instead of the result of learning, thus placing her idea in a wider context, higher education. The group members know that they share a similar educational background, studying at university. Tiina seems to be curious about how her fellow learners experience their university studies.
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**Tiina:** […] …Do you think that Optima here helps us to record our learning process?

Speaking of which, do you think that studying at the university level gives people enough opportunities to focus on the process instead of getting a final product done and forgotten?

[…] (Discussion on Theories forum: Message 6. Thinking, writing and learning…)

**Saara:** […] …Yes, I do think so. I mean, I come here, and write down some preliminary thought. Then you guys come and comment, and I clarify my point and we discuss it further. When we have something to say, we also have the process recorded there.

*Everything we do outside shape is lost, however.* That’s why I think that in this kind of learning it is very important to try to use this environment as much as possible to put down the ideas. […] (Discussion on Theories forum: Message 7. Thinking, writing and learning…)

**Tiina:** […]–and in addition, the ideas put down here help us as a group to “see” where each of us and we as a group are. […] (Discussion on Theories forum: Message 8. Thinking, writing and learning…)

Relying to Tiina’s question about whether the online learning environment helps them to record their learning process, Saara shifts the focus to the group-work process and the role of written language and group discussions. Alluding to their joint activities and her personal experience, she points out that everyone’s contribution is needed if the discussion is to go further. She introduces a new consideration by observing that the
group members’ actions outside the online learning environment escape attention. She also emphasises the importance of exploiting the environment to the full, meaning that they should use all the resources available in it as thoroughly as possible in making their ideas explicit. Tiina elaborates Saara’s idea a little further by highlighting the roles of individuals and the group, a move which Saara endorses. As Mercer (2003) and Stahl (2004) suggest, an appeal to common history or experiences may help learners to build shared understanding or meaning of some kind. The next example follows a similar idea, that of creating shared understanding by appealing to shared book knowledge and joint activities.

*Collective remembering based on book knowledge.* In the discussion thread *Few thoughts on the other book I read* Liisa wished to share some of the ideas picked up from another book regarding computer-supported collaborative learning (see excerpt). She introduces her ideas and reflects on the group’s past joint activities, feeling that in the light of the book they are important factors in collaborative learning. She thinks that their group meets the criteria that the book’s authors establish as indicators of high-quality collaborative learning, that is, agreeing on a group task and working on it
together. Liisa refers also to important factors such as interaction, commitment to the learning process, mutual encouragement, mutual assistance and confidence, and the creation of a relaxed and calm atmosphere, in her opinion present in their group.

**Liisa:** […] Marttunen Miika and Laurinen Leena had an article in this book that was concerning their research about: promoting argumentation skills in university: comparing e-mail and face-to-face studies. In p.19-20 'they had something very interesting and I quote:’ an important quality of collaborative learning is that the task of the group is commonly agreed and worked on together.

Precisely what me have been doing! […] (Discussion on Theories forum: Message 12. Few thoughts on the other book I read…)

**Tiina:** […] …Yep. =) And people (students and teachers alike) should remember that the negotiation on the task is essential for collaboration… and that it may take time. Sometimes deciding *together* what the task is is the most important 'result' of learning, methinks.

…[…] (Discussion on Theories forum: Message 13. Few thoughts on the other book I read…)

**Liisa:** […] …They also continue by defining important factors which are: interaction, committed to the learning process, mutual encouragement, mutual assistance and confidence and creation of a relaxed and calm atmosphere.

Also things that I think we have managed to fulfill in our group.
Aren't we good or what? […] (Discussion on Theories forum: Message 12. Few thoughts on the other book I read…)

**Tiina:** […] Yeah! We're great! We've even been able to create a calm atmosphere ;), which isn't always that easy. =) […] (Discussion on Theories forum: Message 13. Few thoughts on the other book I read…)

Tiina elaborates on Liisa’s views and adds that the negotiation of the group task is another essential factor, which could also be seen as an outcome of learning. Tiina agrees with Liisa that they have been able to make the important factors described in the book a reality in their group. The discussion ended with everyone agreeing that the group was doing well. The information from Liisa’s book seemed to offer a standard of a kind by which to evaluate the group members’ collective activities.

The results show that during discussions about their theoretical framework the group members were constantly reflecting on their joint activities. In fact, it seemed that they integrated their theoretical knowledge into their joint activity. This may have served learning better by combining the content to be mastered and the activities entailed by this particular content, thus enabling these two aspects of the learning process to support each other as the group members assimilated the subject. However, the goals they set themselves might have contributed to the way in which they
processed the relevant information because their aim was to design an experimental project where they wanted to share their experiences. This might be one reason why they pondered over their book knowledge against the background of their experiences of how communication and learning took place in the online learning environment. At the same time, the group put together a product, one component of their overall theoretical framework. This made it possible to consider the quality of the final product and its links with the group’s preceding collaborative activities, such as the group discussions and other documents.

Comparison Between the Final Product and Activities of the Group

In their final written assignment (called by the group their final work) the group members sum up all that they have done during the online course. This final written assignment comprised the following five sections: 1) Getting Started, 2) Organizing Our Work in Optima, 3) Research Questions and Theories: A Conclusion, 4) Reflections on Our Feelings and Thoughts and 5) What Have We Learnt? The final document was put together from different elements, the main sources being the group’s joint Project Log, the group discussions, and the book summaries by the group members. The results show
that the final written assignment represented only a minor portion of their collaboration
and was, moreover, of poor quality compared to their knowledge-building activities as a
whole.

The final written assignment lacks any shared summing-up of the group’s
theoretical framework. Instead, they present their research questions and explain how
they were led to build the theoretical framework and make the summaries. They provide
links to the summaries and the theoretical discussion forum, from which they have
copied a few contributions into their final product. These contributions are about
language, thinking and inquiry learning, communication in different situations,
nonverbal communication, and negotiating the group task. The group members might
have presented a few contributions as illustrations of how various issues were
considered during the online course. Instead, though Liisa’s proposal of discussing
non-verbal communication for example failed to evoke any response, it was
nevertheless added to the final written assignment.

The final written assignment can be seen as a document offering a short account of
the group’s work process. The results show that the group started to build their
theoretical framework in the very first message that Saara and Liisa posted on the
Thoughts discussion forum, defining a number of terms and presenting some preliminary research questions. The process of building the theoretical framework was guided also by Tiina’s mind map and Saara’s response to it. But in their final written assignment the group members make no mention of these previous discussions or documents.

The links between the different discussion forums and documents where the group worked on the formulation of their research questions and theoretical framework are presented in Figure II.

As the figure shows, Stahl (2004) is right in his suggestion that collaborative knowledge building is a cyclical process. It seems also that once negotiated, shared understanding becomes the learners’ tacit knowledge which can be used again to build further new understanding. However, the quality of the group’s final written assignment could have been better if it had compared the group’s theoretical framework with its knowledge-building activities during the online discussions. As it is, the document’s
analyses of the group activities cast no light on the quality of the group’s felt learning experiences.

Quality of Felt Learning Experiences

As the above data analysis shows, the individually made book summaries seemed to have an essential role in the process of building knowledge in the theoretical discussion forum. However, when they reflect on their collaborative activities and learning the learners first report that they learned mainly how to organise themselves and work as a group in the online learning environment. The next section describes the learners’ learning experiences first as a group and then as individuals.

The learners reveal, as a group, that the book summaries, which were the main resources in their theoretical framework, were a minor source of learning. The elements making up their theoretical framework can be traced back to different resources, such as the individual book summaries and other documents written from an individual perspective (Tiina’s mind map and Saara’s response) and the group discussions. Thus, few topics from the summaries were taken up during the group discussions, which might suggest that these two activities, discussing issues and making book summaries,
were quite separate processes. Nor did they summarise these separate activities in their final written assignment, which might give the impression that the group members lack a joint theoretical framework. The lack of a joint theoretical framework might have led the learners to conclude that they were learning less about the theoretical issues than about what they call practical matters (see Jeong & Chi, 1997). As individuals, the group members seemed to have different perceptions of how they had learned in the online learning environment.

As Saara sees it, what she had learned was how one learns in an online learning environment. Tiina feels that she had learned something about collaborative activities, negotiation processes and the demands that working in online learning environments makes on learners. Liisa mainly lists the technological tools she had mastered and talks about what communication seemed to be like in online learning environments and about how she had acted during the online learning course. What she fails to disclose is that she had read more than one book and that she had brought up these books in her contributions to the discussion forums. Given this, it can be assumed that she has learnt more than what she reveals herself as thinking she has.
Afterwards Tiina comments on her learning again by saying that she learnt from the summaries as she made, edited and read them. She adds that the effects might emerge in the longer term, but she feels that the summaries and the discussions helped her to deepen her understanding of learning and thinking. It might be that the learners’ self-constructed explanations were important for their learning when they were drawing up individual documents such as summaries of the books they had read or mind maps representing their own ideas (see Jeong & Chi, 1997). In this way, they had to make their own interpretations and understanding visible, which might have enhanced their own thinking and learning (see King, 1999; Webb, 1989).

However, the learners’ reflection on their learning experiences reveals that they learnt more through participation in their joint activities than through building their theoretical framework as a group. The close relationship between these two processes, mastering the content to be learned and engaging in the activities entailed by it, may have made it hard for the learners to make out what they had learned about the theoretical aspects of their topic. This might even have reinforced the group members’ learning experiences.
Conclusion

The purpose of this study was to find out how a group of three students reached shared understanding and built knowledge in an online learning environment as they worked out their research questions and constructed their theoretical framework and what were the tools and resources that they used in the process. The research task included also an examination of the quality of the group’s joint product as compared to their knowledge-building activities and an analysis of the group members’ perceptions of their collaborative learning situation. The learners’ own interests, backgrounds and contexts affected the way in which they shared their individual perspectives and operated as a group in the online learning environment. However, the results suggest that negotiations over joint goals and activities were an essential aspect of the collaborative learning situation.

The group built knowledge through a cyclical process (Stahl, 2004). The learners’ shared knowledge became the group’s tacit knowledge, reused to build new understanding. Thus, their synthesis of theoretical knowledge and group interaction shows also that they accepted the book knowledge as representing an authoritative standpoint at the same time as they held their own ideas and thinking in little esteem.
The learners’ own expectations and assessments showed that they had adapted to academic culture, where concepts and theories play a major role.

Research on computer-supported collaborative learning faces the methodological challenge of keeping track of a group process where there are always tacit assumptions and knowledge not shared in visible ways as group members interact in an online learning environment. For example, the group studied here created a great many documents whose link with their collaborative knowledge building was visible only if the topics covered in them were brought up in the group’s discussion forum. As Clark and Schaefer (1989) observe, the basic rule in communication is that shared understanding has been reached unless there is evidence to the contrary. This means that explorations of mutual understanding and knowledge should focus either on misunderstandings between learners and on the processes where these are cleared up or in moments where there is no evidence suggesting a lack of shared understanding. These moments where learners seem to achieve shared understanding without asking for or offering positive evidence of having truly gained it, could be investigated, for example by interviewing the learners and analysing their interpretations about their shared understanding and knowledge. The learners in the group examined here
communicated mainly within the online learning environment, at the same time as they belonged also to their own classroom context in their home universities. Observing learners in the classroom context might produce valuable information about the different factors which may affect learning and interaction in various learning contexts (see Arvaja, 2004).

As regards the pedagogical aspect, the group members created a joint project log where they continuously evaluated their group processes and their own experiences of and feelings about their collaborative work. According to Jeong and Chi (1997), a shared representation of some sort achieved between collaborating learners seems to be one of the mechanisms that explain how people learn through collaboration. The group studied here linked their evaluation activity to the learning process itself, which may have enhanced their learning and collaboration. A stronger focus on assessing both the individual and the group aspects of knowledge growth and group participation and interactions might help learners to work and learn together efficiently (see Chan & van Aalst, 2004).

From the viewpoint of teacher education, the learners’ own perceptions of their learning indicate that the group members did learn valuable things as future teachers,
such as the basic preconditions for collaborative activities in online learning environments. These experiences might have amplified conceptual changes in their own thinking about learning in general and especially in their own views, as teachers, of collaborative learning and online learning environments in particular. It has been argued that collaborative learning and online learning environments represent a new educational culture not easy to adapt to our current culture of education (Hakkarainen, Lipponen, & Järvelä, 2002). By offering pre-service teachers a chance to themselves explore a new cultural approach of this kind as learners might encourage them, when they are themselves teaching their future students, to experiment with these various methods and tools. In this study, the learners’ own experiences taught them how to guide fellow learners towards the goals and support them in collaboration in online learning environments. These future teachers wishing to make use, in their classrooms, of a new educational culture should be seen as potential collaborators with researchers involved in and designers constructing online learning environments.

**Acknowledgments**

This study was supported by the Academy of Finland.
References


