Participant profiles during collaborative writing

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Abstract: When students are composing a collaborative text together and share responsibility for the writing task, cognitive and metacognitive processes become external and visible and thus amenable to research. The aim of this study was to clarify how students interact and how the different student roles and activities are divided up when students engage in collaborative writing face-to-face. In this study 19 university students performed a collaborative writing task in 6 groups consisting of 2–4 students each. The purpose of the task was to assist students in learning the theories of development presented in their course book. The most frequent activities observed during the collaborative writing task were discussing concepts (31%), writing and revising (25%), planning the text (16%) and steering the group's performance (9%). The students engaged rather seldom in evaluative activities and the proportion of off-task talk was also small. Cluster analyses revealed four participant profiles: Cognitively versatile thinkers, Cognitively focused thinkers, Performance steering writers, and Textbook consulters. The participant profiles were the same for all the group members in four groups out of six.We conclude that participant profiles are not individual roles but are dependent on the discursive interaction through which collaborative groups approach the writing task.

Keywords: collaborative writing, collaboration, higher education, informational writing, interaction

journal of WRITING RESEARCH

Marttunen, M., Laurinen, L. (2012). Participant profiles during collaborative writing. *Journal of Writing Research, 4*(1), 53-79. http://dx.doi.org/10.17239/jowr-2012.04.01.3

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1. Introduction

Collaborative writing is defined by Giroud (1999) as a specific learning task in which two or more learners construct and write a text together, participate in its production, and are equally responsible for task achievement. She also emphasizes that during collaborative writing the partners have to work together to solve the problems that arise. During collaborative writing the partners have to combine both individual writing processes, like planning, formulating and revising (Erkens, Jaspers, Prangsma & Kanselaar, 2005) and several collaborative processes, such as grounding (Clark & Brennan, 1991), meaning negotiations (Andriessen, Erkens, van De Laak, Peters & Coirier, 2003), argumentative knowledge construction (Weinberger & Fischer, 2006), and collaborative argumentation (Golanics & Nussbaum, 2008). As these processes are highly interwoven during collaborative writing, the task of producing a joint text can be characterized as a very complex phenomenon (see Passig & Schwartz, 2007).

An advantage of collaborative writing, when compared to individual writing, is that it enables each party to receive immediate feedback about his/her writing actions (Storch, 2005; Erkens et al., 2005). Such feedback helps the collaborators to recognise the deficiencies of their own individual writing and to find ways to overcome them. The participants in a study by Noël and Robert (2004) reported the positive aspects of collaborative writing to be "having better ideas" and "having different perspectives". Nelson and Carson (1998), in their study on peer response, found that students in an ESL composition class, when writing their expository essays, welcomed negative comments by their peers as this helped them to identify problems in their written drafts. In addition, collaborative work has been found to motivate writers to redraft their work (Hodges, 2002), to give students a sense of power and authority over their own writing (Schultz, 1997), and to have a positive effect on young writers' self-esteem (Yarrow & Topping, 2001). Further, Storch (2005) found that collaborative interactions enabled adult ESL (English as a Second Language) students to pool ideas, which in turn influenced the quality of their collaborative products. Storch (2005) also found that pairs produced shorter but better texts in terms of task fulfilment, grammatical accuracy, and complexity than students who wrote individually. The next sections review the research on peer interaction, argumentation, and participant roles in the context of collaborative writing.

2. Social and cognitive processes in peer interaction

Kreijns, Kirschner and Jochems (2003) emphasize the educational and socio-psychological dimensions of interaction in collaborative learning. In their model of the two functions of social interaction, the first axiom is that social interaction affects both cognitive and social processes in the group. The second axiom is that both cognitive and social (and socio-emotional) processes reinforce social interaction. According to their model, an outcome of cognitive processes is learning and, respectively, an

outcome of social processes is social performance. The model also indicates that learning performance reinforces social processes and that social performance reinforces cognitive processes. Thus, group dynamics and collaborative learning are deeply intertwined. Although Kreijns et al. (2003) focused on the pitfalls for social interaction in computer-supported learning environments, it is clear that forming effective collaborative learning groups that are also able to maintain their effectiveness is not easy in face-to-face situations either.

The effectiveness of collaborative groups can be enhanced by structuring interaction as studies by Nixon and Topping (2001) and Yarrow and Topping (2001) indicate. Nixon and Topping (2001) studied the effects of structured peer interaction (paired writing) on the quality of 5-year-old emergent writers' writing skills. The subjects were 58 children in two classes. In addition to collaboratively planned learning situations by two teachers, 10 students were randomly selected to receive additional structured peer interaction. During the structured peer interaction, the older students helped the younger students to pose appropriate questions to stimulate ideas, and also gave them maximum control over their writing. Pre-post assessment of students' independent writing products indicated significant improvement for all the emergent writers, but the gains were significantly greater for those students who also experienced the structured peer interaction. Yarrow and Topping (2001) investigated student gain in quality of collaborative writing and attitudes to writing among ten- and eleven-year-olds (n=28). The students were assigned by gender and pre-test writing scores to an "Interaction" or "No Interaction" condition. All the students received training in writing and its inherent metacognitive prompting during a six-week period. Analyses of the individual pre- and post-tests indicated that while all the students showed a statistically significant improvement in writing, the gains of the children who wrote interactively were significantly greater than those of the lone writers.

The studies by Nixon and Topping (2001) and Yarrow and Topping (2001) were conducted among young and school-age children who need adult guidance and instructions to work effectively**.** However, we suppose that interaction between university students, the target group in the present study, should not be structured as they are expected to be metacognitively competent readers and writers. Namely, Kiili, Laurinen and Marttunen (2009) have indicated that some Finnish students are skilful readers and writers already at the upper secondary level. These skilful students are most probably later selected to the university. The research interest in the present study was to clarify how university students structure their collaborative work in the absence of specific instructions.

3. Argumentation, metacognition, and depth of conversation

During joint writing tasks, argumentation and meaning negotiations on content are demanding cognitive processes (Andriessen, Baker & Suthers, 2003). In order to reach agreement, collaborators have to defend their standpoints, put forward arguments in

support of their suggestions, negotiate different solutions and clarify their goals. Giroud (1999) encapsulates the benefits of argumentative interaction during collaborative writing by emphasizing that negotiation on text content renders the writing process visible to the partners, thereby increasing their awareness of their writing actions, and giving them more control over their writing and learning.

Several previous study results support the benefits of collaborative argumentative interaction with regard to the writing process and writing product. Keys (1994), for example, found that collaborative writing encouraged ninth-grade general science students to construct their own understanding of science concepts by creating an environment in which thinking, reasoning and discussion were valued. In her study the students improved in writing tasks that involved selecting and processing textbook passages, drawing conclusions and formulating models, and comparing and contrasting. Further, van Drie, Boxtel, Jaspers, and Kanselaar (2005) found a collaborative writing task in a computer-supported collaborative learning (CSCL) environment to be useful for promoting historical reasoning and the learning of history. In a study by Erkens, Jaspers, Tabachneck-Schijf and Prangsma (2001), college preparatory high school students used a computer-based collaborative writing environment for the purpose of writing a joint argumentative text and a chat environment for meaning negotiations. The study indicated that the collaborating students more frequently planned their writing activities on a meta-cognitive level than discussed the specific contents of knowledge, goals or the text itself. However, they found that coordinating and discussing the specific content of knowledge, goals, and formulation of the text, positively influenced the argumentative quality of the final texts. Overall coordination and planning of writing activities on a meta-level, even though it was done more frequently, had less impact on the quality of the outcome. Nevertheless, they conclude that shared knowledge construction – coordination in discussing knowledge on a meta-cognitive as well as on a specific content level – is an essential part of collaborative text writing.

Despite its many advantages for both the writing process and the writing product, also some problems are raised in collaborative argumentative interaction during joint writing. When Andriessen et al. (2003) used a computer-based environment for writing and chat for communication among university students (dyads) they found that elaborate negotiation between the writing partners occurred rather rarely. They assume this to be due to students' tendency to avoid conflict, and also suggest that the topics (nature preservation, labour policy) might not have been debatable enough. As a way to trigger students' negotiation they suggest splitting up a task into several phases (brainstorming, selecting content, formulating, linearizing etc.), and scripting collaboration according to different functionalities in different phases. In another study, Mabrito (2006) compared synchronous and asynchronous collaboration in an online business writing class and found that in synchronous discussions the conversational patterns lacked depth and produced many ideas that were never fully explored. The conversational patterns in asynchronous discussions, by contrast, resulted in deeper

threads of conversation with more follow-up comments provided to the initial topics of discussion. However, in a study by Barile and Durso (2002), asynchronous computer-mediated communication (CMC) groups writing collaboratively often failed to pay attention to the questions asked by other group members, and also had trouble in coordinating their writing tasks. Synchronous CMC settings, in contrast, provided an effective environment for the production of good quality work. Synchronous computer-mediated collaboration and face-to-face communication, the communication mode investigated in the present study, both require immediate responses to other people's speech turns.

4. Participant roles and practices during collaborative writing

Studies aiming at revealing the nature of the collaborative writing process and at answering the general question of *how people write together* have focussed on the writing strategies and practices collaborative group members employ to accomplish their collaborative writing tasks and on the different roles assumed by the participants during the writing process.

In order to understand the process of collaborative writing, Posner and Baecker (1992) and Baecker, Nastos, Posner and Mawby (1993) interviewed individuals representing different disciplines (medicine, computer science, psychology, journalism, freelance writing) who had participated in a number of collaborative writing projects. They found that the roles assumed by the group members were those of writer, consultant, editor, and reviewer. *A writer* converts ideas into text, records the text and freely makes changes to the text; *a consultant* works closely with the writer but does not take part in the actual writing of the text; *an editor* corrects text written by someone else; and *a reviewer* comments on the document. Lowry, Curtis and Lowry (2004) add the role of *team leader*, a person who plans the work of the group and rewards and motivates its members, and the role of *facilitator*, a person external to the collaborative writing team whose task is to lead the team through the requisite processes but who does not give content-related feedback.

Rimmershaw (1992) interviewed academic collaborative writers and identified three different collaborative practices used by the participants. The practice of *writing together* refers to simultaneous composition when writers work physically together and dictate and write the sentences of the text in tandem. *Exchanging drafts* refers to the mutual exchange of comments on the joint document with the aim of building up a final version. *Meeting needs and circumstances* was a different kind of practice based on the idea that the collaborators first interviewed each other, then produced separate pieces of writing individually, and finally blended, connected and rearranged the individual texts at a later meeting. Recently, Onrubia and Engel (2009) identified three main strategies for the collaborative elaboration of written products in a web-based environment. *Parallel construction* (1) refers to a situation in which each group member undertakes a different part of the complete task so that the final text is composed of

separate contributions either without or with the input of the other co-authors. *Sequential construction* (2), in turn, refers to a procedure where one member of the group first composes a partial or complete document, after which the rest of the participants successively add their contributions to this initial document. When writing is based on synchronic chat discussion with repeated revisions where all the group members respond to the comments and changes made by the other participants, the process is known as *integrating construction* (3).

Previous studies have identified the main roles assumed during collaborative writing and the different practices commonly used to accomplish the writing task. The results have mainly been based on data collected through interviews (Baecker et al., 1993; Posner & Baecker, 1992; Rimmershaw, 1992) in which participants have retrospectively described their collaborative writing experiences. Such data do not provide a very accurate picture of the real actions of collaborative group members during the writing process. In order to deepen our understanding of the collaborative writing process and to supplement existing answers to the question of *how people write together,* we analyzed students' actual interaction during a collaborative writing task. Thus we sought to learn how the different student roles and activities are divided up when students engage in collaborative writing face to face.

In this study, university students performed a collaborative writing task in groups of 2–4 students. The following questions were addressed: (1) how are different kinds of overall coordination and planning of writing activities, and topic-related discussions distributed when students engage in collaborative writing? (2) How do individual students participate in the collaborative writing process? (3) What associations are there between the quality of students' collaboratively written essays and students' interaction?

5. Method

5.1 Teaching arrangements

The study was conducted as part of a course (20 hours, 5 seminar meetings) in educational psychology at the University of Jyväskylä. A total of 19 students (2 males, 17 females) were enrolled on the course. The participants were second and third year students aged 21–25 years. During one course meeting (3 hours and 30 minutes) the students studied developmental theories and in small groups collaboratively produced a short essay on one of the theories.

The students prepared themselves for their collaborative task at home by reading and writing summaries of six chapters from a course book (Crain, 1992) in which the following developmental theories were introduced: early theories, ethological theories, Piaget's cognitive-developmental theory, behavioural learning theories, Bandura's theory on social learning, and Kohlberg's theory on moral reasoning. During reading, their task was to list the main concepts of each theory or group of theories, and after

reading to write a summary of each theory. Though the course book was written in English, the students' summaries were in Finnish (the students' mother tongue) and they were to include, at the very least, the three most essential ideas of each theory. The students sent their work to the teacher by e-mail before the seminar meeting.

The task assignments followed the principles of process writing (Flower & Hayes, 1981), with successive and recursive phases of planning (including the sub-processes of generating, organizing, and goal-setting), translating, and reviewing (including evaluating and revising). In classroom practice, process writing comprises some or all of the following phases that are not necessarily linear but intertwined with each other: prewriting, drafting, content revising, rewriting, editing, responding to feedback, proofreading and publishing (Healy, 1980). The concept lists the students were asked to produce during reading were expected to improve retention and recall of the to-be-learned information in long-term memory. Forming a concept list was also a prewriting activity for the summary writing. The summaries the students wrote after reading were used as first drafts on which the students gave mutual feedback. Summary writing is one of the informational writing tasks which can be measured on a scale of increasing levels of abstraction (recording, reporting, summarizing, analyzing, and theorizing), according to Applebee, Lehr and Auten (1981). Informational writing is based on external sources – the chapters of the textbook in this case – and emphasizes comprehension of and communication about the subject matter itself (Bangert-Drowns, Hurley & Wilkinson, 2004). The second and third phases of process writing in this study were more analytic since the students had to synthesize their ideas. These phases included collaborative work in which the students composed their joint essays from the first rough combinations of their ideas, mostly taken from their summaries, to the final collaborative text evaluated by the teacher.

During the collaborative group working phase the students were divided into six small groups, each comprising from 2 to 4 students. The two male students were in different groups. The students were allowed to form their groups freely so that students who already knew each other could join the same group. This was thought to increase group cohesion. Group cohesiveness has been shown to lead to an increase in group productivity by Mullen and Copper (1994) and Mullen, Driskell and Salas (1998). Further, the data were collected in a naturalistic learning environment, i.e. during an actual course that followed a planned curriculum, and not in an artificial laboratory situation. For this reason, the original intention to have from 3 to 4 members in each group was not realized as two students (from groups with 3 students) were absent when the data were collected.

The teacher selected one theory for each group to work with. First, the students read through and compared each other's conceptions of the most essential ideas in their individual summaries (15 minutes). Next, each group wrote a joint essay on the theory (120 minutes). The students discussed the theory and negotiated the content of their texts on the basis of their concept lists and summaries. The students organized their group working and conducted meaning negotiations by themselves. They were also

allowed to use the course book throughout their writing. Each group wrote their essay using a word processor in the classroom and subsequently sent it to the teacher by email. The rest of the seminar meeting (75 minutes) was used for discussion of the remaining five developmental theories and students' reflective evaluations concerning both their own working and the activities of the other members of their group. At the end of the course the students also gave written feedback to the teacher.

The collaborative writing arrangements used in the present study have similarities with both Schultz's (1997) *multiple co-authors composing single texts* mode of collaborative writing and the *reactive writing strategy* of collaborative writing presented by Lowry et al. (2004). Schultz's multiple co-authors mode is characterized by a high amount of interaction between the co-authors, whereas in reactive writing the writers react and adjust to each-others' changes and additions to the joint text. A further advantage of the reactive writing strategy is that the participants can build consensus through free expression (Lowry et al., 2004). Seeking for consensus on the content of the group's joint text was also thought to be important in the present study.

Moreover, in this study the collaborative writing was accomplished so as to meet the three essential criteria of a collaborative situation (Dillenbourg, 1999):

1. The students had a *common goal*, i.e., they had to compose a joint essay in order to earn the course credit;
2. They *worked together*, i.e., all the group members were responsible for the content of the joint essay and they were supposed to take equal part in planning, writing and revising the text;
3. The students were more or less at the same knowledge level, i.e., *symmetry of knowledge* was partly guaranteed by the preparatory reading of the textbook and completing the summary writing tasks; there was *symmetry of status* as the students were all responsible members of the writing group; and *symmetry of action* was taken into account by the students, as in face to face groups an unwritten rule is that each member of the group is allowed the same range of actions.

5.2 Materials

The study data consist of six small group discussions that were tape-recorded and transcribed. The discussions consist of 8177 speech turns ranging from 587 to 2262 speech turns in different groups. The 17 female students accounted for 7187 (88%) speech turns and the 2 male students 990 (12%) speech turns.

5.3 Analysis of the small group discussions

The quality of the students' collaborative discussions was evaluated, and the common and distinctive features of the students' participation in the collaborative communication process were analyzed. Students' group discussions were first roughly divided into different episodes, i.e. thematic entities consisting of successive activities

concerning the same topic. Almost all the speech turns inside the same episode were counted and classified into the same speech turn categories. However, the unit of analysis was not an episode but a speech turn for three reasons: first, evaluative speech turns were usually located inside longer episodes in which concepts were discussed or the textbook was consulted. If an episode had been taken as a unit of analysis, most of the evaluative activities to do with understanding of the content to be learned would not have been counted. Second, as the episodes varied in length, the number of speech turns indicated more precisely the relative amounts of the different writing activities performed inside the discussion. Third, the boundaries between episodes were fuzzy in some cases.

The speech turns were analysed into 6 main categories and related subcategories (11 variables in total): 1) Steering the group's performance; 2) Planning the text; 3) Writing and revising the text; 4) Topic-related discussion, with 3 subcategories: 4a) Discussing concepts, 4b) Presenting one's own idea, and 4c) Consulting the textbook; 5) Evaluation, with 4 subcategories: 5a) Self-evaluation, 5b) Evaluation of another person's writing, 5c) Evaluation of the group, and 5d) Evaluation of the equipment, situation, or task; and 6) Off-task discussion. Short comments and acknowledgements (such as Yeah, Okay, Never, Oh no, and Hmm) were also considered as speech turns but in the analyses they were not treated as separate turns but contextualized inside the episodes and placed in the same category with the speech turns that either preceded or followed them. Acknowledgements and short comments were almost equally divided between the different analytical categories. Repeated short comments and overlaps, i.e. acknowledgements produced either simultaneously or partially simultaneously, were not counted.

In previous studies writing processes have commonly been divided into three main phases: planning, translating, i.e. putting ideas into visible language, and reviewing, which consists of the two sub-processes of evaluating and revising (Flower & Hayes, 1981). Instead of directly applying the three main phases, we categorised the aforementioned writing processes in a different way. We assigned two processes, planning the text and evaluating, into separate categories but combined writing (i.e. translating) and revising in the same category for the following reasons. When adults are producing texts their writing and revising processes are usually parallel such that it is impossible to distinguish between them. According to Flower and Hayes (1981), people can revise written as well as unwritten thoughts or statements. They continue that "the sub-processes of revising and evaluating, along with generating, share the special distinction of being able to interrupt any other processes and occur at any time in the act of writing" (Flower & Hayes, 1981, p. 374). Aside from this consideration, the present collaborative writing task was accomplished after each member of the writing group had written a summary on the topic and immediately after the students had read their partners' summaries. In this context the students' revision processes were probably triggered simultaneously when they began to write their joint text.

The above quotation from Flower and Hayes also includes generating which is one sub-process of planning in their model of writing. We solved this methodological problem of simultaneous and partly overlapping occurrence of generating in the act of writing by deciding that the category named "planning the text" consisted mainly of speech turns in which the students were talking before they were actually writing their joint text. The other sub-processes in planning are organising and goal setting (Flower and Hayes, 1981). As organising the text structure often serves the communicative goals of writing we did not separate between them. Thus we included generating, organising, and goal setting inside the category of planning. Evaluation is also mentioned in the above quotation. We distinguished self-evaluation from other evaluative activities. Evaluations of another person's writing were mostly targeted towards their already written summaries. Evaluations of the group, equipment, situation, or task are not present in the model of writing by Flower and Hayes.

In this study, in addition to finding out how the students treated the phases of the writing process, we were also interested in the extent to which the students steered their group performances and in the ways students constructed their common understanding on the content of their joint text. The aim of the analysis was, first, to provide a detailed picture of the students' activities during the writing process, and second, to find ways to group the students' according to their contribution to the collaborative task. The speech turn categories are introduced below.

5.3.1 Steering the group's performance (category 1)

This category was related to the management of the students' collaborative work. The students discussed the use of time and their equipment (computer and printed pages of their summaries), examined the nature of the task, and agreed on the agenda and division of work within the group. The following extract (speech turns 889–894) illustrates how the division of work was discussed in group 2. The names in all the extracts are pseudonyms.

Ann 'Cos eventually this has to be put in Optima (a web platform), and now it is my turn to do it because you have …
Mark Yeah!
Martina Nobody could have done it yet, because, you know, Optima didn't work last time.
Meris I see.
Ann So, then I could write it on the computer and then export it to Optima.
Martina Yes.

5.3.2 Planning the text (category 2)

The students planned their joint text by setting communicative goals for their writing when they discussed the selection of concepts and topics and pondered how previous knowledge of the readership should be taken into account in the formulation of the essay. They also structured their text by formulating section subheadings and by organising the content and order of paragraphs. The extract (speech turns 3357–3364) below illustrates how the students planned the structure of their text.

Tara What kinds of things have you written on it (learning theory)?
Eva Well, I have put down that one, but…
Tara We could take it, but I don't know. This is only a sort of general study.
Eva Yeah, yeah.
Tara I wonder whether we could put it.
Eva Well, I don't know. I don't know whether it is worth writing. Anyway, it's not more than one sentence.
Tara But it's a bit difficult then, if you only put one sentence and then you move it again.
Eva Yes, that's true.

5.3.3 Writing and revising the text (category 3)

Writing and revising the text refers to the production by the students of their joint text. The writing process was often indicated through utterances such as "comma", "full stop" or "line" referring to concrete writing activities. This category also included speech turns showing that the students were either reading aloud or checking their text. When the students read their text over they also sometimes revised and emended it, as illustrated in the following extract (speech turns 4768–4770).

John And then the words "in reverse" should be removed. Take away the words "it was done in reverse". "The rabbit phobia of three-year-old Peter was gradually removed by familiarizing him with the presence of a rabbit." (Reads aloud the text already written.)
Marie Hmmm.
John That's it. We can also make it a bit longer if we take that phrase from there.

5.3.4 Topic-related discussion (category 4)

The students' speech turns during topic-related discussions were divided into three categories (categories 4a–4c). In these speech turns the students discussed the theoretical concepts, presented their own ideas and consulted the textbook. The discussion was either directly linked to the textbook or otherwise relevant to the theories dealt with.

In category 4a, *Discussing concepts,* students discussed and negotiated the meanings and different interpretations of the concepts included in the textbook. The students also explained to each other how they had interpreted the relevant theories when writing their individual summaries, and discussed their translations of concepts. After Ada's first speech turn (writing and revising), the three last speech turns in the extract below (speech turns 5208–5211) illustrate the discussion on the content of Darwin's theory of evolution:

Ada Well, add "natural selection" there.
Elise What does it mean? Natural selection means that only those of the species …
Ada The most suitable ones.
Elise The strongest and the most successful will procreate and transmit their genes. The others will die. It's a cruel game.

Presenting one's own idea (category 4b): The students presented their own thoughts relevant to the topic under discussion. The students' thoughts and ideas were based on their previous life experiences, and other topic-related texts they had read earlier. *Consulting the textbook* (category 4c) includes speech turns which indicate that the students discussed the topic and read the textbook in parallel. The students, for example, checked the exact meanings of concepts from the textbook for their essay.

5.3.5 Evaluation (category 5)

Evaluative speech turns were divided into four categories (categories 5a–5d). In these speech turns the students evaluated either their own activities, others' activities or the group's activities during the collaborative writing process. In category 5a, *Self-evaluation,* the students evaluated either the quality of the text in their individual summaries, their own understanding during the discussions, or their activities or behaviour during collaboration. The following extract (speech turns 6434–6436) illustrates how one student (Sandra) evaluated her behaviour during the group work:

Sandra Well. That's dull, whenever this kind of collaboration is being done or group work like this, I always feel that I'm the one making most of the running.
Elise Hmm…
Sandra Hmm, I feel that, damn it, that now no one else can say anything.

Evaluation of another person's writing (category 5b): Mostly, the students evaluated the ideas written earlier in other students' individual summaries, as Sheila does in her last speech turn in the extract below (speech turns 348–350):

Sheila Hmm. Hey, let's put this, let's put it just like you have it here.
Vivian Yes.

Sheila Because the concept "schema" comes here and then it comes here again, and here you also explain what schema eventually means.

Evaluation of the group (category 5c): The speech turns in this category demonstrated the students' evaluation of their activities when they were working as a group, as shown in the following extract (speech turns 1521–1525):

Mark You should always concentrate on the formulation of one sentence at time because we can't, you know, formulate it as a group...
Martina No, we can't.
Mark …as we all have our own way…
Martina An opinion of our own. It should only be added now.
Mark …to formulate things. So, we should only write that down.

Evaluation of the equipment, situation, or task (category 5d): In this category the students evaluated, for example, the functioning of the computer during the group task, the quality of the working environment (the 1st extract below, speech turns 1236–1237) or the task assignment (the 2nd extract below, speech turns 4626–4632):

Martina It's a bit difficult to read since everybody is talking so loud.
Meris Hmm.

John It would have been easy if we'd got only Kohlberg's levels of moral reasoning. We would have got them directly.
Marie Yeah.
John To my mind, this was the most difficult chapter.
Marie Hmm, I agree.
Thelma I don't know, I think, on the other hand, it was easy, because we already knew about these things in advance.
Marie Hmm.
Thelma But then, you know, this one is very difficult.

5.3.6 Off-task discussion (category 6)

This category concerned talk about other issues than the task itself. The students talked, for example, about their social relations, leisure activities or having a break.

5.3.7 Reliability of the analysis

To check the inter-rater reliability of the analysis, 10% of the data (816 speech turns, 136 speech turns from each of the six groups) were analysed independently by another person. The reliability proved good as the inter-rater agreement was 77.9% and Cohen's kappa was high, $\kappa = .73$ (Cohen, 1960).

5.4 Evaluation of the students' collaborative essays

As a part of her routine evaluative work during the course, the course teacher, who was an experienced educator in the university, evaluated the collaborative essays of all six groups with a holistic scoring rubric commonly used in Finnish universities (1=acceptable; 2=fair; 3=good; 4=very good; 5=excellent). The main criteria of the scoring rubric for the essays were: a) accuracy of the definitions of the main concepts of the developmental theories; b) inclusion of the most important ideas of the theories, and c) coherence of the text. Since the groups in this study all performed rather well the teacher used only the three highest grades (3, 4 and 5) of the scale.

The scoring was independent of the students' group discussions. The teacher observed the students' working at distance and was available for the students if they asked for help. The teacher evaluated the groups' essays only, not the transcripts of the group discussions. For reliability checking, another teacher of educational psychology evaluated all the six essays; four of the essays were given exactly the same rating by both teachers and two essays were one out. The ratings of the course teacher were used in the final analyses.

5.5 Cluster analysis

According to Stockburger (1998), the purpose of cluster analysis is to discover a system of organizing observations, usually people, into groups where members of the groups share properties in common. The aim of the present study was to clarify whether the students shared specific ways of engaging in the collaborative writing process and, if so, how such shared ways could be described on a theoretical level. Thus, cluster analysis (Aldenderfer & Blashfield, 1984) was conducted in order to identify subgroups of students. First, hierarchical cluster analysis was carried out which included all the 11 variables relating to the students' speech turns. Two outliers were found. Next, K-means cluster analysis (the two outliers excluded) with the same variables, using the four-cluster solution, was conducted. This cluster solution was used as its resolution power proved to be the best, and it resulted in the clearest and most justifiable theoretical interpretations of the clusters.

6. Results

6.1 Quality of the students' collaborative discussions

During the collaborative writing process the students frequently discussed the concepts used in the developmental theories: 31% of the speech turns were in this category. In addition, a lot of the students' speech turns concerned the actual writing and revision (25%) or planning (16%) of the group's text (Table 1). The students only seldom engaged in evaluative discussion or off-task talk.

Table 1. Frequencies and proportions of the students' speech turns by groups (G).

Speech turn category	G1 (*n*=4)		G2 (*n*=4)		G3 (*n*=2)		G4 (*n*=2)		G5 (*n*=4)		G6 (*n*=3)		Total	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%	*f*	%
Steering the group's performance	62	10.6	251	11.1	94	8.1	75	6.8	81	4.8	139	10.1	702	8.6
Planning the text	59	10.1	377	16.7	180	15.5	51	4.6	382	22.7	276	20.0	1325	16.2
Writing and revising	203	34.6	428	18.9	402	34.5	289	26.2	380	22.6	343	24.9	2045	25.0
Discussing concepts	210	35.8	736	32.5	294	25.2	274	24.8	626	37.2	420	30.5	2560	31.3
Presenting one's own idea	4	0.7	283	12.5	5	0.4	64	5.8	89	5.3	73	5.3	518	6.3
Consulting the textbook	0	0	57	2.5	90	7.7	190	17.2	7	0.4	35	2.5	379	4.6
Self-evaluation	9	1.5	30	1.3	34	2.9	22	2.0	36	2.1	11	0.8	142	1.7
Evaluation of another person	13	2.2	13	0.6	1	0.1	16	1.5	16	1.0	5	0.4	64	0.8
Evaluation of the group	12	2.0	42	1.9	41	3.5	11	1.0	11	0.7	19	1.4	136	1.7
Evaluation of the equipment, situation, or task	1	0.2	6	0.3	10	0.9	40	3.6	19	1.1	1	0.1	77	0.9
Off-task discussion	14	2.4	39	1.7	14	1.2	71	6.4	35	2.1	56	4.1	229	2.8
Total	587	100	2262	100	1165	100	1103	100	1682	100	1378	100	8177	100

Since the students were allowed to organize their group work rather freely, the number of speech turns among the groups varied widely, from 587–2262 turns (Table 1). Although a time-table was given to the students at the beginning of the course meeting, the groups did not necessarily follow it. Group G2, with 2262 speech turns, exceeded the time planned for the given task. Most of the group's course meeting time was spent on the collaborative writing task, leaving the group only a limited amount of time to discuss the remaining other five developmental theories.

Group G1, which contained the same number of participants as Group G2, had the smallest number of speech turns (587). Both groups comprised four members. This explains the rather low correlation (Pearson's r=.32; df=5; p>0.10) between the number of speech turns and group size.

6.2 Students' participation profiles during collaborative writing

Although in all 6 groups (Table 1) the students spent more than 24% of their speech turns on discussing concepts and more than 18% on writing and revising the text, the cluster analysis revealed four student subgroups, which were named as follows: Cognitively focused thinker, Cognitively versatile thinker, Performance steering writer, and Textbook consulter (Table 2).

Table 2. Mean proportions (%) of the different speech turns by participant profile.

SPEECH TURN CATEGORY	Cognitively focused thinker (6 students)		Cognitively versatile thinker (5 students)		Performance steering writer (4 students)		Textbook consulter (2 students)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Steering the group's performance	5.8	2.0	**11.6**	3.0	**9.5**	2.7	5.9	2.0
Planning the text	**22.3**	1.3	**16.9**	0.6	14.3	1.7	3.9	0.6
Writing and revising the text	23.9	3.4	20.3	3.5	**35.7**	4.0	25.3	5.2
Discussing concepts	**34.7**	3.8	**31.3**	3.6	27.8	3.2	25.8	2.3
Presenting one's own idea	5.4	1.5	**10.9**	3.3	0.4	0.4	5.8	0.2
Consulting the textbook	1.2	1.2	2.5	1.0	3.9	4.5	**19.3**	1.2
Self-evaluation	1.6	1.2	1.4	1.0	2.3	1.0	2.3	2.5
Evaluation of another person	0.8	0.7	0.6	0.2	1.1	1.3	1.3	0.2
Evaluation of the group	0.9	0.6	1.7	0.6	2.7	1.3	1.1	0.3
Evaluation of the equipment, situation, or task	0.8	0.6	0.3	0.2	0.5	0.4	3.4	0.8
Off-task discussion	2.6	0.8	2.5	1.9	1.8	0.7	5.9	1.4

Note: Means that formed the basis for labelling of the cluster groups are bolded.

Cognitively focused thinkers typically concentrated on two cognitively demanding activities during the group task: planning the text and discussing concepts (Table 2). The average proportion of speech turns relating to text planning among these students was 22.3 whereas among the students (n=11) in the other three subgroups it was 13.6. The corresponding proportions of speech turns relating to discussing concepts were 34.7 and 29.0.

Both planning the text and discussing concepts are highly important activities contributing to success of both the collaborative writing task and the general learning aims of the course. Planning a text is a demanding metacognitive activity during which writers form an internal representation of the knowledge to be used in writing (Flower & Hayes, 1981). Planning includes subprocesses such as generating ideas and organizing and linearizing content (Erkens et al., 2005). The following extract (speech turns 5149–5150) demonstrates how two of the cognitively focused thinkers in this study (Sandra and Marie) organized the content of their text together.

Sandra Shall we consider all of those theories separately, so that we put …
Marie No, I think this is all about one and same theory, but there are in a sense different issues, so in a way different…

Further, discussing concepts describes an activity during which the students negotiated the use of the concepts in their course book. During their discussions the students often constructively presented argumentative speech turns, challenged each other's ideas, and suggested different options with justifications. Such qualitative features of discussions are typical of both exploratory talk (Mercer & Litteleton, 2007, p. 59) and collaborative argumentation (Golanics & Nussbaum, 2008), both of which have been suggested to promote learning. Discussing concepts can thus be regarded as an important facilitator of the social construction of new knowledge. In the following extract (speech turns 7270–7274) three students engage in a knowledge negotiation process (see Andriessen, Erkens et al., 2003) on the concepts of Kohlberg's theory of moral development in order to reach agreement.

Mandy Stages of the preconventional level, or the first stage. The first stage of the preconventional level is obedience and punishment …
Mary So, could it be obedience and punishment? Well, you can't repeat that…
Mandy No.
Ruth They obey because they are afraid of it (punishment). They think that it (a bad deed) will be punished. Isn't it then obedience and punishment? Is it?
Mandy Could a stage be called obedience and punishment?

The particular feature of *Cognitively versatile thinkers* was that they engaged in several cognitive activities during the group work (Table 2). They discussed concepts (31.3%) and planned the text (16.9%). Furthermore, steering the group's performance and

presenting one's own ideas characterized these students as compared to the others. The proportion of speech turns referring to steering of the group's performance among the cognitively versatile thinkers averaged 11.6 as against to 7.0 among the other students (*n*=12). The corresponding proportions for presenting one's own ideas were 10.9 and 3.8.

In the following two extracts students representing the cognitively versatile thinkers steer the group's use of time (1st extract, speech turns 1153–1156), and present their own ideas on Kohlberg's theory of moral development (2nd extract, speech turns 694–697). The new ideas are based on the students' earlier reading and their own independent thinking.

Mark There's no panic or hurry. It's only five o'clock. Look, half planned is the same as a third done.
Martina So, what about it?
Meris Well, we have till seven to do the essay.
Mark To plan … when you plan well and …

Mark I think those are … or at least it seems to me that the first level is the level of preconventional morality. It is not premoral.
Ann Because I have learned about these in my previous studies, I mean Kohlberg's theory.
Meris So in psychology it's translated in this way.
Mark No, I don't think so, it is not so. Because premoral means a level before moral.

The most distinct feature of *Performance steering writers,* in contrast to the other students, was that they were the persons who took charge of the actual writing of the group's text. The proportion of speech turns referring to actual writing among these students averaged 35.7% while among the other students (*n*=13) it was 22.7%. In addition, compared to the other students, these students also, along with cognitive versatile thinkers, often steered the group's performance (9.5%).

The following extract (speech turns 531–534) illustrates how two students, both performance steering writers, get down to writing the group's text on Piaget's theory of cognitive development.

Sheila And then put that bit straight from there.
Helen And then that bit over there.
Sheila Right, so, where is it now?
Sheila Then what Helen wrote, that Piaget's theory.

The two *Textbook consulters* used a writing strategy that distinguished them from the other students: they often consulted the textbook while working on their collaborative text. Almost a fifth (19.3%) of their speech turns referred to consulting the book during

working as compared to 2.3% among the other students (*n*=15). Another distinctive feature of these students was that they engaged in off-task talk more frequently than the other students (5.9% vs. 2.3%).

The extract below (speech turns 4317–4321) shows how the students in this subgroup used the textbook during their collaborative working.

Maria It was there quite near the beginning.
Thelma "…as when the baby's head is dropped" (Thelma reads a book). In a way, you know, ok … or something like this.
Maria Oh, what page are you on?
Thelma Hundred and fifty-eight. Here it is, you know, "fear" and below that. You know, that a sudden sound .. so what could "loss of support" possibly mean?
Maria tuen puute (translation into Finnish).

6.3 Relationship of the groups with the participant profiles and the quality of the collaborative essays

Most of the writing groups (4/6) consisted of students whose participation profiles were in the same category (Table 3). Cognitively focused thinkers formed one group (G5), as did cognitively versatile thinkers (G2), performance steering writers (G3), and textbook consulters (G4). Only one group (G6) consisted of students belonging to different profile categories (one cognitively versatile and two cognitively focused thinkers). The two performance steering writers worked with two outliers (G1) whose speech turns did not fall into any particular profile. The group consisting wholly of cognitively versatile thinkers received the best grade (5=Excellent) and the group of performance steering writers with two outliers received a high grade (4=Very good) for their joint essay. The grade of the four remaining groups was one grade lower (3=Good).

Table 3. Distribution of students with different participant profiles in the different groups (G1–G6) and grades for joint essays.

Participant profile	G1	G2	G3	G4	G5	G6	Total
Cognitively focused thinker	0	0	0	0	4	2	6
Cognitively versatile thinker	0	4	0	0	0	1	5
Performance steering writer	2	0	2	0	0	0	4
Textbook consulter	0	0	0	2	0	0	2
Outlier	2	0	0	0	0	0	2
Total	**4**	**4**	**2**	**2**	**4**	**3**	**19**
Grade for joint essay*	4	5	3	3	3	3	

Note: * 3=Good; 4=Very good; 5=Excellent

7. Discussion

7.1 Cognitive and metacognitive activities in collaborative writing

The context of the collaborative writing situation has an effect on the organization of students' writing process. The students knew that they would not be able to participate in collaborative writing without having done some preparatory work, i.e. they had to read six chapters on developmental theories, make concept lists, and write summaries. Hence, they were well prepared for the subsequent group work session. Intensive advance preparation probably also affected their study motivation: high investment boosts the aspiration to work hard in the expectation of profits.

The students concentrated well on the collaborative writing task, as 83% of their speech turns concerned the most essential elements of the task, i.e. discussing the concepts related to the topic, writing and revising, planning the text, presenting one's own ideas, and consulting the textbook. Discussing concepts and consulting textbooks indicate that collaborative writing invites reflection on the learning content. These results are in line with the findings of a meta-analysis on school-based writing-to-learn interventions that included 48 studies in grade levels varying from elementary school to college (Bangert-Drowns et al., 2004). The meta-analysis indicated that the educational importance of writing might lie in the scaffolding that writing can provide for meta-cognitive and self-regulatory processes. In Bangeert-Drowns et al. (2004) study, especially metacognitive prompts were effective in bringing the students to reflect on their current knowledge, confusions, and learning processes. In the present collaborative writing study, university students' meta-cognitive and self-regulatory processes became explicit – even though metacognitive prompts were not provided to them – especially when they were planning the text, because they had to make their thoughts audible to the other group members.

Planning refers to the selection of appropriate cognitive strategies in relation to the writing task, like deciding what ideas should or should not be included in the text and in which order the ideas deemed essential should be presented. Even a simple regulative question like "What shall we write first?" triggered planning by students. Another important meta-cognitive and self-regulatory strategy is the deliberate monitoring of one's own comprehension. The proportion of speech turns in the category of self-evaluation was, however, small (2%) in the present study. When the students encountered comprehension difficulties it was not necessary to reveal them literally, because they could directly ask the group for help. When students sought help in this way, exploratory activities were stimulated in the group.

In this study the students presented their own ideas and elaborations rather seldom, apart from the cognitively versatile thinkers. Through presenting their own ideas the students related new concepts to already familiar ones and elaborated the developmental theories in question (i.e. the topic of their essay) with reference to their previous life experiences. The small proportion of elaborative comments, in particular the lack of examples, might be explained by the nature of the writing task. The students'

task was to compare and collect each-others' basic ideas about the theories and produce a synthesis of them. As the aim of the task was to foster students' understanding of the central ideas of the developmental theories, they concentrated solely on theoretical ideas, instead of applying them in the light of their own experiences and giving examples. Moreover, the theories were written in a foreign language (English) so that**,** in addition to new theoretical concepts, the text also included difficult phrases and unfamiliar words. Thus**,** the writing task was challenging enough without extra elaboration. Nevertheless, it is possible that the students could have produced more elaborative comments had they been prompted to do so. The effectiveness of elaboration prompts has been indicated recently in a study (Nückles, Hübner & Renkl, 2009) on the quality of learning protocols students wrote individually after watching a videotaped lecture.

7.2 Participation profiles and the quality of essays

The four participation profiles identified in this study showed that the students' cognitive processes differed when they performed the collaborative writing task. *Cognitively versatile thinkers* invited each other to engage in various cognitive activities, such as planning the text, writing and revising, discussing concepts and presenting their own ideas. Perhaps due to the diversity of their activities, they also had to steer each other's performance. The difference between cognitively versatile and *cognitively focused thinkers* lies in the more frequent concentration on the actual writing task by the cognitively focused thinkers. The majority (80.9%) of their activities encompassed discussion on the topic of the text, planning, and writing and revising the text. *Performance steering writers* directed their attention mostly to writing and revising activities (35.7%) and to discussing concepts (27.8%), although the relative proportion of speech acts devoted to the latter activity was smaller than among the cognitively focused and versatile thinkers. Performance steering writers also seldom presented their own ideas (0.4%).

Textbook consulters attempted to keep the writing task closely connected with the theoretical ideas presented in the textbook. When they discussed concepts (25.5%) their thinking was mostly linked with the content of the textbook. Uncertainty about one's ability to understand a theory may be one reason for consulting textbooks. The two textbook consulters formed a single group in this study. At the beginning of the collaborative writing task they decided to utilize underlinings that somebody else had made in the textbook instead of their previously written summaries, although in quality their summaries did not differ from those of the other students. Their decision indicates that they were willing to learn and wanted truly to understand the theories in question, instead of simply repeating and transferring their earlier ideas from their summaries. Unfortunately, this decision partly hampered the aim of enhancing the progressive development of students' own thinking and understanding. In fact, they changed the task assignment from a phase of process writing to purely informational writing. Following somebody else's underlined text might explain the small percentage of text

planning (3.9%) in this group. Moreover, translating underlined textbook material into another language is a demanding task with a rather heavy cognitive load. This might have caused concentration problems, which might in turn explain the larger proportion of off-task discussion (5.9%) engaged in by these students in comparison with the other participant profiles.

The group with two performance steering writers and two outliers composed almost as good an essay (4=Very good) as the group of cognitively versatile thinkers (5=Excellent). Thus, good essays were produced not only by cognitively versatile thinkers but also by combinations of the participant profiles identified in this study. This makes it is difficult to generalize about the association between the participant profiles and essay quality. However, the teacher's observations about the behavior of the group composed exclusively of cognitively versatile thinkers sheds some light on the factors behind effective collaborative learning.

The group of cognitively versatile thinkers was extremely motivated and engaged in the task. One indication of this is the large number of speech turns (2262) compared to those in the other groups (587–1682 turns). Usually the group did not restrict its collaborative work to the hours of the seminar meetings but continued working either by spending extra time in the classroom or meeting each other in their free time. The most salient features of the group were togetherness, positive interdependence, and both eagerness to understand the topics to be learned and willingness to indicate their good understanding through their joint writing. As a result, the group achieved the best grade (5/5) for all the sub-tasks and the final essay. This was not the case with any other group.

Furthermore, the only male student in the group of cognitively versatile thinkers refused to accept easy solutions, such as copying inaccurate terms and definitions from Finnish school books or web pages. His behavior was in line with the results of the classroom observation study by Swann (1992, see also Vass & Littleton, 2010), who found that, when compared to females, male students of all ages tend to adopt more executive roles in joint problem solving and make more direct and directive comments to their partners. Nevertheless, he did not dominate the discussion. In this case, his persistence with regard to proper understanding – which could also be due to his personality rather than gender – forced the other group members to follow his example and take the task seriously. The female members of the group were supportive and helpful. They looked after the groups' welfare.

The importance of the nature of students' interaction in terms of successful group work becomes evident when these observations are examined in light of the model of the two functions of social interaction by Kreijns et al. (2003), presented earlier in this article. If social and socio-emotional processes are in balance with cognitive processes that produce noticeable learning outcomes for the group, the positive feedback circuit between learning performance and social performance maintains group members' willingness to work together and to spend time with each other. In this study one student from group G1 illustrated this notion in her e-mail feedback letter to the

teacher: "So far I have learnt to hate group work. At school we did plenty of it. But working in groups in this course was something special; it was totally different from what we did at school. Each of us was responsible and worked very hard both at home and when we were together. We even met each other voluntarily in our spare time outside school hours in order to finish our course tasks; we really wanted to do them well and we did. We really helped each other to learn. Working together was so meaningful that we also wanted to be together."

It is worth noticing that the participant profiles in this study were rather impure; because each student profile consists of many speech turn categories, the differences between the profiles are based on the distributions of the most frequent categories. This means that students with different profiles are also able to perform a wide variety of activities, if needed. If, for example, no one in particular insists on steering the group, all the group members are capable of taking responsibility for keeping the group's writing work on track.

This result indicates that participant profiles are not individual roles as such but characteristic ways in which groups as a collective approach the task at hand. Hence, the participant profiles are not dependent on the individual participants acting out a certain role, but are interactive by nature. This interpretation is in line with the sociocultural linguistic approach of discourse identity, according to which, identity is the product of linguistic and other semiotic practices and therefore is a social and cultural rather than primarily internal psychological phenomenon (Bucholz & Hall, 2005, p. 585). In the present study the participant profiles can thus be interpreted as temporary and interactionally specific ways to participate in writing.

7.3 Collaborative writing strategies found in earlier studies and in this study

Posner and Baecker (1992) have found four types of scientific writing strategies: 1) *Single writer*: one team member writes the document while the others assist; 2) *Separate writers*: the document is divided into parts and different individuals write the various parts; 3) *Joint writing*: several group members compose the text together, and even minute segments of the text are decided by the group; and 4) *Scribe*: the content of the document is based on group discussions, and one individual writes the document.

In the present study the students' writing strategy could be described by combining the typology of Posner and Baecker (1992) with the three main strategies of collaborative elaboration of written products identified by Onrubia and Engel (2009). The main strategy has parallels with *integrating construction* and *joint writing,* as all the group members had equal possibilities to respond to the comments and proposals made by the other participants and the whole group was responsible for the decisions concerning the final text. Further, the writing strategy employed by the students in this study is in line with the collaborative writing activity known as *co-writing* (Saunders, 1989). Typical of co-writing is that it is completely cooperative because the peer writers share ownership of the text and because they are expected to interact and contribute

throughout each of the collaborative writing phases: planning, composing, reviewing, and correcting.

However, in the present study only one individual typed the text on the word processor, hence the strategy could be described, at least in part, as a scribe strategy. In this case the writer took part in the group discussion and all the other members of the group saw what she or he wrote. These observations are slightly in conflict with the results of the study by Noël and Robert (2004), who found that the most popular collaborative writing strategy among their sample of collaborative project participants was *parallel construction* in which the final text is composed of separate contributions followed by the single writer strategy and sequential construction.

7.4 Limitations of the present study and suggestions for further studies

The speech turn categories applied in this study are partly theory driven, such as planning the text and writing and revising (Flower & Hayes, 1981), and partly data driven. The context and task assignment of the collaborative writing situation clearly influenced the data-driven categories. According to Rojas-Drummond, Littleton, Hernández and Zúniga (2010), collaborative writing opens a window for analysing not only students' dialogues and texts, but also their thinking. But what is the optimal size of the window through which thinking processes can be seen most clearly? In this study the window size was perhaps too small, as we used a speech turn as the unit of analysis and our categories emphasized the individual cognitive activities of the group members. A more qualitative analysis with open interpretation, instead of strict categories, might provide a larger window on the complexity of collaborative writing, which is an inherently dialogic activity in that its processes and products are interwoven and mutually constitutive.

It should also be noted that the results mainly describe female students' thinking processes since four out of the six small groups consisted solely of female students, and 88% of the analysed speech turns were presented by females. The generalizability of the results to mixed gender groups should be questioned, since several previous studies (e.g. Underwood, Underwood & Wood, 2000; Fitzpatrick & Hardman, 2000) have reported on differences between same gender and mixed gender small groups (pairs) with regard to collaborative verbal interaction and level of task performance. However, the results of this study are representative of educational studies in universities where female students form a large majority.

The selection of writing strategies and other cognitive activities is largely dependent on the purpose of the writing situation and the collaborative group members' preferences and working habits. The primary goal of collaborative writing in the present study was to assist students to understand and learn developmental theories; a secondary goal was to provide them with experiences of collaborative group work. At the end of the five seminar meetings (20 hours of work with several experiences of collaborative writing and discussion situations), the students wrote their reflective evaluations on the course. Their feedback indicated that they thought that they both learned more and worked

much harder than they usually do in their university studies. Thus, in spite of its limitations, the present study offers an effective model on one realization of collaborative writing-to-learn intervention. Aside from its practical significance, the study made a methodological contribution: collaborative writing has not much previously studied in a process-oriented manner by analyzing the discussions of the participants during composing a joint essay. In future research, students' collaborative negotiations could be examined by targeting the analysis at the points in students' discussions where they reformulate and elaborate ideas presented in their individual summaries into sentences to be included in their joint essay. This analysis might reveal important properties of students' conceptual learning processes.

Acknowledgements

The authors thank Michael Freeman for his valuable comments on the language and Minna Pulkkinen for her help in the data analysis.

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