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# Understanding the dynamics of motivation in socially shared learning

Sanna Järvelä [a,*], Hanna Järvenoja [a], Marjaana Veermans [b]

[a] University of Oulu, Oulu 20014 Finland
[b] University of Turku, Finland

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**Abstract**

The aim of this study was to gain an understanding of the dynamics of motivation in socially shared learning from both individual and group perspectives. Higher education students' motivation was analysed in the context of collaborative learning tasks, applying quantitative and qualitative methods. The research questions were: (1) what kind of motivations and task-specific goals do individual students have and (2) how do they combine their motivations as a group in socially shared learning? Three- to five-member groups of university students ($n = 99$) were observed as they worked with three different collaborative learning tasks in an educational psychology class. The experiment included differently organised conditions for collaboration, ranging from face-to-face situations to virtual collaboration situations which were perceived as motivationally and emotionally challenging. Self-reports and video-tapings were collected. The results show that the students who studied in face-to-face settings reported significantly more learning goals and fewer performance goals during the collaborative tasks than the students in the virtual group. Therefore, the collaborative process of volunteer face-to-face groups was analysed qualitatively and an attempt was made, by observing their shared motivation, to uncover the reasons why they achieved their learning goals.


## 1. Introduction

Motivation researchers have always emphasized specific scientific design and methods. This approach has produced a large body of research that has found its way into scientific publications. However, empirically supported knowledge does not necessarily translate into classroom practice and the criticism has been made that the motivation constructs used and the findings do not relate to real learning processes in classrooms (Murphy & Alexander, 2000; Pintrich, 2003). Some people also claim that theories and research in motivation have not been well integrated into theories of learning and instruction, and therefore the practical implications of empirical research are weak (Boekaerts & Corno, 2005). One of the ways to make motivation research more effective is to try to develop research designs and methods which capture the learning process and students' motivational expectations in real contexts. Many conventional measures of student motivation report perceptions, but not what really happens in the learning context (Järvelä, Salonen, & Lepola, 2001).

* Corresponding author. Tel.: +358 8 553 3657; fax: +358 8 553 3744.
*E-mail address:* sanna.jarvela@oulu.fi (S. Järvelä).

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More than a decade ago Salomon (1991) proposed an analytic and systemic approach to educational research. His underlying assumption is that events in a learning environment are tied to each other systemically. According to Salomon (1992), the traditional focus of researchers' attention is on individuals and the ways in which their cognitions and motivations change. However, it is the whole system that changes in interaction with the individuals, not just the individuals' perceptions and motivations. According to other recent approaches the cognitions, motivations and learning of individuals cannot be comprehended unless social and cultural context are taken into consideration (Dowson & McInerney, 2003; Hickey & McCaslin, 2001; Volet & Järvelä, 2001). Boekaerts (2001) has noted that a student's learning in a classroom environment is not determined solely by intrapersonal or environmental factors, but presupposes a student's motivational tendencies and the demands and the resources provided by the environment. Thus, motivational assessment means focusing on the actual process and assessing how a student's motivational responses change in the course of a chain of learning episodes (Järvelä et al., 2001). In this study, the aim was to understand the dynamics of motivation in socially shared learning by combining quantitative and qualitative data (see Gläser-Zikuda & Järvelä, this issue). Examining individual goals and motivations and combining individual and group level perspectives can capture the dynamics of motivation in collaborative learning.

## 2. What are the dynamics of motivation?

Recent discussion in motivation research has tried to analyse the social nature and origin of motivation, and stresses that both the individual and the social context should be targets for data collection and analysis (Pintrich, 2003). The notion that social context or environment is an important part of student motivation and self-regulation is evidenced in Zimmerman's (1989) socio-cognitive model of self-regulation, which involves a student's personal perceptions and environmental conditions, such as support from teachers and feedback from peers. It appears, however, that the mainstream social cognitive models of motivation still focus on the individual as the basic unit of analysis. With regard to the social aspects of learning, these models examine how social context plays a role in generating cognitions and the pursuit of personal goals, or alternatively, how individuals use their social context as well as other objects such as cognitions, motivation, and emotions in order to achieve their goals.

Motivation in socially shared learning can be considered from a process-oriented approach. This is to say, it is an integral part of the overall process during the course of a learning activity. In this case, the ''social'' is not seen as one aspect of the context, but rather constructed through interaction between an individual and the context (Järvelä & Järvenoja, 2007; Järvenoja, Järvelä, & Volet, submitted). Hickey (2003) and McCaslin and Hickey (2001) point out that from the socio-cultural and systemic perspective motivation is fostered, shaped and maintained through an active and on-going process of co-regulation. According to them, the social system that individuals are part of is assumed to provide opportunities and constraints for members, to participate or to stay at the periphery or avoid engagement. From this perspective, motivation is created and maintained through the collective, interactive and even shared activity of group members (Jackson, McKenzie, & Hobfoll, 2000). In this paper the aim is to capture the dynamics of motivation from an individual perspective in interaction with a group perspective (see Fig. 1).

It is assumed that in collaborative learning situations motivation occurs through interaction between the individual and the social environment (Järvelä, Volet, & Järvenoja, submitted for publication). In this study achievement goals were chosen to represent individual motivational constructs as an indicator of individual approaches to learning, because there is a strong tradition in research of the theory of goal achievement. Traditionally, according to this theory, students can be oriented towards two kinds of academic goals: learning-focused and performance-focused goals both

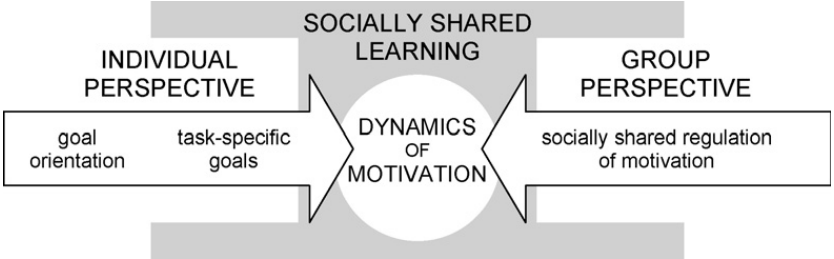


Fig. 1. Conceptualising individual and group level perspectives in order to characterise dynamics of motivation.

provide motivation (Ames, 1992). Students who adopt learning goals are typically interested in learning as in end itself. They are more likely to work hard, choose challenging tasks, and persist in learning activities (Maehr & Midgley, 1991). By contrast, students who adopt performance-focused goals are interested in learning as means of demonstrating their ability or competence (Dweck & Leggett, 1988). Lately there has been discussion of the need for theoretical reconceptualisation of achievement goals (e.g. Harackiewicz, Barron, Pintrich, Elliot, & Thrash, 2002). The core of this discussion concerns the role of performance-approach goals in an individual's achievement. In this study, performance and learning orientations are used without distinguishing between approach and avoidance, since the focus of the analysis is on process data, and achievement goals are seen as a student's general motivation to interact with the learning situation. In addition to students' achievement goals, task-specific goals were chosen as a ''baseline'' for characterising individual student motivation in collaborative learning. The task-specific goals included personal, socio-emotionally important goals, in addition to the academic goals. This is because in real-life situations a student's priority may also be well-being (Boekaerts, 2002).

In this study these two goal structures, achievement goals and task-specific goals, were chosen to represent the individual perspective. In addition, socially shared regulation of motivation was chosen to represent the group perspective. The idea is that when a group of students are sharing a learning task (Teasley & Roschelle, 1993; Thompson & Fine, 1999) in order to achieve their goals they also have to regulate their motivation as a group.

## 3. Motivation regulation strategies

Regulation of motivation refers to ''the activities through which individuals purposefully act to initiate, maintain, or supplement their willingness to start, to provide work toward, or to complete a particular activity or goal'' (Wolters, 2003, p. 190). According to Kuhl (1985), theories of motivation emphasize the subjective control that various beliefs and attitudes have on student choice, effort, and persistence, whereas the regulation of motivation concerns students' active control of the processes that influence these outcomes. *Regulation of motivation* is conceptually distinct from motivation; even though it may be difficult to differentiate empirically between these two phenomena; the relation between students' motivation and motivation regulation is mutual (Järvenoja & Järvelä, 2005; Wolters & Rosenthal, 2000).

Wolters (1998, 2003) has reviewed several strategies for regulation of motivation and identified key activities by evaluating the evidence linking these strategies to students' motivation, cognitive engagement and achievement. *Self-consequating* is a strategy that includes identification of extrinsic reinforcement or punishments for particular goals associated with completing a task. *Goal-oriented self-talk* rests on students' desire to reach various goals associated with completing academic tasks. It involves students' use of thoughts or subvocal statements while they are engaged in a task. *Interest enhancement* is a strategy which aims to increase immediate enjoyment or the situational interest they experience while completing an activity. *Environmental structuring* is [close to volitional literature concept environmental control (Corno, 1993) and it is] defined as decreasing the possibility of encountering a distraction or reducing the intensity of distractions that do occur. *Self-handicapping* (Urdan & Midgley, 2001) is somewhat counter-intuitive regulation of motivation activity and it involves the manufacture of obstructions before or during a task that make performing that task more difficult. *Attribution control strategy* deals with manipulation of causal attributions (Weiner, 1986). Students may purposefully select causal attributions to maintain or increase their motivation for a task. *Efficacy management* deals with students' ability to monitor, evaluate, and purposefully control their own expectations, perceptions of competence, or self-efficacy for a task. It involves strategies such as proximal goal-setting, defensive pessimism, and efficacy self-talk.

In previous empirical studies these strategies have been found essential for individual self-regulation. However, in recent discussions self-regulation has been extended to deal with socially constructed self-regulated learning (Hadwin & Oshige, 2006). Socially shared regulation refers to the processes by which many people regulate their collective activity, but also to individual regulatory processes as part of socially constructed knowledge. Earlier research on these issues has not been explicitly linked to the concept of socially shared regulation, but many implicit findings show that socially shared and technology-based learning environments provide an opportunity for social exchange and co-construction (e.g. Hurme & Järvelä, 2005; Iiskala, Vauras, & Lehtinen, 2004; Järvenoja & Järvelä, submitted for publication). In addition, findings of communal self-regulation processes have been reported (Jackson et al., 2000; Yowell & Smylie, 1999). In practice, socially shared regulation is examined in

a group, and individual regulation is always studied in relation to regulation of co-members and the group (Hadwin & Oshige, 2006).

## 4. Aims

The aim of this study was to gain an understanding of the dynamics of motivation in collaborative learning. Individual and group level perspectives were combined by examining individual goal orientations as a part of socially constructed regulation of motivation. This means that the motivation of students in higher education was analysed in the immediate contexts of collaborative learning tasks by applying quantitative and qualitative methods. The research questions were: (1) what kind of motivational orientations and task-specific goals do students have (individual perspective) and (2) how they regulate their motivation in socially shared learning (group perspective)?

## 5. Method

### 5.1. Participants and design

The participants of the study were 99 first year educational psychology students of whom 74 were females and 25 males (average age was 24, S.D. = 5). The students participated in an educational psychology course which was part of their teacher education studies. They were informed about the study at the beginning of the course. The students were randomly divided in terms of two learning conditions. These conditions were face-to-face ($n = 58$) and virtual learning settings ($n = 41$). In both of the settings the students studied in groups of 3–5 members and participated in three different collaborative learning tasks. Altogether the students worked in groups for 10 lessons (including one orientation lesson). In the face-to-face setting each of the tasks lasted 2–3 lessons (one lesson lasting 90 min). In the virtual setting the students used an asynchronous discussion board where they were able to post their comments at different times. The students had about 1 week time to work with each task.

### 5.2. Collaborative learning tasks

During all three collaborative learning tasks the students were presumed to have a shared goal. The tasks were pedagogically structured to support student learning and collaboration, but the form of the pedagogical structure varied with respect to how much responsibility it required the students to take for their learning. In the *first task* the students read scientific articles on issues of learning, dealing with the same theme but having different views on it. It was designed to create cognitive conflicts among the group members and to support the shared reconstruction process in a group. (Dillenbourg & Traum, 2006). The aim of the *second task* was to encourage the students to discuss and share their own views and expertise (CTGV, 1990). The students were first asked to read articles dealing with the theoretical basis of some phenomenon in learning. Every group member read a different piece. The reading preceded construction of a real-life case example of the phenomenon the group were studying. Once an agreement was reached regarding the case, the group members ''analysed'' the case. Every member was expected to contribute to the analysis based on his or her unique expertise gained from the different articles (Brown & Campione, 1994). In the *third task* only general themes and some basic materials were provided to the students. The groups were advised to study the theme (e.g. conceptual change or metacognition) so that they were able to create a ''scientific'' poster as a result. The group members first had to agree on the theme they wanted to study and then plan how to organise their collaborative work.

### 5.3. Data collection and analysis

The students' individual interpretations of their personal goals and the group's socially shared regulation of motivation were assessed using both quantitative and qualitative methods. The data sources were *a general self-report questionnaire*, *a task-specific self-report questionnaire*, and *video data*. In the analysis the different types of data were used to complement each other. The quantitative data provided a general framework for more detailed qualitative analysis. For the qualitative analysis two volunteer student groups from face-to-face settings were chosen for an in depth process-oriented analysis.

### 5.4. Self-report questionnaire

In the beginning of the course the students completed a self-report questionnaire assessing their general goal orientations. The questionnaire included sub-scales for learning (e.g. *"I prefer tasks in which I can learn new things"*) and performance goals (e.g. *"I feel best when I can show to the others that I master things"*) (Niemivirta, 1998; Pintrich, Smith, Garcia, & McKeachie, 1993). Both sub-scales consisted of five test items (Cronbach's alphas 0.71, 0.85, respectively). The items were assessed using a 7-point Likert scale. In the analysis the self-report data was used to define the goal orientation of the two different student sets (face-to-face and virtual learning) before the collaborative learning. Descriptive statistics were performed to describe both of the student sets. Then a *t*-test for independent samples and the effect size for significant differences were performed.

### 5.5. Task-specific questionnaire

The students performed three collaborative learning tasks in face-to-face or virtual learning settings. After every task the students filled out a task-specific self-report questionnaire (Järvenoja et al., submitted). The questionnaire was the same for both of the student sets and every evaluation point. The task-specific questionnaire aimed to assess students' personal, task-specific goals and the students were instructed to evaluate which goals were important to them in the group project apart from completing the project. The questionnaire included scales for learning (e.g. *In this task it was important to me to learn as much as possible and get new ideas*) and performance goals (e.g. *In this task it was important to get the highest possible mark, ideally a High Distinction*) (Pintrich et al., 1993). The items were assessed using a 4-point Likert scale.

In the analysis the task-specific questionnaire data was used in quantitative and qualitative ways. In the first analysis, a quantitative analysis of the goals of both student sets was performed. Descriptive statistics, namely mean and standard deviations, of the learning and performance goals were performed in order to describe the data in both learning settings after every three evaluation points. After that a *t*-test for independent samples and effect size for significant differences between the two learning settings in all three evaluation points was performed.

In the second analysis the questionnaire data was used qualitatively. After rating all the items the students were asked to prioritise the most important goal to them personally. In order to enrich the qualitative analysis, personal well-being and socially oriented goals (Boekaerts & Corno, 2005) were included to this ranking, in addition to the learning and performance goals. By widening the scale it was possible to understand the dynamics of students' individual interpretations in collaborative learning from a more comprehensive perspective. Furthermore, the qualitative analysis included the students' ratings on the 4-point Likert scale of how well the most personally important goal was achieved and of the role of the group in this personal goal achievement.

Finally, the task-specific questionnaire responses of the students from these groups were collated in-group profile illustrations. While individual questionnaire responses illustrate the students' personal task-specific goals and their accounts of the collaborative learning tasks, the group profiles, in turn, demonstrate how group members' individual differences and the group role match. This analysis provides a possibility for triangulation between the researchers' and the students' constructions of the collaborative learning situations as well as finding congruencies and differences between the quantitative and qualitative results.

### 5.6. Video data

In face-to-face setting the collaboration of two of the student groups were videotaped. There were four students in each group (two females and two males). However, one student only participated in the beginning of the third task because of personal reasons. Altogether there were 9–12 h of video recordings from both groups.

The analysis proceeded first by sequencing the whole set of transcribed data into units that reflected motivation, focusing on one aspect of the task at a time. Thus, a single episode can be described as a meaningful motivational contribution. From these transcriptions the group members' regulation of motivation (Wolters, 1998, 2003) was coded into eight categories, which are presented in Table 1. However, Wolters' motivation regulation strategies focus on individual motivation regulation, and thus the framework was modified to adapt to a socially shared learning situation. The modification (resulting in the categories in Table 1) was done during the first analysing phase. Two researchers read the transcriptions and combined the theory-based ideas with the data and vice versa. In the second phase two

Table 1
Motivation regulation strategies in a socially shared learning situation

| | Regulation strategy | Definition | Example |
|---|---|---|---|
| SR | Social reinforcing | Students' identification and administration of reinforcements influencing their motivation and shaping their joint behaviour | The students make reciprocal suggestions of how to plan the poster. Kalle suggest an idea and Mari completes "*why don't we add...*". The other two support the plan |
| G | Socially shared goal oriented talk | Students using goal-oriented dialogue; thinking about various reasons for persisting in or completing a task | The students discuss which topic to take for poster-task. *Lets' take the topic "metacognition". That is also a good choice concerning the exam"* |
| I | Interest enhancement | Increases aspects of students' intrinsic motivation or situational interest while completing an activity | *"This is a how brilliant idea!"* The students express concrete examples to increase joint interest *"I can describe my example..."* |
| TS (ES) | Task structuring (environmental structuring) | Decreasing the possibility of off-task behaviour by structuring a task or environmental conditions | In a situation where students have difficulties making progress with the task one student says *"Lets' make a list of five most important points"* |
| SH | Self-handicapping | Manufacture of obstructions before or during a task that make performing difficult | *"This text is so complicated..."* "*The other group has much better poster than we have"* |
| E | Efficacy management | Students' ability to monitor, evaluate and control their expectations, perceptions of competence, or self-efficacy | *"The task is not easy and this group is not working well"* or *"The discussion today has been productive. We progressed well!"* |

independent codings were conducted. During the third phase the two codings were compared and contradictory codings were searched. Since the number of contradictory codings was less than 15%, those codings were taken under joint analysis and codings were negotiated until a unified solution of the coding was reached.

## 6. Results

In this study the students' motivational goals and regulation of motivation was studied both from an individual student's perspective as well as that of a group of students in socially shared group-learning tasks. The aim was to illustrate how quantitative and qualitative methods can measure motivation in socially shared learning. First the quantitative analyses of all groups of students' motivational goal orientations and task-specific goals are presented. Then qualitative analyses of two student groups' motivation in face-to-face collaborative learning settings are presented.

### *6.1. Self-reported goal orientations and task-specific goals*

Before the students started the course they all responded to *the self-report questionnaire* concerning their goals. In both face-to-face and virtual learning sets learning goals were the most often reported of the two goal orientations (means 5.67 and 6.07; S.D. 0.65 and 0.75, respectively). The mean for the performance goal was 4.42 (S.D. = 1.24) in face-to-face learning set and 4.02 (S.D. = 1.25) in the virtual learning set. At the beginning of the course there were no significant differences between the face-to-face and virtual sets in performance goals. However, there was a significant difference in learning goals ($t$-test $p = .006$, effect size $-0.57$).

After every group task the students answered *the task-specific questionnaire*. Table 2 displays the mean and standard deviations for the task-specific goals after every three tasks. Both sets of students reported a greater number of learning goals than performance goals in every evaluation point. In addition, in both settings the reports of both goals slightly decreased from the first task to the third task. The decrease was significant from the first task to the second task for both goals in both of the settings, but not in relation to the third task.

The face-to-face group reported more learning goals than the virtual group in every evaluation point, as seen in Table 2. This was the opposite from the performance goal reports. Table 2 displays the $t$-test values for this difference. The test revealed that there were significant differences in both performance and learning goals between the two sets of students in each of the three evaluation points.

Table 2
Descriptive statistics (mean and standard deviations) for task-specific goals and *p*-values and *effect size* values for independent means after every three collaborative learning tasks

| Goal (task-specific) | | Task 1 | | Task 2 | | Task 3 | |
|---|---|---|---|---|---|---|---|
| | | F2F | Virtual | F2F | Virtual | F2F | Virtual |
| Performance | M | 1.64 | 2.07 | 1.40 | 1.88 | 1.47 | 1.83 |
| | S.D. | 0.67 | 0.88 | 0.54 | 0.81 | 0.58 | 0.76 |
| | *p* (*t*-test) | .006 | | .001 | | .007 | |
| | ES | −0.56 | | −0.72 | | −0.54 | |
| Learning | M | 3.55 | 3.17 | 3.45 | 2.91 | 3.34 | 2.87 |
| | S.D. | 0.53 | 0.61 | 0.55 | 0.74 | 0.68 | 0.81 |
| | *p* (*t*-test) | .001 | | .000 | | .002 | |
| | ES | 0.66 | | 0.84 | | 0.64 | |

*Note*: task goals were measured using a 4-point Likert scale (1 = not important, 4 = very important).

The results indicate that, based on self-reported achievement goals, the students in a face-to-face setting had a significantly lower learning goal orientation than the students in virtual learning settings at the beginning of the study period. However, the opposite was true in the task-specific self-report responses of the same students. The students who studied in face-to-face settings reported achieving significantly more learning goals and fewer performance goals than the students in the virtual group.

Analyses of motivation in face-to-face collaborative learning settings of two groups of students.

The self-reported quantitative analysis showed that face-to-face collaborative groups were more learning oriented during the tasks than the virtual groups, even though this not true in the beginning. This indicates that the students in the face-to-face learning setting found actual studying more motivating in terms of their preferred goals than the students in the other learning setting, who emphasised performance. The qualitative data was used to find answers pertaining to what the students did in the face-to-face group and how they were able to regulate their motivation in a socially shared learning situation.

The data of two groups of four students is presented so that the qualitative analysis of the task-specific questionnaire responses and the analysis of the video data is combined from each of the three collaborative learning tasks. For every three tasks both student group profiles are first constructed from the students' questionnaire answers. The video data analysis is used to give another, process-oriented perspective on group working and collaboration.

### 6.2. Task 1

#### 6.2.1. Task-specific group profiles

After the students finished the task, they filled out the task-specific questionnaire which reflected their personal interpretations of the group work. The students' responses can be seen in Table 3. In the first task all four students from group A indicated *learning* as the most personally important goal for the first collaborative learning task. All the students were also relatively satisfied with the achievement of this personal goal, giving it a value of 3 on the 4-point Likert scale. Three of the students, Timo, Henna, and Jukka, decoded the role of the group as relatively positive for this personal goal achievement, while Riina did not perceive it to be as important as the others.

In contrast to group A, where the students were in agreement with each other in respect to the most personally important goals, the student responses of group B were divided into two different goal categories (see Table 3). In addition to the two students, Mari and Raija, who indicated *learning* as their main goal, there were two students, Kalle and Marko, who indicated that their goal was more *socially* oriented (associate with friends and enjoy the experience). Raija, Kalle, and Marko were satisfied with their goal achievement, assigning it a value of 4 on the 4-point Likert scale. Mari, however, was less satisfied with her personal goal achievement, giving it a value of 2 on the 4-point Likert scale. All the students decoded the role of the group as really positive for this goal achievement.

#### 6.2.2. Video-data analysis

What the students really did during the group task and how they were able to maintain their motivation can be seen in qualitative video analyses. The video analysis is in line with the questionnaire data. Most of the students in both

Table 3
The task-specific questionnaire responses of the students from groups A and B after the three collaborative learning tasks

| | Group A | | | | Group B | | | |
|---|---|---|---|---|---|---|---|---|
| | Timo | Henna | Riina | Jukka | Mari | Raija | Kalle | Marko |
| Task 1 | | | | | | | | |
| Task goal* | Learning | Learning | Learning | Learning | Learning | Learning | Social | Social |
| Achievement** | 3 | 3 | 3 | 3 | 2 | 4 | 4 | 4 |
| Group role*** | 3 | 3 | 2 | 3 | 4 | 4 | 4 | 4 |
| Task 2 | | | | | | | | |
| Task goal* | Learning | Learning | Well-being | Learning | Learning | Learning | Social | Learning |
| Achievement** | 3 | 3 | 4 | 3 | 4 | 3 | 4 | 4 |
| Group role*** | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 |
| Task 3 | | | | | | | | |
| Task goal* | Learning | Learning | Learning | Learning | – | Learning | Well-being | Learning |
| Achievement** | 4 | 4 | 3 | 3 | – | 4 | 4 | 4 |
| Group role*** | 4 | 3 | 3 | 3 | – | 4 | 3 | 4 |

Students' interpretations of: *task goal: the most personally important goal indicated in task-specific questionnaire. **Achievement: achievement of the personal goal; 4 = fully achieved; 1 = not achieved. ***Group: role of the group for achievement; 4 = the group played a negative role; 1 = the group played a positive role.

groups considered the role of the group relatively important for their personal goal achievement. In practise this is seen in their development of a variety of regulation strategies. Fig. 2 presents the distribution of the strategies that the students employed. The group level coding shows that a number of strategies were used and in the first task most of them were those which aimed at social reinforcement. An illustration of a situation where group A used the social reinforcing strategy can be seen in Example 1.

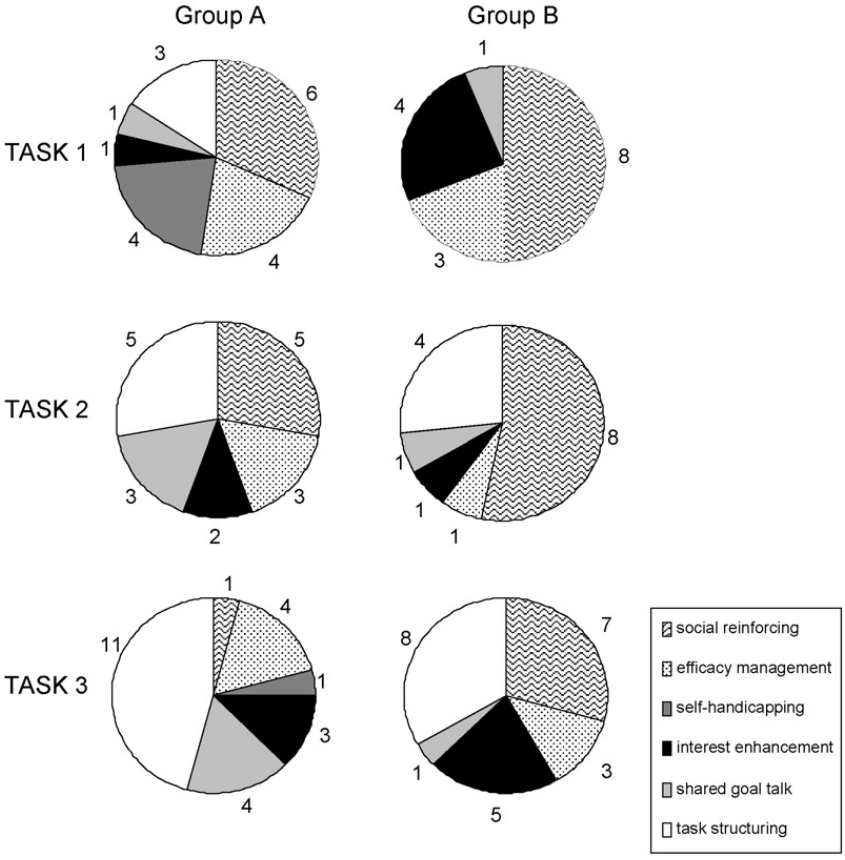


Fig. 2. The distribution of the socially shared motivation regulation strategies in groups A and B during group work in the three tasks.

**Example 1.** [0:23:00–0:26:00] The group (Riina, Henna, Timo, Jukka) are having a discussion about an article ''The many faces of constructivism'' and they construct an outline of the main points of the article on paper Riina and Henna notice that they both have pointed out the same kind of issues. Timo reads his ideas aloud and the other students agree that they are focusing on the same subjects. A discussion follows during which students stress words such as ''learning for understanding'' and ''active learning''. Riina draws the conclusion that ''*We all stress the same ideas!* '' and Timo says: ''*We have adopted the view very well!*'' Henna and Jukka nod their heads in agreement.

The group members are reading scientific papers, each having a different perspective on constructivism. The task is challenging but the students are reading actively and discussing the topics from the beginning of the lesson. The atmosphere during both group work sessions is positive and enthusiastic. The group members' engagement can also be seen from their ability to develop the ideas reciprocally from the learning task. However, the students expressed the least satisfaction with their achievement in this task, which may tell that they were conscious of the need to regulate their motivation. Also, earlier research on collaborative learning has shown that it takes time to create a solid atmosphere and common ground for socially shared learning (Mäkitalo, Pöysä, Järvelä, & Häkkinen, 2005).

### 6.3. Task 2

#### 6.3.1. Task-specific group profiles

After the second collaborative learning task Timo, Henna, and Jukka from group A indicated *learning* as the most personally important goal, whereas Riina had changed her most important goal to personal *well-being* (avoid looking incompetent or letting the group down). Table 3 illustrates that after this task all the students were either fully or relatively satisfied with the achievement of this personal goal (Riina rating it as 4 and Timo, Henna and Jukka rating it as 3 on the 4-point Likert scale). Timo, Henna, and Riina also decoded the role of the group as positive for their personal goal achievement. Jukka decoded the group role as relatively positive for his personal goal achievement.

The student responses of group B were also divided into two different goal categories (see Table 3). Mari, Raija, and Marko indicated *learning* as their main goal, whereas Kalle indicated that his goal was more *socially* oriented. All of the students were either fully or relatively satisfied with the achievement of their personal goal (Mari, Kalle and Marko rating it as 4 and Raija rating it as 3 on the 4-point Likert scale). All the students decoded the role of the group as very important for this goal achievement.

#### 6.3.2. Video-data analysis

In the second task the qualitative task-specific questionnaire analysis revealed that the students again emphasised the group's role in goal achievement. Even the two students with non-learning personal goals were very satisfied with their goal achievement and thought that the group played a positive role.

However, the video data show that at times the two groups' engagement in the task is scattered, and every now and then the members end up participating in off-task activities, such as discussing personal things or drawing. The students are working toward solving a problematic authentic case task. Every member was expected to contribute to the analysis based on his or her unique expertise gained from the different articles and finally create suggestions for how this case could be approached and solved in practise. The students in group A are progressing in their task, but they are not very motivated to work. For example, they discussed the fact that they expected the previous task (task two) was the final task before the exam. They begin the task by reporting on their personal experiences, which helps them to find a joint goal. It is possible that the presence of social goals (Patrick, 1997) plays a role in this situation and helps students to activate motivation regulation. The group members are conscious that they have to control their motivation (''*Let's not stress*. . .'') and Timo is taking the most responsibility in trying to control group motivation (''*Are we able to focus on this task or not*?'') while the other students' ideas fly off-task. What makes the group successful in the end is that during the task group motivation is consciously constructed and controlled, as can be seen from the coded strategy use. Fig. 2 presents the distribution of the strategies that the students employed as a group. The group level coding shows that a variety of motivation regulation strategies were used. During the second task group A used a lot of task structuring to stay focused in addition to the social reinforcement which was the method they also used in the first task.

In group B the members' participation is unequal and they are not able to work as a group (see Example 2). Fig. 2 shows that during this task the students used many social re-enforcing and task-structuring regulation strategies, which may explain their need to structure the task and their learning activities in order to decrease distraction.

**Example 2.** [0:07:00–0:16:00] The group (Kalle, Marko, Raija, Mari) summarise their case description. Kalle, Marko and Raija suggest that they could report the case to the other groups. At times they also discuss other off-task topics, such as sports and Raija's upcoming wedding. Raija begins writing a summary of the case and Kalle comments on her summary. Mari is silent and does not participate. Marko leaves for 3 min.

[0:16:00–0:18:00] Marko repeats the main points they discussed in the previous lesson and the group members briefly discuss the importance of the teachers' role in activating the students during a lesson.

[0:18:00–0:30:00] The group agrees that the summary is complete and they can move to the next phase of the task. They begin brainstorming for about 10 min, but they are not very enthusiastic and they repeat each other's ideas. Mari is only observing; she does not participate. Finally, the members end up with a joint conclusion (how to activate students in a lesson).

When combining the quantitative and qualitative data it can be seen that even though the students' work is not motivated and it is difficult for them to progress in their joint task, they are able to activate motivation regulation. Because of their efforts in regulating their socially shared task they were still able to reach a positive learning experience, since in the questionnaire they pointed out the positive group role and were relatively satisfied with their achievement of goals.

### *6.4. Task 3*

#### *6.4.1. Task-specific group profiles*

After the third task, all students in group A indicated *learning* as the most personally important goal (see Table 3). According the questionnaire responses all the students were either fully or relatively satisfied with the achievement of this personal goal. Timo and Henna rated it as 4 and Riina and Jukka rated it as 3 on the 4-point Likert scale. Henna, Riina, and Jukka decoded the role of the group as relatively positive and Timo decoded it as positive for personal goal achievement.

In group B one of the students, Mari, did not participate in the last task. Raija and Marko indicated *learning* as the most personally important goal and Kalle emphasised personal *well-being* (see Table 3). All of the students were satisfied with their personal goal achievement, valuing it as 4 on the 4-point Likert scale. Raija and Marko decoded the role of the group as positive and Kalle decoded it as relatively positive for personal goal achievement.

#### *6.4.2. Video-data analysis*

In the third task the qualitative task-specific questionnaire analysis revealed that the students again emphasised the group's role in goal achievement. Learning was the most often reported personal goal and this goal was achieved well. Also, the group's role in this achievement was seen as positive. However, the video data reveals that during the task the students faced more motivational difficulties than in the first and second task.

In this task both groups A and B have difficulties with beginning the poster task and they progress very slowly. In group B the students have long silent periods and two of the members discuss their personal matters instead of the task. Finally, they start reading the papers aloud, which slowly awakens their interest and they also begin to add their own personal examples to the discussion. Students' motivational problems in terms of working with the task can also be shown in the dynamics of socially shared motivation regulation strategies used in the third lesson. The two groups worked longer on the third task when compared to previous tasks but still their coded regulation strategies (see Fig. 2) were about the same as before.

Nevertheless, despite the motivational difficulties, both data analyses, the task-specific and video, agree that the groups are successful in regulating their group's motivation. When the motivation regulation strategies are used, they seem to work well. For example, during the group work Marko in group B takes the initiative in regulating the group motivation, as seen in Example 3. Later in the same task Kalle activates motivation regulation, as seen in Example 4.

**Example 3.** ''[00:10–00:13] Kalle reads aloud issues about conceptual change. He mentions that this is not an easy topic and says ''Hey, are you sleeping?'' Students' task engagement increases and they show shared interest for a while, but soon they begin to observe other groups' working and focus on off-task issues. Marko takes a leading role in the group and begins to explain the basic processes of conceptual change. He asks: ''Are you listening?'' Marko's scaffolding stimulates the group members' interest and they again focus on the task.

**Example 4.** [0:37:00–0:41:00] Kalle starts reading a book and mentions that there is good information in it. Marko and Raija are busy with other things, Raija making drawings and Marko playing with a pen. Kalle continues reading and making notes. He begins to explain the text (about conceptual change) to the other group members. Marko and Raija begin to listen. A lively discussion arises among the group members and they suggest a variety of practical examples of conceptual change. Marko reads aloud information he found on the Internet, Kalle clarifies the definition, and after a while all the students agree that they are beginning to understand the topic.

From the analysis of the third task it was found that when a group has problems working, an individual group member could play a leading role in activating motivation regulation. When someone acts as an initiator it can restore task-oriented working to the entire group and also trigger more shared use of regulation strategies, as seen in Example 4. Also, qualitative analyses of the third task revealed that the students could maintain their motivation and be satisfied with group work in spite of the occasional motivational difficulties during the task.

## 7. Conclusions

In this study the dynamics of motivation were analysed in a collaborative learning context by applying quantitative and qualitative methods. The students' motivational orientations represented an individual perspective on the development of group motivation. The socially shared regulation of motivation represented the group perspective on development of motivation. The results show that when face-to-face groups and virtual groups were compared, the students in a face-to-face setting had significantly a lower learning goal orientation than the students in virtual learning settings at the beginning of the study. After the three learning tasks, the students who studied in face-to-face settings reported significantly more learning goals and fewer performance goals than the students in the virtual group. These favourable findings of the face-to-face setting was further explicated in qualitative analyses of two case groups' task-specific questionnaire responses and video-data analyses, and the reasons for the increase in their learning goals were explored from the aspect of their socially shared motivation regulation.

The students in both face-to-face groups considered the role of the group as relatively important for their personal goal achievement and they were able to activate a variety of motivation regulation strategies. Many studies have reported on university students' regulation of effort and persistence in academic tasks (Zimmerman & Martinez-Pons, 1990), interest regulation (Sansone, Weir, Harpster, & Morgan, 1992), or regulation of goals (Wolters & Rosenthal, 2000). However, most of the earlier empirical findings deal with motivation regulation in individual learning situations. Furthermore, the earlier findings have been received mainly from quantitative self-reports, which may limit the ways in which students are able to focus on the dynamic processes of motivation regulation in a learning context (Murphy & Alexander, 2000).

The results also show that in a socially shared challenging learning situation an individual group member can play a leading role in activating motivation regulation. It was noted that socially shared learning tasks may also stimulate new strategies for motivation regulation, as was seen in the observed strategy, ''social reinforcing''. Related findings can be found in studies on group dynamics, even though clarification or analysis of motivation regulation in shared group processes is rare. Studies have reported on group transactions, information sharing (Tindale & Sheffey, 2002), socialisation in groups (Moreland & Levine, 2000), co-ordination of different perspectives (Barron, 2000), or shared understanding (Teasley & Roschelle, 1993). Examination of social goals and their implications for regulation could be an important addition to the conclusions of this study. Social goals may assist in explaining motivational and emotional patterns of regulation; social goals can be seen as a substantial part of an individual's activity (Urdan & Maehr, 1995). This is especially true in new learning environments where students are expected to participate in ''multi-tasking'' behaviour rather than conventional on-task behaviour. However, it is not yet known how learning goals and social goals are regulated and co-regulated.

This study especially attempted to find ways to apply quantitative and qualitative methods to understand the dynamic processes of motivation and its regulation in socially shared learning contexts. Salomon (1991) ideas for a systemic approach were applied to classroom learning so that the whole interactive context of socially shared learning was studied; students' motivational goals, task-specific goals, accounts of the collaborative group work, and interaction in an actual learning situation were captured. The results show that the different sources of data, i.e., self-reports and video data, were needed to provide details concerning the complex learning situation in which a socially shared learning setting demands application of a variety of methods.

The self-report questionnaire made it possible to solicit the students' general goal orientation. The task-specific questionnaire made it possible to analyse students' situational goals and to examine how different students' goals and interpretations of their group work related to the other group members' individual interpretations in a collaborative learning context. The video data, in turn, aided in understanding students' socially shared working processes in a group context by observation of verbal and non-verbal signs. This understanding of the learning process on a micro-level aided the understanding of socially shared regulation strategies. The combination of quantitative and qualitative methods, as suggested by Ercikan and Roth (2006), as well as individual and group level measurements, seemed to be a proper way to capture the dynamics of motivation in a socially shared learning situation.

There are problems in the methodological approach used in this study. Analysis of a socially shared learning process is very challenging, since individual levels and social levels always merge. Future research should focus on revealing which measurements should be applied on an individual level and which are best suited for application at the group (social) level. Another challenge for future research is to think of ways in which the process of learning in virtual learning groups can be captured, since collecting video data is not possible. A virtual learning environment poses specific motivational challenges and opportunities (Veermans & Lallimo, 2007). Emotional regulation may be more difficult to capture in virtual learning than in a face-to-face context. There has been some research analysing students' products in virtual learning environments; however, that is still limited to rather narrow written conversations compared to more behavioural data such as observations (video data).

From a practical perspective, the methods used in the study can help making motivation research more realistic. When the generalisations from quantitative measurements, for example why students increase their learning orientation and maintain motivation in group learning, are made transparent in qualitative analyses, more concrete illustrations of students' actions can be discovered. In practise, the results will increase our knowledge of how students are able to engage in studying more deeply, and continuously improve their skills in socially shared learning. From a teacher's point of view this type of research can offer information about methods to support motivation regulation in practise, which will open new opportunities in fostering students' motivation to learn (Brophy, 1999) Furthermore, the data highlighted both problems and solutions that teachers may face while supporting students' regulation. By bringing concepts related to motivation to the forefront, individual teachers are able to focus their guidance in a more meaningful way based on the regulation strategies of their students.

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