Self-regulation and Motivation in Computer Supported Collaborative Learning Environments

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Introduction

Postindustrial society is changing both quantitatively and qualitatively. Population is not only increasing in number, but also growing older and more diverse. Life expectancy has almost doubled in the past century and the exponential growth of the world’s population, along with its increased longevity, diversity and mobility, has significant implications for teaching and learning (Murphy & Alexander, 2000). The changing character of the population also demands a re-examination of what being a lifelong learner means. The learner is required to study effectively by self-regulated learning and use many learning tools and work collaboratively with other learners at the same time. Theory of learning, empirical experiments and learning tools are developed to guide the learners to improve how they learn, as they learn (Alexander, 2004). Self-regulated learning theory concerns how learners develop learning skills and use learning skills effectively (Boekaerts, Pintrich & Zeidner, 2000). In this chapter arguments are given regarding why self-regulated learning is an important issue in future learning in social practices. During the
past few years we have been studying self-regulated learning in computer supported collaborative learning environments. In this paper, we review findings from our studies and other studies to demonstrate a need to focus on students’ engagement and cognitive and motivational coping while working in modern collaborative and computer supported learning environments. The basic idea of self-regulated learning will be introduced and metacognition as a form of cognitive regulation, as well emotion and motivation regulation models, will be introduced. Finally, we will discuss how self-regulated learning skills can be supported with various new computer supported regulation tools.

Why self-regulation is topical in social learning situations practices.

Multiple new forms of social and collaborative learning practices (Barab, Kling & Grey, 2004; Strijbos, Kirschner & Martens, 2004) have been developed from the recent ideas of social cognition (Higgins, 2000; Thompson & Fine, 1999) and more cognitive oriented approaches (Dillenbourg, 1999). From a motivation point of view, the implication is that learners’ adaptation to complex social learning practices such as sharing knowledge and maintaining coordinated activities requires cognitive, motivational and socio-emotional skills that are different to, and often more challenging than more conventional and well-structured learning situations. Recent student-centered learning methods (Singer, Marx, Krajcik & Chambers, 2000; Randi & Corno, 2000; Hakkarainen, Lipponen & Järvelä, 2002) afford student opportunities to engage in self-regulated learning including encouraging students to set their own goals, emphasizing collaboration and negotiation and proving scaffolding during learning. The results of these studies have provided
evidence that by using computer supported pedagogical models it is possible to create more challenging learning situations for students. Challenging conceptual work can be more intrinsically interesting than more traditional learning tasks (Stipek, 2002) because pushing students to explain and analyse their answers and problem-solving strategies has resulted in high levels of engagement among the students (Turner, Meyer, Cox, Logan & DiCintio, 1998).

Recent research, however, reveals that students face difficulties engaging in learning and achieving their goals in a variety of learning contexts (Volet & Järvelä, 2001). The results of these studies consider what kind of emotional and motivational experiences the students have during the computer supported learning projects and indicate that students with different socioemotional orientation tendencies will interpret the novel instructional designs in ways which subsequently will lead to different actual behaviours among them. Our own studies have shown (Järvelä, Veermans & Leinonen, 2008; Järvenoja & Järvelä, 2005; Salovaara & Järvelä, 2003) that students may adopt context specific interpretations of motivational goals and self-regulation when confronted with atypical learning demands. By these demands it is meant pedagogical practices with increased orientations toward social learning and collaboration in the service of solving problems. For example, social processes are highlighted in students' contextual interpretations of their self-regulation (Järvelä & Salovaara, 2004).

Wosnitza and Volet’s (2005) study examined the origin, direction and impact of emotions in social online learning. Their analysis of social online-learning situations revealed a range of other-directed emotions, in addition to self-, task- and technology-directed emotions. Emotions generated in social online environments are not different in
nature from those generated in face-to-face learning situations. What is different in social online learning is the fact that emotions are expressed via technology, and that the disclosure of emotions is necessarily voluntary. The results highlight the multiple directions emotions can take and the significance of students’ interpretations of their emotions on the learning process.

In general academic emotions are significantly related to student motivation, learning strategies, cognitive resources, self-regulation and academic achievement (Pekrun, Goetz, Titz & Perry, 2002). Anyhow, not only the emotions themselves vary but also the sources that cause emotions. Learning situations are important sources of emotions that instigate a variety of self-referenced, task-related and social emotions. Some of the recent studies show that when more contextual attempts at investigating classroom motivation have been made, the need to examine emotions tends to emerge (Meyer & Turner, 2002; Volet & Järvelä, 2001). Järvenoja and Järvelä’s (2005) study investigated what kind of explanations students gave to their emotional experiences related to computer supported collaborative learning. The process-oriented interviews were conducted during and after the lessons and questions dealing with students’ self-related beliefs and feelings were asked. By looking at the ways the students explain the different emotions in new pedagogical contexts it was possible to find out their subjective and contextual specific explanations. Four categories were composed to describe the differences in reasons for emotional experiences. One of the critical features was that, especially in the beginning of the learning project, the self-driven emotions played an important role in inhibiting or facilitating task-involvement.
Self-regulated learning

After three decades of research, self-regulation is a well established concept with empirical support from developmental and intervention research. The nature and assumptions underlying self-regulation in learning have been widely discussed (e.g. Winne, 1995; Zimmerman, 1989). Self-regulated learning has been defined as an active, constructive process whereby learners set goals for their learning and then attempt to plan, monitor, regulate and control their cognition, motivation, behaviour and context (Boekaerts, et al., 2000; Pintrich, 2000). Self-regulated learners take charge of their own learning by choosing and setting goals, using individual strategies in order to monitor, regulate and control different aspects which influence the learning process and evaluating his or her actions. Eventually, they become less dependent on others and the contextual features in a learning situation (Boekaerts, et al., 2000; Schunk & Zimmernann, 1994; Winne & Hadwin, 1998). Studying effectively by self-regulated learning itself can be seen as a skill powered by will.

Self-regulated learning includes several sub-processes. Accordingly, different studies on self-regulated learning have stressed different aspects; for example, metacognitive processes (Winne, 1995), learning strategies (Zimmerman & Martinez-Pons, 1989), self-efficacy (Schunk & Zimmerman, 1997), motivational regulation (Wolters, 2003), emotional self-regulation (Pekrun, et al., 2002) and volition (Corno, 2001). Depending on the studies, there are differences in how self-regulatory processes are portrayed. Based on these studies there is strong evidence of how cognitive strategies contribute to students' learning and how different motivational perceptions (e.g. achievement goals, the beliefs of self-efficacy) reciprocally affect the use of strategies.
Although self-regulation research has traditionally focused on an individual perspective, there is an increasing interest in considering these processes at the social level with reference to concepts such as social regulation, shared regulation or co-regulation (Jackson, McKenzie & Hobfoll, 2000). All these regulation types contribute to how students reach their goals, even though they are directed differently. These processes are self-regulation, where the individual aims to regulate her-/himself; other-regulation, where an individual aims to affect others; and finally shared regulation where some or all of the group members simply cooperate to regulate others or in the best cases, regulate themselves consensually in shared regulation (Järvelä, Volet & Järvenoja, 2009; Vauras et al. 2003).

**Metacognition as a form of cognitive regulation**

One important aspect of the self-regulated learning models is that students can monitor, control and regulate their own cognitive actions (Pintrich, 2000; Zimmerman, 2001) which could also be referred to as metacognition (Flavell 1979; Brown, 1987). In general, metacognition refers to the awareness that learners have of their general cognitive strengths and weaknesses, and of the cognitive resources they can apply to meet the demands of particular tasks (*knowledge of cognition*). It also concerns learners’ knowledge and skill about how to regulate learning processes and engagement in tasks (*the regulation of cognition*) to optimize learning outcomes (Winne & Perry, 2000; Pintrich, Wolters & Baxter, 2000).
In order to engage the learners into joint problem solving and the use of metacognitive skills, computer based learning environments, like asynchronous discussion forums, have been utilized to support students’ metacognitive activity - for example in mathematical problem solving (Hurme & Järvelä, 2005). The main idea is that in networked discussion the students make their thinking visible (Lehtinen, 2003) and externalize their thinking by writing computer notes to the discussion forum (Scardamalia & Bereiter, 1996). The students are encouraged to construct explanations, pose questions and provide further information to each other (Cohen & Scardamalia, 1998). The processes of explanation construction (Ploetzer, Dillenbourg, Preier & Traum, 1999), help providing, and help seeking (Newman, 1994) are essential for students’ metacognitive activity. While constructing explanations, the students become aware of their thinking, of the missing knowledge and lack of understanding (Webb, 1989). While contributing their ideas and making their thinking visible the students are able to reflect their cognitive processes and discuss what they do or do not know and understand with others. In addition, the messages saved to the database are continuously available to the students for further review afterwards.

In networked mathematical problem solving, the learners can explain how they have solved the problem, how the given task influences the problem solving or they can ask for support and advice on their own problem solving and regulate the group’s working. For example, in one of our studies, Hurme and Järvelä (2005) analysed the metacognitive content of the discussion forum data of thirteen-year-old secondary school students’ mathematical problem solving in geometry and probability courses. The main finding was that even though there were a quite lot of messages in the database, only a
few of them were characterized as metacognitive. In their study, Hurme and Järvelä provide an example of a joint problem solving session where the three student pairs were working with a probability problem given by the mathematics teacher. The problem was the following: “Rolling one dice twice makes a two-digit number. What is the probability that the number you get is bigger than 46”. The purpose of this task was not just to solve the problem but also to make an inquiry with three phases: *planning the inquiry, implementing an experiment with dice* and *making a report of the inquiry*. In the beginning of the task the students must first understand what the concept of probability means and how to apply it in this problem. One pair of girls had published their inquiry plan in the Knowledge Forum learning environment and the three groups had the following discussion, presented in Example 1.


Bob and Michael: “The number of rolling dice… Aren’t there actually 72 possibilities because the dice can be tossed vice versa…”

Tina and Helen: “It could be… but we don’t think that it is calculated that way because in the formulation of the problem there is not mentioned the dice as separate (e.g. dice 1 and dice 2)”

Bob and Michael: “A little bit more about the total number of tossing dice… But in the problem the same dice is tossed twice and it doesn’t matter if you toss one dice or use two different dice.”

Jack and Sam: “We agree. We think so too but there are still altogether 36 possibilities. At every number [1,2,3,4,5,6] in first dice there is 6
possibilities, in other words $6 \times 6 = 36$. This is a quite complicate explanation but think about it.”

Jack and Sam: “No it is not. It is not possible because the dice are tossed TWICE and not FOUR times.”

Tina and Helen: “Tell us about it...let’s start all over again...there are 6 numbers in the number cube, and if we toss it twice we have to MULTIPLY 6 by itself, so $6 \times 6 = 36$? So how to get 72 [possibilities]? There is no reason to multiply 36 with 2...”

In this discussion, the students made their thinking visible by asking questions and providing explanations. Bob and Michael have not completely understood the problem and the question they posed to the girls requires an analysis of the premises of the given task. Tina and Helen reply to them in order to make their understanding visible. Bob and Michael continue their analysis of the problem by suggesting that it is the same thing to use one dice twice or have two different dice. This can be seen as a *regulation of cognition* because they are providing an explanation in order to facilitate others’ problem solving. Jack and Sam’s first discussion comment can also be interpreted as a *regulation of cognition*: they have an attempt to make the others think about the problem and its prerequisites by providing a detailed explanation. Jack and Sam’s second comment is a reply to Bob and Michael’s first suggestion of having a total of 72 possibilities for rolling a dice and it continues their previous explanation how to count the probability. In the last message Tina and Helen are monitoring and evaluating their own understanding (*the regulation of cognition*) rather than asking for a further explanation.
Example 1 shows that metacognitive activity is an essential part of joint problem solving where the students are working with an inquiry task. The students are not only metacognitively monitoring and controlling their own, but also the others’ cognitive activity, requiring reciprocal interaction (Hurme, Palonen & Järvelä, 2006). Similar way, previous research has seen metacognition as socially mediated (Goos, Gailbraith & Renshaw, 2000) or as socially shared metacognition, in terms of inter-individual awareness of joint problem solving (Iiskala, Vauras & Lehtinen, 2004). Thus, metacognition is an essential part of collaboration where the group’s cognitive activity is regulated by planning, monitoring and evaluating in order to achieve meaningful thinking and new approaches to solve the problem. This kind of shared metacognitive activity is presented in Example 2 where the first year pre-service teachers are jointly trying to solve the given mathematical problem called “Dark Stairs” in Workmates asynchronous learning environment (see Hurme, Merenluoto, & Järvelä, 2009):

Matt, Grandmother, little sister and Dad are standing upstairs in the dark and they need to go downstairs. The stairs are really narrow and are in bad shape and about to crash, so they can take only two people’s weight at a time. The stairs will collapse in 18 minutes. The family has only one flashlight and it is impossible to use the stairs without the light being on. The sinuous stairs are also so long that it is impossible to throw the flashlight upstairs from the downstairs. The members of the family are aware of how much time it requires for them to get down the stairs. Because Grandmother is in poor health it takes 7 minutes for her to go down the stairs. The little sister walks down the stairs in 5 minutes and Dad in 3 minutes. Matt runs the stairs in 2 minutes. Is there enough time for them to get everybody downstairs in 18 minutes? (Modified, Björklund, Lehto, Pasanen & Viljanen, 2002).
The Dark Stairs was a brain teaser problem, where the solver needs to build an efficient situation model and be ready to test different kinds of solutions. The most obvious but incorrect strategy would be to choose the fastest one to run up and down the stairs. The crucial elements for solution are that the two slowest people go downstairs together and the two fastest people change which one of them runs up or down the stairs.

Example 2. Socially shared metacognition in joint problem solving in triad A (Hurme, Merenluoto, & Järvelä, 2009)

Alina: Matt is the fastest one to dribble the flashlight up and down, but should it be someone slower to go together with Grandmother…? I’ve tried several ways to solve this but I always get 19 minutes.

Tapio: I’ve also the same 19, that’s why someone slower should take Grandmother down but I don’t get it.

Anna: I noticed that there is an error in my thinking… So if for Grandmother it takes 7 minutes anyway, it would be reasonable for example to put little sister to go with her because for little sister it takes for 5 minutes. But now the Grandmother and little sister are going together and it takes altogether 7 minutes. The little sister goes up – 5 minutes. Sister goes down with dad and it takes 5 minutes…Does this sound reasonable…?

In Example 2, Alina’s message illustrates the regulation of cognition because she is channeling the group’s thinking into a new approach: having two slowest persons going down at the same is an essential part of successful problem solving. Tapio agrees with her and he appropriates Alina’s idea but he still does not quite understand how the
prerequisites of the task are fitting together. Anna participate in the discussion first by monitoring her own thinking (the regulation of cognition) and then she adopts Alina’s idea and develops it further. This kind of regulation of the group’s cognitive activity could be considered as a sign of socially shared metacognition.

The group continues to work collaboratively for an hour by supporting each other and constructing new ideas to solve the problem. On the basis of their several joint attempts Anna presents the effort which leads them to the solution: Dad and Matt goes down (3 minutes), Matt runs up (2 minutes), Grandmother and Little sister go down (7 minutes) and Matt goes down with Dad (3 minutes). To sum, in this section, we have presented metacognition in joint technology-based problem solving in mathematics at secondary school level and among pre-service teachers. In the first two examples, the groups were working together collaboratively which allowed the members not only to regulate their own cognitive processes but also to affect how others thought and proceeded in problem solving. Particularly in the first pre-service teacher's group they took each other's ideas into account and jointly developed them further.

Motivation regulation in self-regulated learning

In every learning situation a student has to cope with his or her own emotional and cognitive demands and conflicts as well as social settings and environmental cues (Volet & Järvelä, 2001). This is to say, that students have to regulate their cognitive, motivational and emotional learning processes (Boekaerts, et al., 2000). Learners’
capabilities for exerting motivational and emotional control have been shown to be useful in describing these individual differences of learning processes.

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). Motivation regulation is a key to successful self-regulated learning (Järvelä & Niemivirta, 2001). It consists of means by which students’ select and manage goals, and how they follow through when challenges arise as learning unfolds. While goals set standards for students’ achievement (Pintrich, 2000), motivation control strategies operationalize how self-regulated learning is applied. Regulation of motivation is conceptually distinct from motivation even though it may be difficult to differentiate empirically between these two phenomena, and the relation between students’ motivation and motivation regulation is reciprocal (Järvenoja & Järvelä, 2005; Wolters & Rosenthal, 2000). 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 (Kuhl, 1985).

A concept of volition can be seen as a part of the regulation of motivation. Kuhl (1984) as well as Corno (1993) discussed under the label of volitional control various strategies that individuals might use to control their motivation. Corno has defined volition as a tendency to maintain focus and effort toward goals despite distractions. Volition is needed particularly in the executive phase of a learning process, when motivation and goal commitment is established, but a student still needs to sustain and support the decisions made. Volitional processes strengthen the motivational aspects that
back up the goal oriented actions and also the control of emotional reactions. Traditional research on volition divides into specific volitional control strategies for covert and overt processes. Covert processes involve the control of cognition, emotional control and motivation control. Overt processes deal with environmental control, such as task control or control of others.

What is the role of motivation and emotion control in collaborative learning situations?

Motivation and emotion control is an emerging area of study that is gaining interest in the field of collaborative learning research. Collaborative learning includes a variety of shared processes where individuals aim to regulate the prerequisites for learning together, and an increasing amount of studies emphasise the meaning of motivation and emotions for successful collaboration (Crook, 2000). Social learning situations, where individuals’ characteristics, goals and demands meet, can evoke emotions and create novel motivational challenges for individuals (Järvelä, Lehtinen & Salonen, 2000; Järvenoja & Järvelä, 2005). In collaborative learning processes these socio-emotional conflicts can emerge due to a variety of reasons originating from, for example, individual differences, cognitive conflicts or modes of interaction. For instance, collaborative learning models presume that group members create a shared conception of a task and then try to reach this goal by equally sharing the responsibility of the learning process respectively (Roschelle & Teasley, 1995). Collaborative learning creates new challenges for motivation maintenance. This requires constant negotiation and argumentation between
the students, as well as adjustment of individual conceptions and goals, and also control of emotional reactions to these conflicts.

Several studies have shown how different elements, such as lack of common ground in shared problem-solving (Mäkitalo, Häkkinen, Järvelä & Leinonen, 2002) or multiple cognitive perspectives and complex concepts (Feltovich, Spiro, Coulson & Feltovich, 1996), can inhibit collaborative knowledge construction. Often these same situations are also socio-emotionally challenging and they can act as competitive motives or interruptions or obstacles to motivated action in different phases of the learning process. Therefore, these situations invite the need to control motivation and emotions of individuals and their group members. In other words, it can be argued that the regulation of emotion, at both the individual and group level, is critical for successful collaboration.

When considering self-regulation in collaboration, regulation processes can be seen as a form of individual participation in the collaborative activity (Järvelä, et al., 2006). In other words, with regulation actions, individual group members take part in the formation of a group’s common ground and emotional stability. For example, in order to reach personal goals, individual group members have to try to reciprocally regulate each other (Vauras, et al., 2003). Also, in order to reach the shared goal, the group members may need to regulate their motivation or emotional conflicts together through equally sharing the responsibility of the learning task requirements. For example, individual students who are required to form a group and work toward a common objective must define their aims and standards to create a shared goal. They need to be able to negotiate compromise, change their opinions, explain and listen. These actions expect an ability to control personal emotions and support others in this process.
In the Järvelä, et al. (2006) study, 99 first year educational psychology students participated in an educational psychology course which was part of their teacher education studies. 41 of the students worked in a virtual setting and studied in groups of 3-5 members in three different collaborative learning tasks. Example 4 illustrates the students’ motivation regulation in collaborative on-line learning tasks. It is a brief review of a virtual discussion from a group of three students illustrating how students use social comments in order to maintain motivation and a socio-emotionally secure atmosphere in the group (A review includes examples in a discussion from a one week virtual course discussion).

Example 4.

DAY 1

I think Maria had found a good point…

What do you think about…? 

What else comes to your mind about…?

OK, what have we got from here?

Laura had found a good thing…

What do you think if I say…?

DAY 3

It seems that as shared things we have...

In Laura’s text it was emphasized well that…

This time we found pretty much the same things. We also found different things and
same things but in different names.

What do you think about…?

I agree with you Anna…

What do you think?

Sure, those things that Anna suggested are important…

What else would come to your minds about this?

DAY 6

In the future we could develop…

I want to thank my group for successes in team work.

In Example 4 it is seen that even when the focus of three students is on the topic and they all agree that they are willing to find solutions, the students also aim to regulate their shared efforts to complete the task. Example 4 demonstrates what kind of non-cognitive, socially constructive comments the students used in order to motivate each other. With these comments, the student aimed at explicitly acknowledging and giving support to others ideas, and at building and maintaining the motivation and socio-emotional ground by, for example, asking each others’ opinions, referring to their shared goals, using other group members’ first names and talking about “us“ or ”we”.

Conclusions
In this chapter we have discussed how effective learning in social practices, with and without computers, necessitates that students self-regulate their learning. A long research tradition in self-regulated research has identified the core regulatory processes of cognition, motivation and emotion. As Winne (2006) puts it, studying effectively by self-regulated learning is a skill powered by will. Learners apply this with varying expertise. Is there anything we can do to support effective learning skills and active self-regulation?

Among educational psychologists and instructional designers it has been popular to create “powerful” often technology supported learning environments. The adaptation of constructivist epistemological principles has particularly encouraged researchers to analyse how technology-based environments would provide learners with new opportunities for activities which are beneficial for knowledge construction (Roschelle, Pea, Hoadley, Gordin & Means, 2000). Technology has contributed to many attempts for supporting higher order learning and the development of metacognition and self-regulation (De Corte, Verschaffel, Entwistle & Van Merriëboer, 2003). Recently, there have particularly been efforts by people working on self-regulated learning theory to find ways to design technology to assist in helping students’ to develop better learning strategies and regulate their learning process (e.g. Hadwin, Winne & Nesbit, 2005).

In this chapter we have also discussed the competencies needed to participate in future social learning practices, with an emphasis put on motivated and self-regulated learning and how these processes emerge in various computer supported learning environments. New opportunities for scaffolding self-regulated learning have been searched from computer-based regulation tools which aim to promote cognitive regulation processes (Hennessy & Murphy, 1999). Learning tools are to promote
motivated learning from the individual learning point of view, as well as in opening new learning opportunities for social and interactive learning (Azevedo, 2005). Another promising line of research comes from Winne and his colleagues (2006) who have developed the gStudy computer environment that provides an environment for Learning Kits. Tools in gStudy are being researched to investigate their capacity to help learners learn more effectively by enhancing self-regulated learning. The environment gathers the detailed process data of students’ actions that can be provided for students to enhance their awareness of their learning process.

Emerging learning practices (Ludvigsen, Lund, Rasmussen & Säljö, this volume) in a variety of contexts are so complex and multidimensional that a strong theoretical and conceptual understanding is needed to elaborate learning processes in research and practice. In addition to motivation, emotion and cognition the self-regulated learning theory takes into account the behavioral and environmental features when analyzing the effectiveness of learning in computer supported learning environments. The future progress in research presumes theoretical and empirical analysis made in real contexts, embedded into authentic learning. Salomon (1992) has claimed that the traditional focus of researchers’ attention has been on how the individuals and their cognitions and motivations change when studying in new learning environments. According to him, however, it is the whole system that changes in interaction with the individuals in it, not just the single and isolated individuals’ perceptions and motivations. Thus, the focus should also be on analysing how individual characteristics interact with situational features and social factors, and furthermore, how technology forges learning processes.
In the contemporary computer supported collaborative learning environments, social interaction is often taken for granted because the tools are made available (Kreijns, Kirschner & Jochems, 2003). Beyond tools for collaboration, learners need structured and scaffolded support for enacting the collaboration process. Recently, there have been efforts to combine ideas from instructional design and collaborative learning, to structure the collaboration process in order to promote specific types of interactions (Weinberger, Ertl, Fischer & Mandl, 2005). However, the focus has been on orchestrating and emphasizing collaborative interactions on the task, but not on the development of the collaborative community, and individuals’ engagement in the community. Successful engagement in collaborative learning presumes norms that allow members to feel safe, take risks and share ideas. This actually involves core processes of self-regulated learning; effective use of learning strategies to participate in collaborative interactions; metacognitive control and regulation of motivation and emotions. There is not yet much research on these aspects, but our own findings already show that in a collaborative learning situation an individual group member can play a leading role in activating motivation regulation (Järvenoja & Järvelä, 2009). Socially shared learning tasks may also stimulate new strategies for motivation regulation (Järvelä, Järvenoja & Veermans, 2006), as well as collaborative knowledge construction and joint metacognitive regulation (Hurme et al., 2007).

To conclude, broadening research perspectives on computer supported collaborative learning to self-regulated learning can increase understanding about how students are able to engage in studying more deeply and continuously improve skills in socially learning practices. From teachers’ as well as instructional designers’ points of
view this type of research can offer information and methods concerning how to support motivation regulation in practice, which will open new opportunities for fostering students’ motivation to learn.
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