Supporting Self-Regulated Learning in a Blended Course

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Abstract. This study investigates the practice and development of self-regulated learning abilities in a blended course for trainee teachers, where traditional, face-to-face sessions alternate with online collaborative modules. Based on data emerged from an end-of-course questionnaire and on the analysis of the online interactions, the study suggests that the potential of the online CSCL component of the course was especially valuable as concerns the social aspects of SRL. The face-to-face sessions, instead, seem to contribute in particular to the development of the cognitive sphere. This study suggests that a balanced blend of presence and online activities may result synergetic from the point of view of SRL.

Keywords: Self-Regulated Learning, Computer Supported Collaborative Learning (CSCL), Interaction Analysis, Blended Learning

1 Introduction

Self-Regulated Learning (SRL) is a learner-directed process which transforms mental abilities into operative capabilities, in relation to a task at hand [22, 23]. It allows people to autonomously handle their own learning process and to face the needs to learn and to get updated that arise, with increasing frequency, in professional carriers and in everyday life [19]. Hence, self-regulation skills support lifelong learning by making people active learners and by favouring the transfer of knowledge and problem solving methods among different learning situations. For this reason, developing students’ self-regulatory skills is currently considered a major goal in education, and it is deemed as important as acquiring content knowledge.

It is widely accepted that self-regulation entails an active and conscious control of one’s own activity from the point of view of meta-cognition, motivation and behaviour, both individual and social [22, 23]. The same author also points out that SRL entails the cyclical repetition of three phases, that is, planning or forethought, performance (which includes execution monitoring), as well as evaluation of the work done and achievements reached. Controlling cognition, motivation and behaviour throughout these three phases allows the students to take advantage of their knowledge and skills in the environment where learning takes place, progressing towards the achievement of their personal learning objectives.
Concerning the development of self-regulation, the literature indicates that some aspects, such as meta-cognitive knowledge and skills, generally improve as students get older. It is also acknowledged, however, that the acquisition of SRL competence is not automatic nor does it take place in a short time [2], but should be supported by suitable teaching and practice. Developing SRL abilities is a complex task and depends on many factors. The literature underlines the importance of creating and structuring learning environments that allow and facilitate control of the essential dimensions of learning [16]. The importance of receiving formative feedback [13] and being encouraged to reflect and revise one’s work [20] is also stressed. The literature suggests that SRL abilities need to be adapted when moving to different learning contexts [6], as learners do not seem to self-regulate in the same way on all tasks.

SRL in Computer Supported Collaborative Learning (CSCL) has been investigated by several authors [1, 7, 8, 14, 19]. From these studies, it appears that CSCL environments are suited to practice SRL or even foster its development, both in online and in blended courses, because of the great emphasis given to collaborative activities and to the fact that in such courses meta-cognitive skills are often among the explicit or implicit objectives of the learning process. Moreover, CSCL is essentially based on textual interactions, and this seems to lead to a deeper reflection and involvement, since the messages exchanged are recorded in the environment and learners can access them at any time [12]. Finally, in CSCL learners are usually free to choose when and where to work on a course. This gives them a perception of freedom of choice, which is reported to encourage self-regulation [3].

The relationship between CSCL and SRL, however, has a twofold nature. If SRL can be seen as a useful side-effect brought about by CSCL, it also turns out to be one of its requirements. Effectively participating in CSCL, as a matter of fact, entails possessing a good amount of self-regulation, not only for time management and work organization but also for handling the transition from the classroom model of instruction to that of distance, collaborative learning [1]. Moreover, a number of meta-cognitive skills are necessary to take full advantage of this learning method. The relationship between SRL and CSCL is therefore quite complex and worth further investigation.

The study of SRL in blended learning, is even more necessary, especially since there is not a single way to mix face-to-face and online activities [20]. Since in this case learning always takes place in two different environments (one online and one face-to-face), SRL is possibly clearly put into play in more than one way; it is therefore worth investigating if, and under what conditions, the support to SRL provided by the online and face-to-face modules may result synergetic, or independent or even in conflict with each other.

In order to help understand this relationship, we analysed the potential support to SRL of a blended course for teacher training. We analysed the online component of the course, by applying two complementary methods. The first consisted in asking course participants to fill in an end-of-course questionnaire (the TELESTUDENTS questionnaire developed by the TELEPEERS European project). The aim of this

survey was to investigate if the SRL-supporting features of the online course component had been perceived by the participants as effective and useful in regulating their own learning. The second was based on data obtained by carrying out a quantitative analysis of the messages exchanged by a group of students in two activities of the course. This small scale, more in-depth study provided us with complementary information based on the observation of learning dynamics. Finally, we considered if and to what extent the face-to-face component resulted synergetic with the online one in determining the SRL potential of the whole course.

2 The course analysed

We analysed a course in Educational Technology, called TD-SSIS, run by the Institute for Educational Technology (part of the Italian National Research Council) within the Teacher Training School of the University of Genoa. The course objectives were to promote the development of instructional design competence, with special focus on the evaluation and selection of learning strategies, techniques and tools and on the implementation of educational technology in the school context. This course has been shaped differently over the past years, experiencing different blending designs. In this paper, we focus on the course run in 2005, that addressed 94 prospective teachers of all disciplines. Most students (94.4% of the respondents) did not have previous experience with online courses.

The course consisted of five blended modules lasting a total of twelve weeks, with a face-to-face meeting at the beginning of each module to start up its activity. In addition, the course featured two transversal activities, respectively devoted to socialization and to meta-reflection on the course and its method, which were run completely online, in parallel to the other modules. The five blended modules consisted in:

1. a familiarisation game aimed at getting acquainted with each other and with the software environment;
2. an activity devoted to online educational resources, including a phase of individual work and one of peer review;
3. a role play where students were requested to spot strengths and weaknesses of a WebQuest;
4. a case study focusing on a best practice project where several classes and schools collaborated to develop a common artefact;
5. a conclusive activity promoting reflection on the course itself and on the learning achieved.

The course adopted a social-constructivist learning model and employed Centrinity FirstClass™ as Computer Mediated Communication (CMC) platform to support collaborative activities. The main interaction modality was written and asynchronous, but in some cases chats were also used. Guidance and facilitation was provided by a team of 7 tutors plus the course coordinator. Online activities were carried out in groups of about 10 students and took place within discussion areas set up on purpose.
3  Indicators of self-regulation from the questionnaire

The questionnaire used to collect data on trainees’ appreciation of the SRL features was an adaptation of the TELESTUDENTS-SRL\textsuperscript{2}. This questionnaire, which was developed based on the SRL-characterization arising from the literature, especially from the work of 22, 23, considers students’ perception and appreciation of several aspects of a learning environment:

- the support provided to the users in finding their way in the environment (facilities of the interface and possibilities of personalization),
- the support to planning the learning process (availability of planning tools like calendars and progress reports, history, indication of prerequisite, etc.),
- the support to execution (availability of materials in different formats, of tools for collaboration and communication, of different learning paths and levels of difficulties, of formative feedback),
- the support to self-evaluation (evaluation tools, possibility to compare one’s work with that of peers and with given models).

For each of these areas, the possibility to control cognitive, motivational, emotional and social aspects was considered. All questions were to be graded on a 0 to 4 scale. In the analysis of students answers, we took as positive the grades above 2, which express an appreciation more than average.

The data gathered with this questionnaire come from 72 respondents (out of 94 students, amounting to 76.6\% of the course participants). Its main outcomes are reported and discussed below.

3.1 Cognitive and meta-cognitive aspects

The students expressed their appreciation in relation to the cognitive aspects as concerns the possibility to:

- establish personalised learning goals: mean 2.53, sd 0.96;
- plan their own learning 2.16, sd 0.84;
- switch to a new learning strategy if needed: mean 2.60, sd 0.84;
- pace one’s learning activities: mean 3.44, sd 0.77;
- learn from home 3.63, sd 0.59;
- personalise the interface: mean 2.51, sd 1.19.

From these data, students appear to feel fairly in control of the cognitive aspects related to planning, and in particular to take advantage of the freedom offered by the environment in terms of time and work organization. The lowest average score was given to the possibility to pace one’s learning activities. This relatively low rating was probably due to the fact that most of the planning decisions had to be negotiated with both the course designers and peers, and the learning pace was somewhat imposed by the need to collaborate.

\textsuperscript{2} http://www.lmi.ub.es/taconet/tools.php
The study also investigated meta-cognitive aspects related to performance and evaluation; the students expressed as follows their appreciation for the possibilities offered:
- encouragement to actively participate in learning: mean 2.79, sd 0.88
- help to reflect on problem solving: mean 2.80, sd 0.98
- help to reflect on learning progress: mean 2.72, sd 0.95
- help to recognize the achievement of learning goals: mean 2.49, sd 0.92
- availability of appropriate feedback on work done: mean 2.37, sd 1.

In this case as well, the data are rather positive, especially as concerns the support provided to meta-reflection. These data support the claim of several authors [10, 15] that asynchronous written communication has considerable potential for reflection since written messages are permanent, provide multiple viewpoints from group members and force people to strive for clarity.

3.2 Emotional and motivational aspects

Concerning emotional and motivational aspects, the help provided by the environment was deemed valuable as to:
- re-establish a positive working attitude after difficulties: mean 2.67, sd 0.96
- keep up a positive working attitude: mean 2.40, sd 0.97
- work out strategies to keep up motivation: mean 3.43, sd 0.96
- have more confidence in their own abilities: mean 2.21, sd 1.06

These data highlight a weakness of the online environment: the online help facilities provided by the CMC platform used are rather poor and in some cases the novelty of the approach generated anxiety and a sense of inadequacy. Both problems were also reported by the tutors. The first was effectively counter-balanced by a special conference devoted to technical help, where one expert was available to provide support in a very short time. The second is typical of online activities and hence unavoidable, but it can be alleviated by creating a comfortable social climate. This was done by encouraging a friendly atmosphere in the online discussion areas, that was further reinforced during the face-to-face meetings.

3.3 Social aspects

The social aspects concern the ability of course participants to interact with the other members of the community in an efficient and effective way, and take advantage of such interactions to improve their learning process. These aspects include help-seeking, communication ability, effective collaboration, comparison with given models or with peers’ performance and achievements, etc. The questionnaire reported the following appreciation for the various social aspects of the online activities:
- working with peers: mean 3.04, sd 0.92
- communicating with peers: mean 3.00, sd 0.94
- comparing results with peers: mean 3.21, sd 0.84
- contacting and receiving help from tutors: mean 2.68, sd 1.01
discussing work with tutors: mean 2.41, sd 1.03.

According to the above data, the students’ judgement about the potential of the course to develop social SRL aspects appears particularly positive, especially concerning contact with peers. Appreciation of this aspect also emerged from several participants’ messages, where students expressed the opinion that the virtual environment had much helped to create a sense of belonging to the course community. They also pointed out that the use of the two delivering modalities had created an opportunity to interact with more course mates, in comparison with other purely face-to-face courses, in that the online collaborative activities had led them to interact with peers they did not know before and would have not thought to approach in normal conditions, and subsequently felt motivated to look for them during the face-to-face classes.

3.4 Summary of questionnaire results

The data presented distinguish the three main components of SRL: the cognitive/meta-cognitive one, the emotional and motivational, and the social behaviour. This distinction derives from the literature on SRL, but it is clear from the above discussion that the borders between them are quite blurred and that the various aspects investigated within each of them are strictly intertwined. Nevertheless, it may be useful to try a rough comparison of the support perceived by the students in relation to the three components. If we compare the mean value of the above data we obtain the histogram shown in Fig.1, which suggests that the social component of SRL was perceived to be supported more than the cognitive/meta-cognitive component, which in turn was deemed to be supported more than the emotional/motivational one.

This general evaluation is confirmed by the data obtained by applying content analysis to part of the messages exchanged in the course, that are presented in the following section.

4 Indicators of self-regulation from interaction analysis

We resorted to interaction analysis in order to see if a different way to analyse the course would confirm or not the questionnaire data. Content analysis of interactions appears a suitable tool to this end, because it combines qualitative and quantitative analysis of messages. This technique has been increasingly used by researchers to gain insight about CSCL dynamics, taking advantage of the permanent nature of computer conference transcripts [17].
We analysed the messages exchanged by a group of eight students and one tutor in the work areas of Modules 3 and 4, looking for expressions that could indicate the use of SRL in some activities. Each activity lasted three weeks, for a total of six weeks and 249 messages exchanged. The sample chosen had more or less the same features of the whole cohort of students, as concerns ratio between males and females, mixture of backgrounds, average grade earned in the final assessment. Both activities were collaborative.

Two coders examined separately all students' messages of the sample. One coder was one of the course designers, while the other was an external rater. The chosen unit of analysis was the message. After coding, the inter-rater reliability was calculated. The percent agreement resulted to be 88% for the first activity and 80% for the second one.

The indicators of SRL we used are derived from the literature, checked against our experience. They can be classified along three dimensions. The first dimension has to do with the phases of the self-regulated learning process, that is, planning, monitoring and evaluating. The second has to do with the distinction between self regulation in individual work vs self-regulation in team work. The third distinguishes between cognitive or meta-cognitive aspects and emotional or motivational ones. More details about this distinction and the related indicators are reported by Dettori and Persico [9].

If a message contains reference to self-regulated actions, then we can deduce that the author of the message, having taken those actions, has practised self-regulation to some extent. For example, if one of the students proposes to his/her peers a given workplan and asks for feedback, we can interpret the message as a planning action (in that the author of the message must have done some planning to write the proposal) and also as an attempt to socialise his/her own efforts, in that he/she is asking for feedback and is not trying to impose his/her own ideas to the group. The opposite, however, can not be claimed, because if self-regulation does not emerge from students messages, this doesn’t mean that it did not occur, but simply that it was not openly expressed. For example, a student might have done some planning in individual work, but he/she might have decided that it was not relevant to tell his/her peers and tutors about those plans. In conclusion, the interpretation of the results of the study must be carried out bearing in mind that what has emerged from them may just be the “tip of the iceberg” of a wider phenomenon.
The main results of the content analysis are reported in Fig. 2 to 4. The two activities had the same duration, but both the total number of messages exchanged and the percentage of messages that were found relevant to study SRL were higher in Module 4 (a case study) than in Module 3 (a role play). This can partly be explained by the nature of the two activities and by the increased familiarity among the group members, but it can also suggest that self-regulation had improved over the course. Most likely, all hypothesis contributed to determine these data. Module 3, being a role play, proposed an inherent plan (who does what) that partially relieved students from taking individual decisions on how to participate (this is confirmed by the data in Fig. 2, where indicators of planning events in Module 3 are significantly less than those of Module 4). However, Module 4 shows a generally higher concentration of SRL-related events, therefore supporting the idea that students self-regulated their learning better in this phase, as concerns not only planning, but also monitoring and evaluation tasks.

**Figure 2.** Coding results along the categories of the process model

**Figure 3.** Coding results along the individual vs social categories

**Figure 4.** Coding results along the categories cognitive and meta-cognitive vs. emotional and motivational
5 From online to blended learning

The above data mostly focus on the potential support to SRL of the online component of our blended course. What about the support provided by the whole course? Does the inclusion of some face-to-face activities increase, or decrease, or leave unchanged, students’ possibilities to practice and improve SRL? If any change is induced, what aspects are affected?

At first sight we might think that the presence of a face-to-face component would decrease the global support to SRL, since students’ freedom to organize their learning activities was obviously limited by the fact that the face-to-face activities had a fixed schedule. SRL, however, is not much about being free to organise one’s learning activity, but rather to be able to make good use of the amount of freedom allowed by the learning situation. In this respect, some authors claim that total freedom in taking decisions concerning one’s own learning is not really essential for self-regulation, indeed learners need to have some minimal knowledge related to the learning activity at hand in order to be able to make informed choices [18]. Therefore, some guidance is necessary to allow learners to exercise control [11].

In the case of our blended course, the face-to-face classes at the beginning of the 5 modules had the function to start up the modules’ activity by providing a general, content-related framework for the work to be carried out online. Giving introductory classes in presence turned out to be particularly efficient, since the presentation of the relevant content knowledge and the clarification of collective doubts on the topic could be made more quickly than it would be possible online. Hence, the face-to-face component of the course contributed to the SRL support on the cognitive/meta-cognitive level, by providing the guidance necessary to help the students move at ease through the online activity. Moreover, the face-to-face classes also served the purpose to encourage and motivate the students who were less familiar with technology and collaboration tools, therefore determining a positive perception of this aspect in relation to the whole course.

In the authors opinion, on the other hand, the online component supported the social level more than the face-to-face one. A course with about 100 students, and with a dense schedule of activities, can in fact hardly provide frequent student-centred and highly interactive activities. Since the lack of a suitable social experience appears to be a primary source of self-regulatory dysfunctions [4], the online component of the course served a purpose of great relevance to the overall quality of the learning experience.

In order to better understand the relation between online and face-to-face in this course, we will consider again some of the data coming from the end-of-course questionnaire, and in particular the answers to questions aiming to distinguish between the contribution given to the course by the different learning modes.

These data (Fig. 5) show that the overall course quality was positively judged by the students, and that the online component of the course significantly contributed to such quality, more than the face-to-face one. Consistently, the students found (Fig.6) that learning collaboratively in the CMC environment was more important than individual study of learning resources, which in turn was deemed more important than the face-to-face sessions.
A further remark can be made about the students' opinions on how much they felt responsibility for their own learning. Again, the end-of-course questionnaire provides a mean rating of 2.72 in a 0 to 4 scale (sd 1.06), which is quite satisfactory. Fig. 7 also gives an insight about students perceptions of motivation improvement along the course. A significant increase in students' motivation was also perceived by the tutors.

In conclusion, both components appear to have played different but important roles in determining the SRL potential of the whole course. Each of them contributed to overcome what could be seen as a weakness of the other component. Moreover, it is important to recall what emerged from the students’ messages, mentioned in Section 3.3. The work online with previously unknown peers, followed by face-to-face sessions where they had an opportunity to meet, had led to the creation of a warmer social atmosphere, which supported the emotional aspects of SRL more than it would have been possible in a purely online or purely face-to-face course. Overall, the balance of the online and face-to-face components was appreciated by the students (mean 2.9; sd 0.94).

Figure 5. Question “express your opinion about the quality of the course and its components (0=very low/4=very high)”

Figure 6. Question “Rate the importance of the following modes of study in your learning process (0=very low/4=very high)”

Figure 7. Question “Rate your motivation during the course (0=very low/4=very high)”
6 Concluding remarks

The case study analysed suggests that blended courses can offer good opportunities to foster students SRL skills. We must be cautious, however, to generalise these positive data. The same outcomes can obviously not be expected from any blended course, because the variety of possible ways to blend presence and online activities affects the synergy between the two component. When these cover different parts of the course program, for instance, or the face-to-face meetings have just an organizational aim, the online activity can not take advantage of the cognitive guidance provided by a face-to-face introduction. On the other hand, having only rare face-to-face meetings or concentrating them at the beginning of the course, may fail to create the positive social atmosphere induced by the alternation between online collaboration and face-to-face interaction with peers.

Further research is therefore needed to study different course structures, analysing the impact of components with different aims, organizations and lengths, as well as of different combinations of them, in order to shed further light on the relationship between SRL and blended learning.

References


