Peer feedback and Sense of Community
in a blended university course

Stefano Cacciamani, Vittore Perrucci, University of Valle d'Aosta, Strada Cappuccini 2/A, Aosta, Italy
s.cacciamani@univda.it, v.perrucci@univda.it
Giulia Balboni, University of Perugia , Piazza G. Ermini, 1, Perugia, Italy

Abstract: The aim of the present study was to analyse the students' participation and the association between their participation and their Sense of Community (SC) in a course at University designed according to a teaching method based on peer feedback. Twenty-eight students attending the Guided Practice Exercise (EPG) of Learning Psychology and digital technologies of the degree course in Psychological Sciences and Techniques were involved. The activity of the EPG took place in a blended form with the support of Knowledge Forum (KF). The teaching method was inspired by the Knowledge Building model and based on peer feedback. Data concerning students' participation in terms of writing activity was detected through a specific software called Analytic Tools. The KF notes were divided into containing feedback vs. not. Feedback notes were segmented into syntactic units and labelled by two judges using a coding scheme which provided: Positive aspects, Negative aspects, Proposals for improvement, Questions, Other. The SC was detected by administering the Classroom Community Scale (Rovai, 2002), adapted by Perrucci, Cacciamani and Balboni (2016), composed by two sub-scales: Connection and Learning. Results evidence a statistically significant correlation between the Proposals for improvement feedback and the Connection subscale. Implication of these results are discussed.

Introduction

In psychological literature, the Sense of Community (SC) refers to the perception of similarity and strong interdependence among the members of a group, perceived as reliable (Davidson & Cotter, 1991; Sarason, 1974). The SC has been extensively studied in online courses in higher education because the lack of physical presence may cause, in the students, feelings of isolation from their professors, from classmates, and from the university context, with consequent risk of abandoning (Rovai, 2002; Rovai & Wighting, 2005). When the SC is present in online courses and if students are given the opportunity to create connections to the course community, they are more satisfied and report higher levels of learning (Hsieh, Chang & Smith, 2008; Tsai et al., 2008). According to Lin and Gao (2020), the SC not only increase classroom participation and deep learning (Garrison, Anderson, & Archer, 2010), but also enhance students' ability of managing stress and promote emotional well-being (Stubb, Pyhältö, & Lonka, 2011). SC in online course can be favoured supporting online interaction among the students. Cacciamani, Cesareni, Perrucci, Balboni and Khanlari (2019) showed, for instance, that students' SC - in the membership dimension - can be promoted thanks to a student with the role of Social tutor, facilitating online interaction. One of the most common used tools to measure the SC in university courses is the Classroom Community Scale (CCS), developed by Rovai (2002) which can be used in both F2F and online courses. The CCS is a self-report questionnaire composed by two sub-scales, Connection and Learning, measuring respectively the social community dimension and the learning community dimension. The social community dimension represents students' feelings about the community, including their spirit, cohesion, trust, interactivity, interdependence, and sense of belonging. The learning community dimension includes the feelings of the community members regarding the degree to which they share group norms and values and the degree to which belonging to the group meets their educational goals and their expectations about their formative needs (Rovai, Wighting, & Liu, 2005).

Peer feedback is defined as a communicative process in which those who learn, talk to each other about the performance and the standards required in an activity (Liu & Carless, 2006). Learning benefits have been highlighted in the literature, thanks to the peer feedback exchange. Liu and Carless (2006) identified some peer feedback benefits that motivate the use of this method. They primarily concern the active role that is attributed to students in the management of their own learning, when they are involved in giving and receiving feedback. In fact, students can better self-regulate the own learning, because of receiving feedback from their own classmates, both

thanks to the fact that, commenting others' work, they acquire a more objective knowledge of evaluation standards, which can be also used to evaluate their own products (Cacciamani, Perrucci, & Iannaccone, 2018).

Recently, a teaching method called Progressive Design Method (PDM), inspired by the Knowledge Building (KB) model (Scardamalia & Bereiter, 2003; Scardamalia & Bereiter, 2010) and based on the progressive elaboration of projects by the students and on peer feedback in an online environment, has been developed by Cacciamani (2017). The PDM has been defined through the following principles (described later in a more detailed way): 1. Students as members of a KB Community; 2. Critical Theoretical Model Analysis; 3. Critical Case Analysis; 4. Progressive improvement of the project; 5. Distributed Feedback; 6. Recursive Design.

Despite the relevance of peer feedback and SC in online courses at University, studies exploring the association between the two aspects seems lacking in literature. This study, using the PDM in a blended university course, aims to explore the following questions:

1. Is there any association among students' participation in terms of writing activity in the online environment of the course and the SC?
2. What kind of feedback are used by the students?
3. Is there any association among the number and the extension of feedback provided by the students and the SC?
4. Is there any association among the kind of feedback provided by the students and SC?

Method

Participants

Twenty-eight students (20 females, age M (DS) = 22.39 (3.5) attending the Guided Practice Exercise (EPG) of Learning Psychology and digital technologies of 2nd year of the degree course in Psychological Sciences and Techniques at the University of Valle d'Aosta participated in the research. All participants provided their informed consent.

Online environment

The activity of the EPG took place in a blended form with the support of the online environment Knowledge Forum (KF). KF is a web-based discourse medium specifically designed according to the 12 principles of the KB model (Scardamalia & Bereiter, 2010), to support production and refinement of ideas and to advance understanding of the world through social interaction (Scardamalia, 2004). KF, with its specific design, can facilitate development of KB communities, and provide opportunities for students to act as knowledge workers in an open space (Bereiter & Scardamalia, 2014; Scardamalia, 2004). In KF it is possible to create specific spaces -called "views"- that can be used to organize the discourse about specific topics. In each view the students can insert notes through written text and graphs and images can be added. These notes can also be connected to one another via links. In this case, the notes are called "build-on" meaning that they represent an advancement of the knowledge-building activity. Specific applets called "Analytic Tools" allow the activities of the students working in KF to be traced, in terms of writing and reading activity.

Context

The course was organized with reference to the PDM according to the following principles and activities (Cacciamani, 2017):

1. Students as members of a KB Community: students were organized within a KB community and worked collaboratively in teams to design a project.

2. Critical Theoretical Model Analysis: the KB model was analyzed by students working together in groups to identify the possible advantages and critical aspects in the hypothesis of applying these principles in Italian schools. Reflections were shared in KF, in a specific view.

3.Critical Case Analysis: students analyzed implementations of the KB model in different contexts to identify points of strength and weaknesses and ideas to improve them.

4. Progressive improvement of the project: the elaboration of the project was organized in steps that allowed the team members to progressively improve their project. The steps were: (1st step) identifying the context, the participants, the objectives (in terms of skills to be developed through the project), and a title for the project; (2nd step) defining the phases of work, the timing, the instruments and the resources; (3rd step) choosing the method to be used for assessment and evaluation of the project, in coherence with the previous aspects; (4th step) creating an

advertising spot through a video or a Power Point, to explain the reasons for adopting the project by a possible stakeholder.

5. Distributed Feedback: for each step the partial created product was organized in a Power Point presentation and published in KF (except for the advertising spot that received an oral feedback), where each member of the community could analyze the others' team product and provide a feedback with the following scaffolds: Positive aspects of the project, Negative aspects of the project, Questions, Proposal for improvement of the project.

6. Recursive Design: after receiving feedback in KF, each team was given time to reflect of any ideas that emerged through the feedback and to introduce changes to their project.

The EPG was then developed in eight F2F meetings of three academic hours each, according to the described above principles. Students could continue the activity of reciprocal feedback also online at home.

Procedure

Data concerning students' participation in terms of writing activity (notes and build-on) was detected through a specific software program called Analytic Tools (AT). AT provides summary statistics on the activities in each view in the KF database. In order to identify the notes containing feedback two different judges analysed the content of each notes and classified it in "note with feedback "and "note with no feedback. The 130 KF notes containing feedback were then segmented into 384 syntactic units by two independent judges. The content of the segments has been labelled by the same judges by means of a coding scheme which provides: *Positive aspects*, *Negative aspects*, *Proposals for improvement*, *Questions*, *Other*. The degree of agreement was good (Agreement index = 87% and Cohen's K = .80). The number of segments containing feedback was considered a measure of the extension of the feedback. The SC was detected by administering in the penultimate meeting of the EPG the CCS (Rovai, 2002) adapted by Perrucci, Cacciamani and Balboni (2016), consisting of 20 items rated on a 5-point Likert scale and formed by the two sub-scales: Connection (12 items) and Learning (10 items).

The correlations between the investigated variables were calculated with the Spearman's Rho coefficient.

Results

With reference to the first question of inquiry we have not found any association among students' participation, in terms of notes or build-on written in KF, and SC. Concerning the second question of inquiry, results showed the prevalence of feedback focused on *Positive aspects* of the projects (142 segments), followed by *Negative aspects* (26 segments), *Proposals for improvement* (24 segments) and *Questions* about the projects (17 segments). Third, there was no statistical correlation between the SC and the number of notes containing feedback or number of segments containing feedback. Finally, with reference to the kind of feedback provided, the correlation with SC are presented in Table 1

Table 1: Correlation among kind of feedback and SC

	Global SC	Connection subscale	Learning subscale
Positive aspects	.211	.242	.245
Negative aspects	-.073	-.082	.029
Proposals of improvement	.356	.478**	-.025
Questions	-.103	-.181	.239
Other	.120	.181	.067

**$p<.01$

As you can see, a statistically significant correlation was found between the Proposals for improvement feedback category and the Connection subscale (Rho = .478, p = .01).

Discussion

The aim of the present study was to analyse the students' participation and the presence of associations between their participation in KF and their SC in a blended course at University, in which PDM was used. Results showed

the prevalence of feedback focused on positive aspects of the projects, followed by negative aspects, proposals for improvement and questions about the projects. This situation seems to describe a not particularly critical approach from the students toward the projects of their classmates, also if *Negative aspects* and *Proposals for improvement* feedbacks are used. Also, an association between *Proposals for improvement* and the Connection factor of SC emerged. Connection in the CCS is the sub-scale measuring the Social community dimension. We can hypothesize that this association may be due to the fact that engaging in producing ideas for colleagues' projects is a prosocial behaviour that contributes to the development of the SC, but also that high levels of SC stimulate the implementation of help behaviours such as writing comments to help to improve. It seems, indeed, that students assumed the KB perspective: in peer feedback activity, expertise is distributed among groups of work and all groups gain in knowledge through their participation in a joint effort to ameliorate the projects, consistently with the Symmetric Knowledge Advancement principle of KB model (Scardamalia & Bereiter, 2010). From one hand, then, connection among participants could help the assumption of the KB perspective, from the other hand, the assumption of the KB perspective, an promote connection among participants. The lack of correlation among the different kind of feedback and the Learning factor of SC is also interesting. It is possible that students considered their activity more oriented to build products of common knowledge (the group project) rather than focused on individual learning. The Learning subscale of CCS, then could be unable to capture the students' focus on knowledge building

Further investigations will have to study the possible reciprocity of this phenomenon by examining also the relationship between the type of feedback received and the SC. In addition, another direction of inquiry could be focused on contrasting these results with other tests and in other samples, or larger samples, adding some variables that provide information on the quality of the feedback. Finally, it could be interesting to develop a scale that can measure SC with reference to knowledge building, to verify the possible correlation with the kind of feedback provided.

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