Open and Interdisciplinary
Journal of Technology,
Culture and Education

Special issue

From the Teaching machines to the Machine learning. Opportunities and challenges for Artificial Intelligence in education

Edited by
Valentina Grion
& Graziano Cecchinato

Publisher
Progedit, via De Cesare, 15
70122, Bari (Italy)
tel. 080.5230627
fax 080.5237648
info@progedit.com
www.progedit.com

qwerty.ckbg@gmail.com
www.ckbg.org/qwerty

Registrazione del Tribunale di Bari
n. 29 del 18/7/2005

ISSN 2240-2950

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The role of the instructor and the tutor in the discoursive interaction in a blended university course: A case analysis

Vittore Perrucci, Ahmad Khanlari**, Stefano Cacciamani****

DOI: 10.30557/QW000032

Abstract

While a Knowledge Building community is a student-directed community, instructors play an important role, preparing the cultural, cognitive, and social conditions for the adoption of the Knowledge Building perspective. This study examines how a teaching team, including an instructor and a tutor, can facilitate knowledge building in a blended university course. More specifically, it aims to investigate the impact of the instructor's and tutor's interventions on student participation and the differences between them in terms of the quantity and quality of the interventions. The results show the impact of the teaching team interventions in the changes of the Specific Conversational Functions used by the students and highlight that instructor assumed the role of knowledge building activator, while the tutor is identified as a knowledge building facilitator. Practical and theoretical implications of the findings are discussed.

Keywords: Knowledge Building; Online Courses; Instructor; Tutor; Case Analysis

* Università della Valle d'Aosta. Orcid: 0000-0003-3740-4378.
** Università di Toronto. Orcid: 0000-0001-6390-0629.
*** Università della Valle d'Aosta. Orcid: 0000-0003-4455-3988.
Corresponding Author: s.cacciamani@univda.it

Introduction

Constructivist approaches aim to turn agency over to students so that students assume an active role in their learning. Knowledge Building (Bereiter & Scardamalia, 2014), as a constructivist model, turns over the highest levels of agency to students, emphasizing that they should take collective cognitive responsibilities for the state of the community knowledge. The goal of Knowledge Building is to extend the existing knowledge through discourse and encourages students to engage in creating knowledge for public good (Byker, Coffey, Harden, Good, & Brown. 2017).

In Knowledge Building (KB), indeed, knowledge is viewed as a social product, with students collaborating to advance the community knowledge through social interactions (Scardamalia & Bereiter, 2006). According to the KB principles (Scardamalia & Bereiter, 2006), the creation of knowledge takes place within a community knowledge through discursive interactions; students are encouraged to take responsibility to advance the knowledge of the community by participating in the progressive discourse. Students indeed engage in progressive discourse, define and analyze the issues and problems, propose new ideas, evaluate ideas, and build higher-level ideas (Gutiérrez-Braojos et al., 2019). In their description of KB model, Scardamalia and Bereiter (2006) assert that knowledge that is shared in a community "only exists in the discourse of that community, and the progress of knowledge just is the progress of knowledge-building discourse" (p. 102). Discourse, as claimed in several studies, plays a vital role in learning processes and increases students' abilities to test their own ideas, synthesize others' ideas, and build deep understanding of the issues and phenomenon (e.g., Corden, 2001; Reznitskaya, Anderson, & Kuo, 2007; Weber, Maher, Powell, & Lee, 2008). Also, discourse is shown to increase students' motivation, collaborative skills, and problem-solving abilities (Dyson, 2004; Matsumura, Slater, & Crosson, 2008).

Due to the importance of discourse for knowledge creation, an online discussion forum, called Knowledge Forum (KF) (Scardamalia, 2004) is developed to support the production of knowledge. Three specific design features of KF are "views", "notes", and "build-on".

Students can share their ideas, questions, and problems of understanding using notes. They can also build ideas onto other students' ideas/notes or answer questions posted by the instructor/other students using the build-on function. Notes and build-ons are posted on the created views, which are collaborative design environments (Scardamalia, 2004). Views, notes, and build-ons are stored on KF, allowing the researchers/teachers to have access to, and analyze subsequently students' discourses.

While KB turns over the highest levels of agency to students, the instructor plays an important role in preparing the cultural, cognitive and social conditions for enculturating students to the Knowledge Building perspective, in order to successfully adopt the KB model. As described by Scardamalia (2002), "educators play an active role throughout the [knowledge building] process by establishing a culture where ideas are respectfully challenged, tested, redefined and viewed as improbable, moving children from a position of wondering to a position of enacted understanding and further questioning" (p. 68). Zhang, Hong, Scardamalia, Teo and Morley (2011) highlighted the importance of the instructor's role in facilitating knowledge building processes. As they stated, the instructors can enable collective cognitive responsibility by creating an "accepting, caring, and responsible community" in which students are encouraged to jointly work to build and share knowledge (p. 296). To create such a cohesive community, the instructors would need to devote considerable effort (Bereiter & Scardamalia, 2014), move away from tasks and activities and focus on the process of learning and moving knowledge towards innovation (Scardamalia & Bereiter, 2008). Indeed, as stated by Matuk and Linn (2018), instructors orchestrate, monitor, and guide collaborative activities among peer learners in Computer-Supported Collaborative Learning environments (CSCL). In order to facilitate the process of moving knowledge toward innovation, the instructors may occasionally intervene in students' discourse in order to scaffold their thinking. Such interventions indicate sharing of epistemic agency and the collective cognitive responsibility of knowledge creation between students and the instructor (Chen & Hong, 2016).

Nevertheless, a review of the literature shows that Knowledge Building researchers (e.g., Hod, Yaari, & Ebrerle, 2019; Hong & Lin, 2018; Lin & Chan, 2018; Lin, Chang, Lin, & Hong, 2017) have mainly focused on students' interactions, while the role of the instructors in the discursive interaction is not well-studied. For example, Lin and Chan (2018) conducted a study involving 52 Grade 5 students from two different classes with different instructors. As the authors stated, "the instructors scaffolded students to reflect on their forum discourse" (p. 570). However, the authors did not examine the differences between the two instructors in terms of providing scaffolds, which may have impacted the results. As another example, Hod and colleagues (2019) studied students' responsibility-taking in a knowledge building community. While the authors acknowledged the "instructor presence" as a means to support effective collaborative learning, they did not examine how the "instructor presence" may have encouraged students to take responsibility for collaborative knowledge creation.

Moreover, to the best of our knowledge, there is no study to examine the role of the instructor in a higher education course in which the pedagogy of teaching and learning is the KB model. In order to fill these gaps, the present study aims to explore how a teaching team-including an instructor and a tutor- in a blended university course engages in discursive interaction oriented towards knowledge construction. More specifically, this study aims to address the following two research questions:

1. What is the impact of the teaching team's contributions on student participation in online discussions?
2. Are there any differences between the contributions of the instructor and the tutor?

Method

Setting

The study is conducted in the Educational Psychology course offered by the University of Valle d'Aosta. The course was delivered in a blended mode and the pedagogy of teaching and learning was the KB

model. The activities were designed in five modules, each of which addressed a specific topic (e.g., theories of learning, motivation, and collaborative learning). Students from two undergraduate programs enrolled in this course: Primary Education program and Educational Sciences program. The last module of the course was only offered to Educational Sciences students; therefore, it is excluded from the analysis. Each module started with a face-to-face meeting in which the instructor introduced the module outline and set the conditions to start an online discussion. The online discussion took place on specific KF views (created by the instructor) and lasted for two weeks. In each module, the instructor initiated the discussion and monitored its progress to make sure the students cover the course topics, and a tutor assisted the instructor to encourage student participation. The two roles were not pre-scripted; rather, they were "emerging roles" (Strijbos & Weinberger, 2010) which means the instructor and the tutor

Figure 1. A view of Knowledge Forum (KF) used in the course

were able to freely interpret the situations and take required actions. Each student could directly post notes to express his/her ideas or respond to others' notes by creating build-ons (see Figure 1).

Participants

The participants included 25 students (20 F and 5 M) in addition to the teaching team: An instructor who taught the Educational Psychology course and a tutor, graduated in psychology with two years experience in this role.

Corpus of data

Among the different blended courses offered at the University of Valle d'Aosta, and stored on KF, the course with the highest number of participants was selected, in order to have the largest corpus of data possible[1]. The corpus of data is composed of messages that the instructor, the tutor, and the students wrote on KF during the four modules of the selected blended course. The instructor and the tutor wrote 32 and 73 messages, respectively. Out of the total 25 students, only 23 students (18 F and 5 M) posted messages in all the four modules, consisting of 335 messages.

Instrument

CF4KB coding scheme, developed by Cacciamani, Perrucci and Khanlari (2018) is used to code participants' contributions. CF4KB allows analyzing the online discursive interaction in terms of Conversational Functions (CF), in accordance with the principles of the KB

1. The selected blended course was delivered in the a.y. 2006-2007. Considering that the analysis of the messages is focused on the conversational functions used by the students, the teacher, and the tutor, this type of analysis is independent of the period in which the data was collected.

model. CFs are defined as specific types of activity that support productive interaction in a discussion (Wise, Saghafian, & Padmanabhan, 2012).

As reported in Table 1, this coding scheme is structured in two categorical levels: The first composed of four Global Conversational Functions (GFC) which refer to conversation activities in online interactions according to the principles of the KB; the second consists of eight Specific Conversational Functions (SCF) which refer to subcategories of global conversational activities[2].

Table 2. CF4KB coding scheme: Global Conversational Function (GCF), Specific Conversational Functions (SCF), and their corresponding KB Principles (Cacciamani et al., 2018)

KB Principles	GCF	SCF
"Real Ideas, Authentic Problems" and *"Epistemic Agency"*	1. Exploring	1A. Question or problem of inquiry
		1B. Hypothesis and ideas
"Constructive Uses of Authoritative Sources"	2. Providing Information	2A. Applicative example
		2B. Information from authoritative sources
"Improvable Ideas" and *"Rise Above"*	3. Re-elaborating	3A. Repetition/Quotation of others' idea
		3B. Synthesis
"Concurrent, Embedded and Transformative Assessment"	4. Evaluating	4A. Comment
		4B. Metacognitive reflection and Metacommunication
None	5. Other	O. Other

2. For the precise definitions of the categories of the coding scheme CF4KB, see Cacciamani et al. (2018).

Procedure and data analyses

In order to detect the impact of the teaching team's contributions on student participation, the messages written by the participants on KF were first classified into two categories: Notes and build-ons. We compared then notes and build-ons posted by the teaching team and the students at a descriptive level.

In addition, the messages written by both the instructor and the tutor were segmented into syntactic units according to the punctuation criteria (cf. Strijbos et al., 2006). Two independent judges applied the CF4KB coding scheme and coded the segments at the SCF. For the instructor and the tutor, the segmentation resulted in 468 segments and about the coding of SCF the judges obtained an Agreement Rate of 73.9% and k of Cohen = 0.68 (good). The 335 messages posted in KF by the students resulted in 2726 segments and, concerning the coding of SCF, the two judges obtained an Agreement Rate of 73.6% with Cohen's $k = 0.63$ (good). The controversial cases were discussed and resolved by the same judges and the frequencies of SCF performed by the instructor, the tutor and the students were computed. To identify the impact of the teaching team's messages on students' notes, we first used Friedman's test to analyze all the SCF performed by the teaching team in all the 4 modules. Then, we analyzed students' SCF contributed in all the 4 modules, using the Friedman's test to examine how the teaching team's contributions affected students' contributions. In case of statistical significant differences, for each SCF we compared each pair of modules using the Wilcoxon test.

In order to detect any differences between messages written by the instructor and the tutor, the number of notes and build-ons contributed by them were computed and differences were analyzed using Exact Likelihood Test (ELT) and Adjusted Standardized Residuals (ASRs). Differences between the two roles were investigated both at the GCF and SCF levels, using a Chi-square statistic (if expected frequencies in the cells ≥ 5) and ELT (if expected frequencies in the cells < 5).

Results

Numbers of messages written by both the teaching team and the students in all the four modules are shown in Table 2.

Table 2. Teaching team and students' messages in the 4 modules

Participants	M1	M2	M3	M4	Tot
Teaching team	22	44	28	11	105
Students	81	107	81	66	335
TOT	103	151	109	77	440

As can be seen in the table, in the modules in which there are more messages written by the teaching team, there are also more messages written by the students. The highest number of messages written are posted in Module 2.

Figure 2 shows the ratio in percentage of each SCF performed by the teaching team in each module to the total SCF performed by them during all the modules.

Friedman test, applied on the SCF performed by the teaching team in each of the four modules, reveals that the SCF are distributed differently in the modules [Chi2 (8) = 25.52, p <.005]. In particular, compared to other modules, Module 2 has the highest number of "Question or problem of inquiry" (1A), "Metacognitive reflection and Metacommunication" (4B), "Hypothesis and ideas" (1B), "Information from authoritative sources" (2B), and "Repetition/Quotation of others' idea" (3A). Moreover, the highest number of "Comment" (4A) and "Applicative example" (2A) are observed in Module 1 and Module 4, respectively. It should be clarified that the "Other" category is excluded from the analyses since this category does not refer to any specific knowledge building principle.

Figure 3 shows the ratio in percentage of each SCF performed by the students in each module to the total SCF performed by them during all the modules.

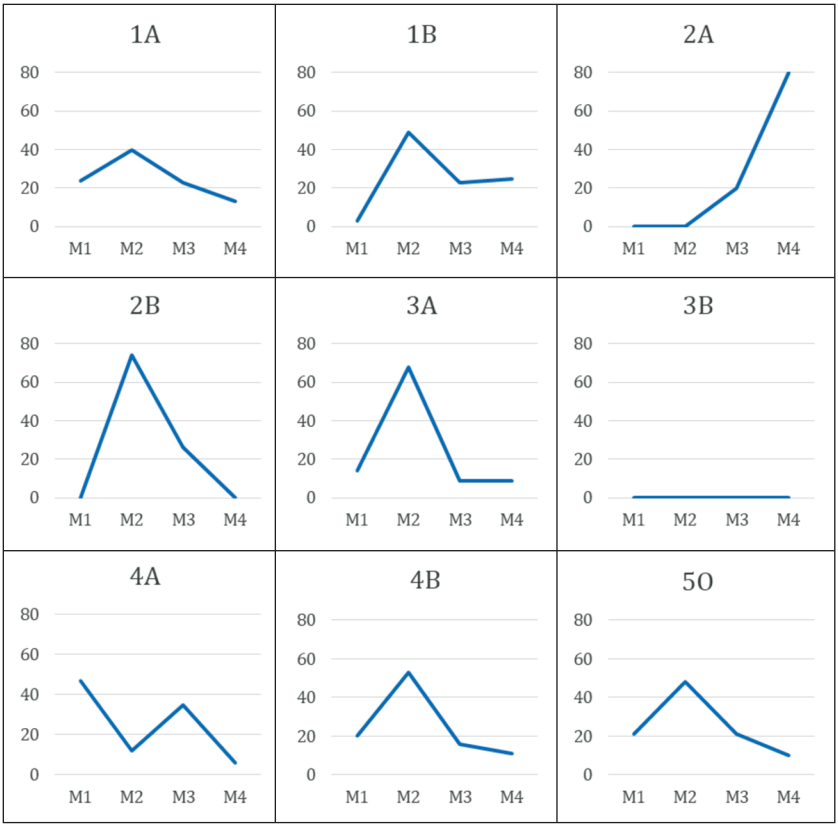

Figure 2. The ratio of SCFs (%) performed by the teaching team during M1, M2, M3, and M4 to the total number of SCF performed by them

Friedman test, applied on the SCF performed by the students in each of the four modules, shows that the SCF are distributed differently in the modules [Chi2 (8) = 30.71, p <.001]. Employing the Friedman test for each SCF performed on each module, statistically significant differences identified for SCF "Hypothesis and ideas" (1B), [Chi2 (3) = 9.59, p <.05],"Applicative example" (2A), [Chi2 (3) = 12.47, p <.01], "Information from Authoritative Source" (2B), [Chi2 (3) = 20, 36, p <.001], "Metacommunications and Metacogni-

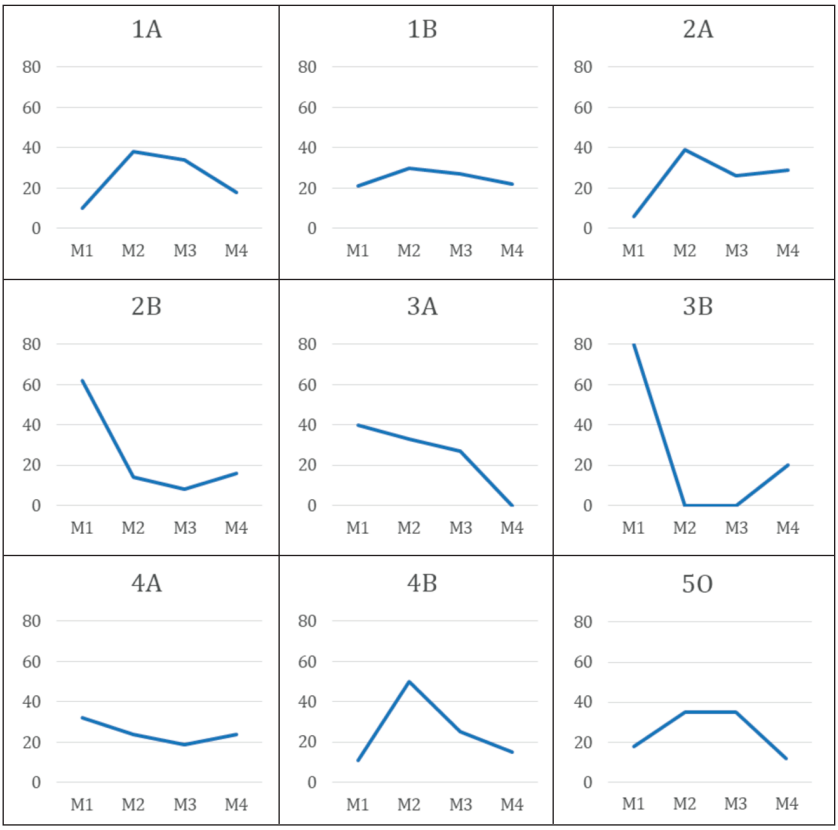

Figure 3. The ratio of SFCs (%) performed by the students during M1, M2, M3, and M4 to the total number of SCF performed by them

tive Reflections" (4B) [Chi2 (3) = 13.39, p <.001]. Pairwise comparisons for each SCF between different Modules through Wilcoxon test showed that from M1 to M2, "Hypothesis and ideas" (1B) (Z=-3.14, *p*<.01), "Applicative Examples" (2A) (Z= -2.79, *p*<.01) and "Meta-communications and Metacognitive Reflections" (4B) (Z= -2.70, *p*<.01) increased and reached the highest level among the 4 Modules. At the same time the "Information from Authoritative Source" (2B) decreases from M1 to M2 (Z=-2.90, *p*<.01) and remained highest in

M1 compared to M3 (Z=-3.57, p<.01) and with M4 (Z= -2.86, *p*<.01). Differences emerged also for "Hypothesis and ideas" (Z=-2.06, *p*<.05) and "Metacommunications Metacognitive Reflections" (Z=-2.66, *p*<.01) higher in M2 than in M4.

The differences between the instructor and the tutor in terms of the number of notes and build-ons written in each module are reported in Table 3.

Table 3. Number of Messages (notes and build-ons) written by the Teaching team in each Module

Teaching team	Messages	M1	M2	M3	M4	Tot
Instructor	Notes	2	3	1	1	7
	build-ons	5	8	10	2	25
	Tot	7	11	11	3	32
Tutor	Notes	0	0	0	0	0
	build-ons	15	33	17	8	73
	Tot	15	33	17	8	73

Out of the total 105 messages entered in KF by the teaching team, 73 messages (70%) are written by the tutor. As the table shows, in all the modules the tutor posted more messages, compared to the instructor. Further examinations revealed that all the messages written by the tutor are build-ons. However, the instructor posted seven notes (including four initiating notes) and 25 build-ons. An ELT analysis shows that there is a significant difference between the distribution of the messages written by the instructor and the tutor ($G^2(1) = 81.64$, $p < .01$). Moreover, ASRs analysis reveals that the instructor, compared to the tutor, wrote more notes and fewer build-ons ($|Z| = 8.7 > |Zcrit| = 2.57$; $p < .01$).

In Table 4, frequencies of SCF for each GCF used by the instructor and the tutor are shown.

Table 4. Frequencies of SCF used by the instructor and the tutor

	GCF1		GCF2		GCF3		GCF4		GCF5	Tot
	1A	1B	2A	2B	3A	3B	4A	4B	5O	Tot
Instructor	40	25	0	12	4	0	9	14	25	129
Tutor	86	47	10	22	18	0	8	56	92	339
Tot	126	72	10	34	22	0	17	70	117	468

The analysis reveals no statistically significant differences between the instructor and the tutor in terms of the use of the GCF.

Comparisons between the frequencies of the SCF performed by the instructor and the tutor within each GCF showed significant differences in the GCF2 "Providing information" [$G^2(1) = 7.41$, $p < .01$] and in the GCF4 "Evaluating" ($G^2(1) = 6.93$, $p < .01$). The ASRs (respectively, for GCF2 $|Z| = 2.2 > |Zcrit| = 1.96$, $p < .05$ and for GCF4 $|Z| = 2.8 > |Zcrit| = 2.57$, $p < .01$) revealed that the instructor more frequently used the SCFs "Information from authoritative sources" (2B) and "Comments" (4A), while he less frequently used the "Applicative examples" (2A) and "Metacognitive reflections and Metacommunications" (4B).

Regarding the GCF1 "Exploring", no statistically significant differences were found in using "Questions or problems of investigation" (1A) and "Hypothesis and Ideas" (1B) by the teaching team.

Discussion and Conclusions

As highlighted by Chen and Hong (2016), the role of instructors in the KB model is to nurture a cultural, cognitive and social environment conducive to knowledge creation. In the present study, we extended this role to a teaching team, composed by an instructor and a tutor, and examined how they play this role. In particular, the aim of this study was to examine the impact of the teaching discursive activity on students' online participation and to detect differences between the instructor and the tutor in terms of the quality and quantity of

their messages. First of all, the impact of the teaching team messages seems particularly evident in Module 2, where the highest levels of "Question or problem of inquiry", "Metacognitive reflection and Metacommunication", "Hypothesis and ideas", "Information from authoritative sources", and "Repetition/Quotation of others' idea" were used by the teaching team. On the other hand, "Hypothesis and ideas", "Applicative Examples", and "Metacommunications and Metacognitive Reflections" used by the students increased from Module 1 to Module 2. Indeed, among all the modules, the highest levels of frequencies for the above mentioned SCFs are observed in Module 2. It is also interesting to highlight a decrease in the number of "Information from Authoritative Sources" from Module 1 to Module 2.

These changes in the SCF used by the students can be interpreted, with reference to the KB model (Scardamalia & Bereiter, 2010), as an increase in their epistemic agency, expressed by producing hypotheses and new ideas to solve the problems of inquiry. In addition, the result indicates a growing emphasis on embedded and transformative assessment activity: Students engaged more in metacommunication and metacognitive reflections. They also constructively used authoritative sources, which is reflected in the examples they provided. As the results indicate, students' activities in Module 2 seem less focused on providing information from authoritative sources than in the Module 1. Overall, while students in the first module were more engaged in the "Acquisition of knowledge", in the second module they more engaged in the "Creation of knowledge" (Paavola & Hakkarainen, 2005).

The identified differences between the instructor and the tutor allow us to recognize how each of them plays his/her role in the discursive interaction and how both contribute to creating a genuine knowledge building community. The instructor acted as an activator of the knowledge construction activity through posing questions/problems of inquiry at the beginning of the discussion. This action can be considered as a contribution to changing the culture of the community towards knowledge building: The instructor stimulated students to propose solutions and explanations to solve the posed problems, rather than providing them with the knowledge to be ac-

quired (Hakkarainen, 2003). Subsequently, the instructor provided information from authoritative sources and commented on the ideas proposed by the students. Such interventions can be interpreted as his attempts to prepare the cognitive conditions that aim to improve the quality of the discourse and help the students advance the community knowledge. Moreover, his infrequent interventions show that the instructor aimed to avoid putting himself at the center of the interaction. In this way, he gave more communicative space to the students, aiming to recognize a higher level of socio-cognitive responsibility for students to engage in the knowledge creation process (Scardamalia, 2002). Knowledge Building, indeed, requires students to take high-level of social and cognitive responsibility as well as to engage in knowledge transforming processes that characterize expertise and work in knowledge-creating organizations (Chen & Hong, 2016; Oshima et al., 2006; Scardamalia, 2002; Scardamalia & Bereiter, 2003). We can, therefore, describe the role of the instructor as "knowledge building activator": He was mainly oriented toward initiating knowledge building activities and tried to intervene, whenever required, to ensure the quality of the knowledge created during the process.

Once the discussion started, the tutor frequently intervened during the development of the discussion, posed questions, provided hypotheses, or proposed ideas that were linked to those expressed by the students, aiming to facilitate their discussion. We can interpret such actions as her contribution to promoting knowledge building culture in the community: The tutor attempted to enculturate students to believe that all ideas are improvable, which is one of the KB principles (Scardamalia, 2002). We can then trace her specific contributions changing toward the cognitive dimension of knowledge building activity by providing information through applicable examples, which allows students to connect the concepts with real-life situations. The tutor also engaged in meta-communication and provided metacognitive reflection on students' knowledge building activities, which can be recognized as her attempts to promote awareness in the community about the advancement of knowledge, the connection between different ideas, and the distributed commitments among the members

of the community: These aspects are pertaining to the socio-collective cognitive responsibility (Zhang, Scardamalia, Reeve, & Messina, 2009). Indeed, like the instructor, the tutor aimed to encourage students to assume collective cognitive responsibility. However, she employed a different approach: Compared to the instructor, she more actively engaged in the interactions with students, and promoted awareness about the knowledge building activity.

The results obtained by the study allow us to identify the differences between the instructor and the tutor during discursive interactions and to understand how they collaboratively worked to create an environment that supports knowledge creation. Although the instructor and the tutor employed different approaches, the synergy between their roles in the discursive interaction aimed to provide opportunities for students to take more socio-cognitive responsibility for knowledge creation. As highlighted by Chen and Hong (2016) "in most instructional approaches, the power to define the Zone of Proximal Development (ZPD) is reserved for the instructor or instructional designers, and KB challenges this practice and elects to nurture children toward taking over the control of their own ZPD" (p. 277). From an applicable perspective, this study provides the means to address this challenge, defining these roles in a synergic way, and identifying the CFs, both Global and Specific, that can be used to promote and support the knowledge building activity of the students in an online university course.

The study had some limitations. First, we only examined how the teaching team's messages impact the quantity of students' notes or conversational function. However, it is important to examine the interactions among notes and conversational functions of the teaching team and students. Second, as suggested by Wise et al. (2012), it is important to empirically examine the relationship between the instructor and the tutor's use of conversational functions and the quality of the knowledge created through discussions. Furthermore, focusing on one single course[3] can create problems in terms of generalization.

3. The number of participants in the present study is not a real limit because it is appropriate in a community working with the KB model.

Future studies, then, can extend this study to other online courses in order to be able to generalize the results. Moreover, it would be helpful to employ the conversational functions to examine the "emerging roles" (Strijbos & Weinberger, 2010) that students can assume during an online course, or "scripted roles" attributed explicitly by the instructor to the students (Cacciamani, Cesareni, Perrucci, Balboni, & Khanlari, 2019) in order to understand how the instructor and the tutor interact with them. In this way, conversation functions analysis applied to online interactions can represent a promising opportunity to better understand the knowledge building discourse.

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