

Discovering the Pattern of Interactions in Online Discussions Using the Social Network Analysis Principle

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Abstract

This article is based on the findings of a research project that observed the nature of task and activity management in an online learning environment. Based on social network analysis (SNA) and the community of practice framework, this article reports on the interaction patterns and participation of tutors and students in a discussion through a learning management system (LMS). The analysis is focused on the nature of participation; the pattern of tutor-student and student-student interactions; the existence of assisted performance in online interactions; and the social configuration across different task types. An analysis shows that the pattern of assisted performance by a peer or tutor could depend on one or more of the following factors: the type of task (the nature of the task initiated), group formation (either one whole large group or one small working group) and tutor management (the degree of tutor involvement in responding to students' posting).

Keywords: interaction pattern, SNA, online discussion, community of practice, LMS, Discussion Board

Introduction

The unprecedented growth and the unexpected implementation of online and blended learning in higher learning institutions have been paralleled by an increase in research in the same areas. Richardson et al. (2012) suggest that online and blended learning deserve more serious and more rigorous study to identify the properties of successful learning environments. How does the nature of task and tutor management in the online environment affect learning interactions among participants? Viewing each participant as member of an online community of practice, we use the concept coined by Lave and Wenger (1991) as a framework to address this research question. A community of practice (CoP) is defined as:

[...] a set of relations among persons, activity, and world, over time and in relation with other tangential and overlapping communities of practice. A community of practice is an intrinsic condition for the existence of knowledge, not least because it provides the interpretive support necessary for making sense of its heritage. Thus, participation in the cultural practice in which any knowledge exists is an epistemological principle of learning. The social structure of this practice, its power relations, and its conditions for legitimacy define possibilities for learning (i.e., for legitimate peripheral participation) (Lave and Wenger, 1991: 98).

According to De Laat (2006), knowledge sharing and meaning making are two core observed activities of CoPs. Such ways of looking at how people learn when they engage or participate in a group is powerful, especially when we try to understand the community of online learning environments. In the online community, the social fabric is complicated and teaching and learning behaviours are mixed. A review of the empirical research literature (De Laat et al., 2006) indicated that the traditional teacher-student relationships are challenged or at least renegotiated in online communities. Both teachers and students in an online community carry out teaching and learning activities in order to organise and facilitate peer learning. To study the learning process in an online community, we need to understand how students participate in and regulate the community of practice. Lave and Wenger (1991) state:

rather than learning by replicating the performances of others or by acquiring knowledge transmitted in instruction, we suggest that learning occurs through centripetal participation in the learning curriculum of the ambient community. Because the place of knowledge is within a community of practice, questions of learning must be addressed within the developmental cycles of that community, a recommendation which creates a diagnostic tool for distinguishing among communities of practice (Lave and Wenger, 1991: 100)

The Scope of the Study

However, the “practice” within online participation cannot be understood clearly if we limit ourselves to observing the “learning practice” from the perspective that students are always the learners and that a teacher is always the one who actively teaches. It is difficult to understand and identify who is teaching and who is learning in an online community of practice¹. Such complex assumptions about teaching and learning led us to use the concept of “assisted performance”. “Assisted performance” is a mechanism of mediation in the interaction for “teaching” that provides the practices of how the participants (students and teacher) establish what can be viewed as an online “community of practice”.

There are seven categories of assisted performance developed by Gallimore and Tharp (1990) and adapted by Kirkley, Savery and Grabner-Hagen (1998): *Scaffolding, Feedback on Performance, Cognitive Structuring, Modelling, Contingency Management, Instructing and Questioning*. If teaching is defined as assisted performance (Tharp and Gallimore, 1988), the categories of assisted performance suggest that teaching behaviour can also be seen in students’ contributions (see also De Laat, 2006). For example, assistance in the form of questioning and modelling are serendipitously delivered by anyone participating in a “Forum” or “Discussion Board”. These studies have shown that assisted performance provided by the participants of the online community of practice also indicates how learning may occur through social interactions in the learning management system (LMS).

Studies of Interactions

A number of studies were carried out to investigate interaction in online learning contexts. These studies range from looking at interaction patterns that impact the outcomes (Shen et al. 2008) and dimensions of interaction in learning process (Henri, 1992) to making associations among the interactions between knowledge construction (Allan, 2004; De Laat, 2006), attitude and motivation (Fulk et al., 1987; Lee et al., 2003) and performance (Daradoumis, Xhafa and Marqués, 2003; Davies and Graff, 2005). However, a focus on interactional studies has emerged in recent years (e.g., Xie, Yu and Bradshaw, 2014; Gao, Zhang and Franklin, 2013;

Tirado, Hernando and Aguaded, 2012; Gairín-Sallán, Rodríguez-Gómez and Armengol-Asparó, 2010).

It is not certain that interaction is the most impactful factor of successful online learning. For example, findings from research by Davies and Graff (2005) reveal that greater online interaction did not lead to significantly higher performance for students achieving passing grades. However, students who failed their courses tended to interact less frequently. The findings in this research study are based on a number of interactions produced in students' learning. The conceptualisation of the term "interaction" therefore, to some extent, is powerful and important. A distinction is made between interactions *around* the computer and interactions *through* computers (e.g., networked communications) (Littleton, 1999).

Daradoumis, Xhafa and Marqués (2003) apply "interaction" differently than do Davies and Graff (2005). Instead of identifying the quantity of interactions, Daradoumis, Xhafa and Marqués's research study focuses more on the interaction quality, i.e., by quantifying the number of behavioural events in interactions. The analysis examines how groups function in online learning environments and how that relates to collaborative performance. The authors state that interaction behaviour portrays the way a group (of students) functions as a cohesive collaborative learning team. They add that the individual and group problem-solving capabilities and performance in task accomplishment may be related to interaction behaviour.

From these two examples, interaction can be understood as being as simple as the amount of contact and as complex as a set of behaviours. However, these two approaches do not give us a complete understanding of what occurs in an interaction. What is the proper conceptualisation of interaction if we were to look at the *quality of communication* in learning in online environment? Forman and Cazden¹ (1985) observe three styles of interaction among children working on problem-solving tasks. It is suggested that the capability of more advanced partners to provide support at an appropriate level is an important feature of interactional styles. Based

on such assumptions of interactional styles, participants' interactions in online discussions can be understood as:

1. A parallel form in which there is no exchange: an isolated message that does not receive any response from other participants.
2. An associative form in which a participant tries to exchange information but does not attempt to coordinate roles: a message that contains a participant's concern about the task and content or responds to a particular posting, for example, an answer to a tutor's question.
3. A cooperative form in which participants constantly monitor each other's work and play coordinated roles in carrying out the task: messages that contain a participant's assistance.

When humans interact with each other, they are in a social network. In describing the social network of a learning community, Haythornthwaite suggests:

Learning is a social network relation: it is a transaction, an exchange between people as one person teaches and another learns; it is a shared experience as colleagues explore a new area, define terms, and create common ground; and it is a common experience as students attend classes and lectures together gaining a similar view of the subject and profession. Learning involves the transfer of information from one person to another, but it also involves feedback, questioning, and collaborative inquiry. It involves information, but also includes transfer of academic and professional norms, and teaching and acquisition of skills in writing, using equipment, carrying out procedures, and learning to learn. Learning may stand as the only connector between two people, or it may be combined with friendship, social support, and more general advice. Learning jointly around a common interest can foster a sense of community, with benefits to individuals to their personal well-being, and to the community in advancing joint knowledge, sustaining participation, and promoting continued existence (Haythornthwaite, 2005).

In a social network of an online learning community, what is exchanged, shared, delivered and received among members of a network ties the community as an established social group. Such bonding develops interpersonal ties and common knowledge amongst the community of practice. Haythornthwaite discusses the potential of social network studies to:

provide insight into what kinds of exchanges comprise learning relationships (e.g., learning how to carry out a procedure, use a new technology, operate within a profession), what balance of learning and production takes place (exposure to new ideas versus completing tasks or assignments), and what balance of people and associations within a network make for a good learning combination (e.g., of people with whom we are strongly and/or weakly tied) (Haythornthwaite, 2005: 1)

Scott (1991) claims that the established “sociogram” innovated by Moreno (1934) was a way of representing the formal properties of social configurations. The “sociogram” could be represented in diagrams analogous to those of spatial geometry, with individuals represented by “points” and their social relationships to one another represented by “lines”. He added that this idea has systematised the metaphor of “webs” of connection, the “social fabric” and “networks” of relations (Scott, 1991: 10). For Moreno, Scott writes, “social configurations had definite and discernible structures, and the mapping of these structures into a sociogram allowed a researcher to visualise the channels through which, for example, information could flow from one person to another and through which one individual could influence another” (Scott, 1991: 10). He adds, “Moreno argued that the construction of sociograms allowed researchers to identify leaders and isolated individuals, to uncover asymmetry and reciprocity, and to map chains of connection” (Scott, 1991: 10). De Laat (2006) employs a multi-method approach to study online social interactions in order to triangulate and contextualise both quantitative and qualitative data on teaching and learning activities. In these studies, social network analysis is used to understand the network ties amongst the community participants (who is talking to whom?), followed by a content analysis of the online discussion to explore participant contributions to both teaching and learning (what they are

talking about?) and a contextual analysis to explore participant experiences and strategies (why are they talking as they do?).

In e-learning, the underpinnings of social networks can be demonstrated with these three elements: *actors*, *relations* and *ties*. The *actors*, such as people, computers, websites, concepts, or institutions who/which interact, exchange and maintain relationships with each other and with the group that includes peers, tutors and administrators of the online systems, among others, are the nodes in the networks. The *relations* are the connectors between nodes, which are specific types of exchanges that form connections between *actors*. A *relation* can be instrumental or socio-emotional, where the action of a *relation* may include teaching and learning, social support, instrumental exchanges, collaboration and so on. In this study, the assisted performance can be found in the *actors'* exchanges. While the *ties* are the connections found in *relations*, a pair of *actors* is considered to maintain a social network *tie*.

Considering discussion board forums as an example of a network, lines correspond to exchange written messages (Rabbany et al., 2014). In a university course that implements the adjunct online mode, the tutor and the students are the *actors* in the social network. They share understanding and experience in order to carry out the task and subject areas. In the process of obtaining and maintaining “intersubjectivity”, the *actors* exchange or make transactions of information: one delivers, and others receive and decide whether to respond. (In this study, “intersubjectivity” refers to students’ behaviour in achieving common ground in their understanding of the subject matter, how to satisfy the task and so on). The ideal of “learning networks (is that they) provide the opportunity for a rich interchange of information and ideas in which all students can participate actively, learning from one another as well as from the teacher” (Harasim et al., 1999: 173). This quotation indicates that learning normally occurs in learning networks when:

1. There is an interaction with exchanges of information.
2. These exchanges take place between a student and a student or between a tutor and a student.
3. The opportunity for each participant is equal, meaning that there is no hierarchal status of role; the teacher and students learn from the contributions made by the group.

4. The quality of learning more or less depends on the quantity (active participation) and quality (rich interchange of information) of exchanges.

In such activities, there will be conditions or situations where assistance is needed in both implicit and explicit ways. An implicit way might be when there is a conflict in maintaining intersubjectivity, and an explicit way might be when an actor asks for or seeks assistance. Implicitly, at the very beginning of exchanges, any posting can be viewed as a form of assistance to someone else. Explicit and implicit assisted performance is a continuing process until the *actor* perceives that s/he obtained intersubjectivity. As different *actors* have different paces of achieving intersubjectivity, actions of assisted performance are seen in almost all exchanges throughout the course. The *relations* of assisted performance through discussion drive the *actors* to maintain the *ties* amongst them. Without assisted performance, there will be no meaningful observable exchanges in a discussion.

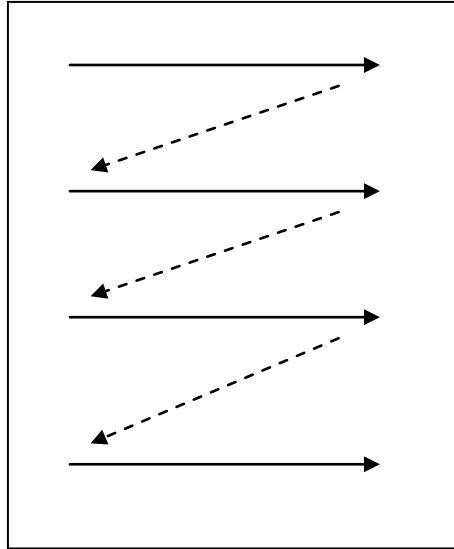
Methodology

This study involved the investigation of interactions to obtain a holistic overview of a community of practice in the online learning environment. Particularly, the tutor-student and student-student interactions when providing assisted performance in the social network of the learning community are observed. The assisted performance interaction in the social network is observed and mapped to understand the assisted provision patterns of each course. This mapping could tell us the possible pattern of peer- and tutor-assisted performance in online discussions through the observation of their interactions and the capacity for assistance in the interactions. They are distinguished in terms of task “openness”, tutor management and group formations (working in one large group or in a small group). An explanation of how to read the interaction pattern is given as follows.

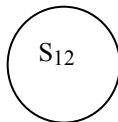
Interactions Map

Before performing the analysis of interaction patterns, we provide guidelines for reading the interaction patterns maps:

1. All the messages posted in each unit are listed and labelled according to the sequence of their postings in the thread to which they belong.
2. The threads are sequenced chronologically. The sequence of the threads in the templates are shown as follows:

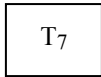


3. Messages are categorised as either:
 - postings – a message to the board with no particular addressee
 - response – a message which responds in the same thread, to a posting which may or may not be addressed to the original poster or the user group.
4. Each student(s) message is shown in a circle(s):



Where S indicates student and 12 indicates the student's identification number.

Each tutor posting is shown in a square:

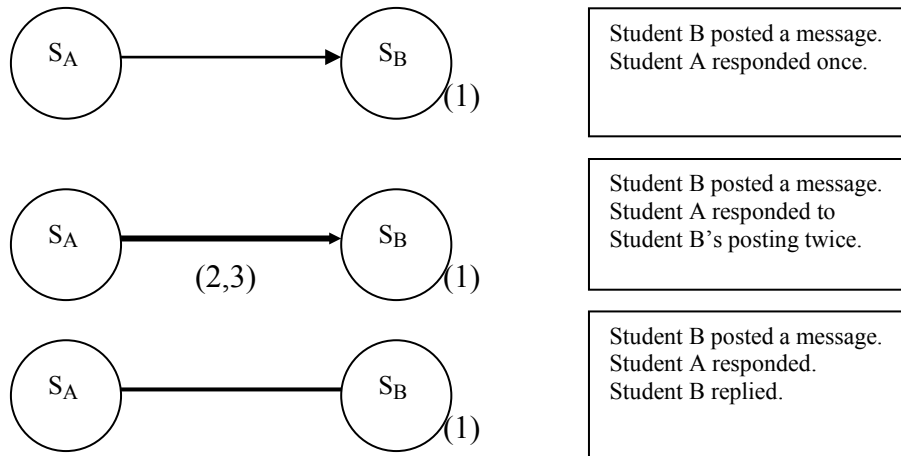


Where T indicates tutor and 7 indicates the tutor’s identification number.

5. Messages containing assistance are shaded thus:



6. A line denotes message activity. The thickness of the line denotes the number of exchanges. If the number of exchanges is equal, a plain line is used. However, if the number of exchanges unequal, an arrow is used. The direction of the arrow is from the person sending the larger number of messages. Labels show the sequence of the responses. The smallest number is the first message in the thread located to the nearest participant.



For the purposes of this article, the investigations are focused on a total of 30 participants, consisting of 19 students and 11 tutors in a Master’s degree programme. The programme runs for one year for full-time students and up to five years for part-time students. It consists of eight taught units and a dissertation. Seven out of eight units are chosen for this

study. The focus is on participants who used the Blackboard Online Learning System in the context of a Master's in education programme at a university in England. Here, the LMS was used in an adjunct mode as a communication tool, extending face-to-face (or classroom) discussion. The number of messages collected is 526.

Findings

Unit 1-1

Unit 1-1 is an example of a unit in which the task is in the open mode and most of the assistance comes from the tutor rather than the students themselves. As shown in the interaction map in Figure 2, it is clear that most of the students' postings were followed by the tutor's responses rather than by peer responses.

Unit 1-1 was the first unit in which the students and tutor had a discussion on *Blackboard*. For this unit, the interaction maps show active involvement from the tutor in giving support and assistance. Most of the threads were the tutor's responses: either in one-to-one interactions (in the public domain) or responses to the discussion threads. The tutor opened up the forum for the students to discuss the lesson they had and to discuss the assignment. One thread in the Discussion Board was started by a student posting, after which the tutor began inviting the students to post their thoughts about the face-to-face session on the Discussion Board.

One student (S19) started by asking a question that s/he struggled to understand in the face-to-face session. Over the course of two days, the student posted five messages. The tutor gave a response to each message. Another student participated by giving some ideas, and these ideas were supported by the tutor's responses (message number 6). The tutor responded to all five messages in one day (four from the first student and one from the other student who responded to the first student). The tutor responded to all messages posted by the students within a short period of time. Most of the time, the tutor responded individually (see the interaction pattern, which shows one-to-one tutoring). Some students posted messages with an attachment of their ideas, and the tutor discussed the matter in public so that other students could benefit from it. At the beginning, the messages concerned the clarification of the concept in the

lesson they had in class. The discussion then changed, as evidenced by message number 31 where, after one-fourth of the conversation, the tutor began to narrow down the task from a general discussion to a more specific task, i.e., by asking the students to post their drafted proposals, stating that the aim was for the students to interact around those proposals.

Current Forum:

Author: T12

Subject: Assignment for UNIT1-1

I have just put up the assignment. Could you all post in your draft proposal for a learning situation before Monday 28th October (in this discussion board). My aim is that we all interact around these proposals but I will also be giving you feedback on what you propose.

T12

Most of the messages from students then asked for ideas and comments on their assignments. Again, most of the time, the tutor responded to individual postings. The tutor's active responses to individual postings might have hindered students from commenting on each other's work. The tutor may have subsequently realised the situation and asked the students to respond to peer posting to create more than "a 2-way conversation", which means more than a tutor-student interaction (as evidenced in message number 65).

Current Forum:

Author: T12

Subject: Re: Reading of the Crook Article

This week as well as adding new messages about collaboration could you try to pick up on what one of the other course members says about collaboration so that we can try to use this discussion board for more than a 2-way conversation. Then perhaps you could put a title to your message which orientates the reader to your message (e.g. "following on from S8's point about the importance of a shared history"). For the time being we need to stay in this discussion area because although I started a new discussion board I haven't yet managed to put it into the Unit 1 course.

The students then began to respond to each other's postings (as evidenced in message numbers 66 and 90). These instances are evidence that even when the tutor narrowed the task (from open to closed) to promote student-student interaction, the students stopped interacting with each other, as the tutor frequently responded to individual students' postings. However, if the tutor "fixed" the situation by emphasising interaction between them, students then started to interact with each other. This above-described situation is evidence that suggests if there is too much involvement by the tutor, there will be less student-to-student interaction.

Social network in Unit 1-1

The *directions* of the *relation* in this unit were mostly from the tutor responding to the students, and most of the assistance found in this unit was from the tutor. In the early stage of the forum, the assistance given by the tutor was meant to respond to each particular message posted by the students (one-to-one assistance). However, there was also assistance given by peers, but it involved no more than a single peer response. Until the tutor initiated a new thread to all students, some of the students replied to the tutor, and the tutor responded back. However, none of those respective interactions was then followed by other students' involvement.

Again, for this next part of the forum (message numbers 31–51), most of the assistance was from the tutor, and the tutor responded to each student's posting. Peer-to-peer assistance can be seen only in the threads with message numbers 61–63 and message numbers 69–73. As the tutor again gave assistance after every posting, and the students stopped giving assistance to their peers until message number 90. These patterns continued until the end of the task. The active involvement of the tutor, however, might have been particularly important for the tutor and the unit, as it was the first unit that used online discussions for the course. Such actions by the tutor consequently developed a very strong *strength* in the tutor-student interaction *ties*. Although the students often had the *starter* role in most of the threads, the tutor remained the *central* source of assistance.

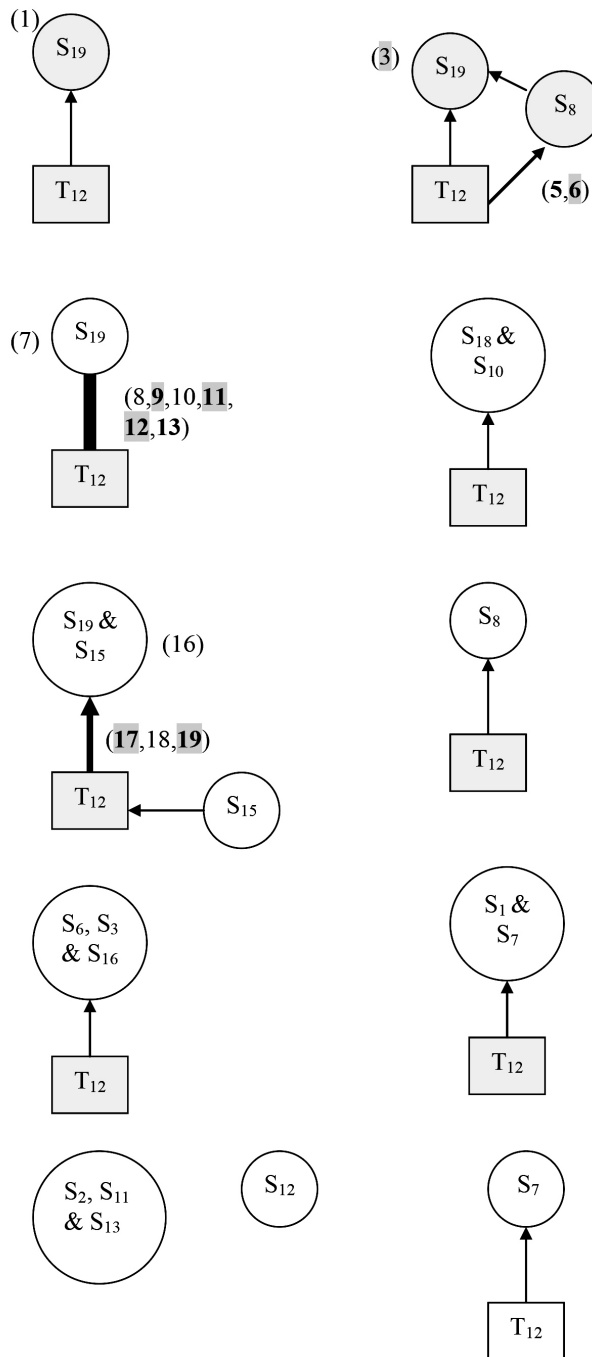


Figure 1: Unit 1-1 Interaction Map (continue on next page)

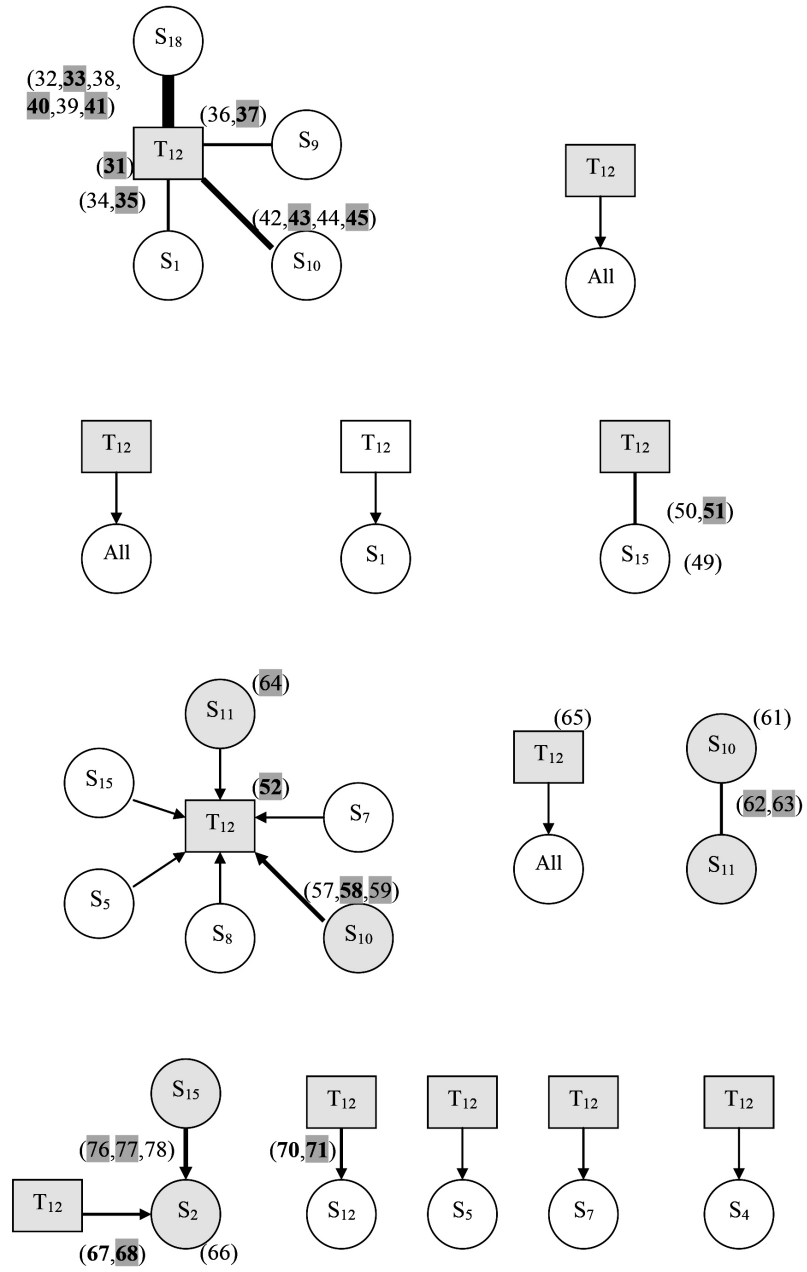


Figure 1: (continue on next page)

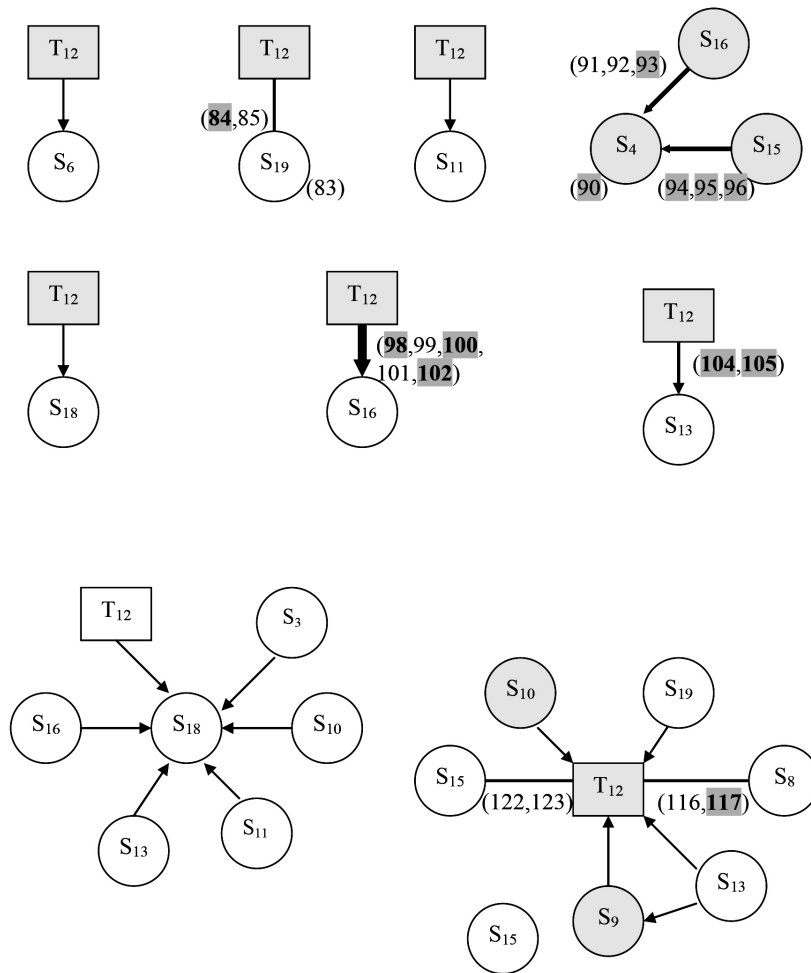


Figure 1: (continued)

Unit 7-1

This unit is an example of a unit that was in a closed task but that contained active tutor-student assistance interaction. As it contained group work, student-student assistance interactions existed only within the group. The pattern in Figure 2 shows that students were working in groups and that the tutor actively responded to individual students, thereby limiting the opportunity for peer interactions.

Unit 7-1 started the face-to-face session at the same time as Unit 1-1. However, the discussion through *Blackboard* started a week later. Unit 7-1 contained two group tasks (a and b) in which there were five pairs of students working together in the second (b) task (groups 3b-1 to 3b-5). The tutor initiated a closed task at the start of this unit by stating that individual groups needed to attach their group work assignments and post them on the Discussion Board for discussion by the other course members. The tutor also raised a closed list of questions related to the task. A group of students started the thread by posting a few files, and the tutor responded by giving comments on that attached file and posting it back on the Discussion Board. This process happened with most of the remaining groups, and the tutor responded in the same way (gave comments on an attached file and posted it back). Then, the tutor summarised all the ideas in one message and mentioned each individual's contributions. The other assignments were conducted in the same way, where pairs of students worked with each other and posted their work on attached files. As a result, there were no responses from students in the other groups. In other words, they did not comment on other people's or groups' work except their own. The Discussion Board was heavily used by the students and the tutors to send files that contained individual and group work; the tutor responded to the students' postings and discussed assignments and group instructions.

Social network in Unit 7-1

This unit was managed by five tutors and had almost the full involvement of students (12 students). This circumstance might be the reason why this unit scored the highest number of messages compared to other units (132 overall; 103 from the students and 29 from the tutors). However, tutors had the *central* role of giving assistance, giving 117 assistance messages, whereas the students overall gave 33 assistance messages. All the tutors' postings contained assistance. Peer assistance was mostly with regards to group work. This result may be due to the nature of the task: the unit contained group tasks, and there were five groups of students working in pairs. Each individual group needed to attach its group work assignment and post it on the Discussion Board for discussion by other class members. A tutor also posted a list of questions related to the task. Students invited comments on their work. There were also a large number of isolated postings. However, tutors were actively involved in giving support, some

by summarising the collection of contributions and some by responding individually, and to some extent, some responded in the file attachments and posted them back to the senders. In most of the cases, students were the *starters*, as most of the tasks were to work in groups. The strength of the *relations* was varied, as the evidence shows the range from isolated postings to threads with minimal exchanges as small as two to the maximum of six. There was a mix of directions of *ties* for interaction and assistance, as there were student-student and tutor-students interaction and assistance. However, student-student assistance was found only in the group work.

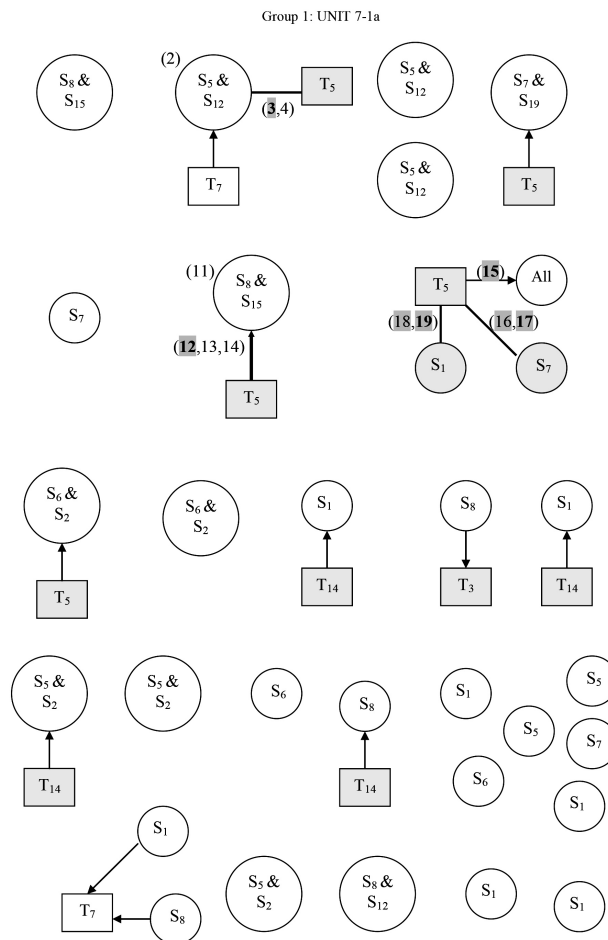
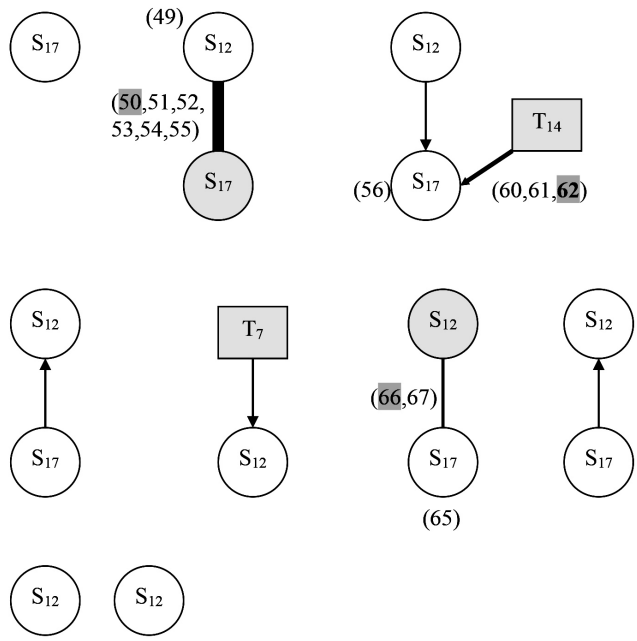


Figure 2: UNIT 7-1 Interaction Map (continue on next page)

Group 2: UNIT 7-1b - 1



Group 3: UNIT 7-1b - 2

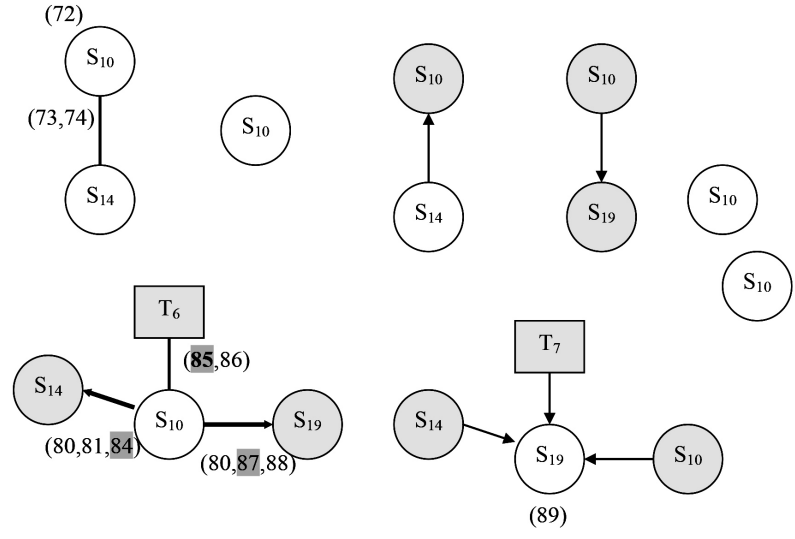
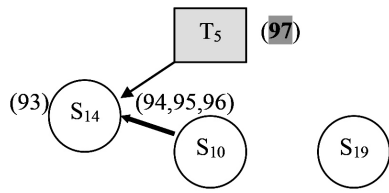
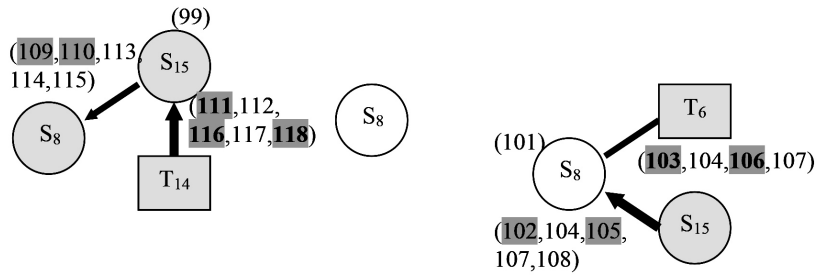


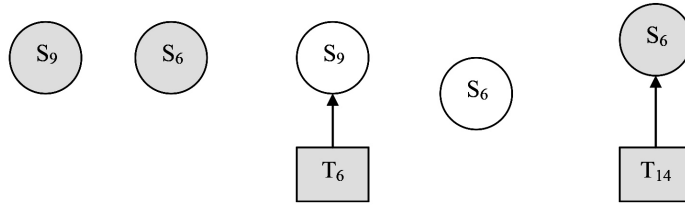
Figure 2: (continue on next page)



Group 4: UNIT 7-1b-3



Group 5: UNIT 7-1b-4



Group 6: UNIT 7-1b-5

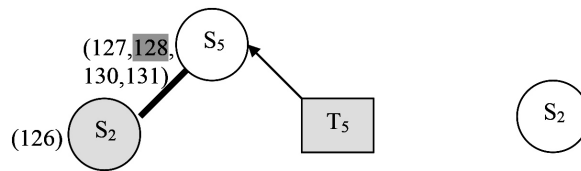


Figure 2: (continued)

Discussion and Analysis

The first case (Unit 1-1) is an example of the possible relationship between the tutor's involvement and student-student assistance and interaction: the active responses of tutors with low levels of student-student assistance and interaction.

Continually offering assistance is not a requirement for good performance. Performances that are fully developed – automatized – will be disrupted by “assistance” that becomes interferences [...] Good teaching involves restraint in collaboration and assistance. Making judgements about when assistance is appropriate, and when restraint is wise, requires careful assessment that can come about only through the processes of intersubjectivity (Tharp and Gallimore, 1988: 88)

The condition of more tutor actions and fewer student actions in providing assistance and reactions to others' postings reflects the traditional teaching and learning environment (Tharp and Gallimore, 1988). However, because in this particular period, the students and tutor adapted themselves to the online environment, this traditional role may be regarded as normal. Although the students and the tutor were on an inter-psychological plane, where they were committed to interacting with and learning from each other, the tutor was still seen by the students as the “most” capable person in providing assistance. Furthermore, as the tutor answered requests for help, this action precluded responses from students because the tutor did not, for example, refer the question back to the group or ask for responses from the students. Even though there is some evidence that the tutor tried to change her role at the end of second week of the unit, adopting a less hierarchical approach in order to promote more student-student interaction and assistance, the tutor maintained her active involvement in responding and giving assistance. This factor may have hindered the students' ability or willingness to shift their role. The posting of the tutor's responses in the middle of the students' activities may suggest that the immediacy of the tutor's action hindered student-student interactions. De Laat (2006) warns about the effects of this responsiveness and the possible performance “...on the role of the teacher, not to interface with the activities of the learner immediately” (De Laat, 2006: 118).

There was also evidence that when the tutor fixed the situation by emphasising the need to encourage more student-student interaction, the students then realised that rather than seeking and waiting for a response or assistance, they needed to provide responses to each other. This finding shows that a tutor not only needs to react positively to the students' activities but also needs to be consciously aware of the students' behaviour and manage it accordingly. The tutor in this particular instance showed a good example of e-learning management in the aspect of providing assistance, as she learned by experience and reacted accordingly.

In terms of the social network built by the tutor, she initiated a very strong *relation* in the task discussion, but the *direction* was imbalanced; i.e., there were more tutor-student interactions than student-student interactions. The students expected the tutor's responses and assistance, and the tutor did what was expected of her. Consequently, the tutor developed a very strong *strength of ties* in the tutor-student interactions but failed to facilitate stronger *ties* in the student-student interaction. Although the students maintained the *starter* role in most of the threads, the tutor remained the *central* source of assistance.

As the tutor created open-mode tasks, the possibilities of students' action were varied. Such varieties of actions from students led to the need for the tutor to respond actively and accurately. As the tutor failed to maintain student-to-student assistance, she had to carry out this role throughout the course. This situation means that the open-mode task seeks strategies of management in which the tutor needs to be active in promoting student-student interaction and assistance or else s/he will need to address the situation by actively giving responses to the students.

The second case (Unit 7-1) is an example of a case in which the strategy and management of a closed task are crucial in promoting students' interaction and assistance. Unit 7-1 is an example of a unit that contained closed mode tasks and entailed group work. It contained the most tutor-student and student-student interactions and assistance compared to others, as this unit was managed by more than one tutor. The participants did not have to collaborate to complete the task, as they simply had to submit answers. In addition, the tutor did not encourage the students to challenge each other's ideas, thereby (indirectly) discouraging discussion in the forum. If the task involves less tutor participation, the aim and process of

the group work should be made quite clear to everyone. Such a strategy will be more likely to generate more participation. This unit also shows that the influence of collaborative work might be beneficial in a closed task situation if this work is managed and supported by more than one staff member. Experience shows that working in groups will not work if there is nothing to work on collaboratively. Posting questions in a closed way usually leads students to post the answers individually, even when they are asked to work in groups.

In terms of assistance in closed tasks with students working in groups, there is an issue of concern here. Although the student who posted at the beginning showed an example of “modelling” by posting the answer, this type of assistance is only useful for one reason: giving the answer. The flaw is that it does not promote or open up opportunities for discussion. This situation suggests that not every type of assistance is suitable for helping to develop students’ potential development that and the timing of certain types of assistance may be crucial. In this instance, “modelling” used at the beginning of the closed task may have led to imitation. Imitation will be beneficial if the one who started the posting provided good “modelling”. It is not as beneficial if the ‘modelling’ or any other type of assistance from peers was inappropriately monitored or managed by the tutor.

Conclusion

Using social network analysis and the concept of a “community of practice”, we discussed the patterns of interaction and participation of tutor and student discussions through LMS. With the help of social network analysis and interaction maps, this article reported on the patterns of interaction and the participation of all units involved. The descriptions addressed the nature of participation; tutor-student and student-student interactions; the nature of assisted performance; and the social network in the particular tasks. The article offered an analysis of interaction patterns between a tutor and a student and between a student and a student with tasks of a different nature. The analysis informed us that the pattern of assisted performance by a peer or tutor may depend on one or more of the following factors: the type of task (the nature of task initiated), group formation (either one whole large group or a small working group) and tutor management (the degree of tutor involvement in responding to

students' posts). The two cases highlighted show some crucial examples of practices of the online community as a community of practice:

1. Active responses of a tutor, which lead to less student-student assistance and interaction
2. Clear instruction by the tutor in a closed task, which leads to high student participation but not necessarily to student-to-student interactions
3. Disposition of students
4. Clash of learning perspectives, which contributes to passivity in students
5. Strategy and management in open and closed tasks, which affect students' interaction and assistance

Notes

1. "Learning" in this context of study refers to a socio-cultural dialogic activity (see Bonk and Cunningham, 1998: 26).
2. Forman and Cazden's profound idea of interactional style is largely seen in studies of interaction behaviour in face-to-face contact and is also used in virtual contact.

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