Social Position in a Knowledge Building Community

in an on-line pre-service teacher's University course

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Abstract

This study investigates the involvement of a group of pre-service teachers in an on line course, with a Knowledge Building Community approach, in terms of production (writing) and appropriation (reading) of ideas and the corresponding social position in the group. Results show that people tend to maintain the same level of activity both in the production of ideas and in the appropriation of ideas during all the on-line course, but the two activities are not correlated. On the contrary people tend to maintain also their social position in the on line activity both in production and appropriation of ideas' interaction and the two dimensions are correlated.

Introduction

The need of providing information technology (IT) for pre-service teachers has been well documented (Wong, Habibah, Ahmad, Kamariah, Tang, 2003). Since the 1990s some researchers (Byrum and Cashman, 1993) have found out that pre-service teachers perceived their level of preparedness or competence for using productivity tools in the classroom as being fairly high. They reported that the students showed the greatest level of comfort with word processing at 89%, followed by databases at 71%, spreadsheet at 67% and Internet at 56%. Wild (1995) conducted an assessment of the IT use by pre-service teachers while performing professional practice following the completion of a pre-service IT course. Wild reported that 83% of pre-service teachers did not make any use of IT in their teaching when practising and 91% did not make use of IT for their personal work. Of those students that made some use of IT for teaching, the most commonly used applications were games (17%), word processing (15%), adventures (13%) and simulations (11%).

Such problems related to lack of IT use in education still continues today on a large scale. For example, the U.S. Secretary of Education, Richard Riley asserted that only 20% of the teachers in the United States feels prepared to use new technologies (Riley, 2000). Roblyer and Edwards (2000) found out that many pre-service teachers are still entering universities with little knoweldge of computers and inappropriate skills as well as lacking in positive attitudes towards technology's use in the classroom.

Gunter (2001) stated that many higher education institutions are still failing to prepare pre-service teachers with positive technological experiences. Clearly, some IT courses have failed to provide pre-service teachers with the necessary IT skills, attitudes or knowledge, in particular about the possibility of using the Internet in classroom.

This is a real missed opportunity because the Internet, as well known, provides fast and easy access to

many areas of knowledge; the use of its various information-gathering tools can also develop students' capacity for thinking, analyzing and constructing knowledge (Hsu, 2004). In addition, one of the Internet's powerful functions is the variety of channels which provide for social interaction. Through these channels, students can communicate with peers, teachers, specialists, scientists, and so on.

The socio-constructivist theoretical approach has always defined social interaction as an important characteristic of education, training and learning. On-line learning literature (Anderson, 2003; LaPointe & Gunawardena, 2004; Duffy & Kirkley, 2004) underlines the value of social interaction as well, in particular within the on-line environments. One form of interaction made possible by the third generation of learning technology is the collaboration in a community about different topics of study (Garrison, Cleveland-Innes, Koole, & Kappelman, 2006).

The literature about the use of the Internet in classrooms shows, in fact, many different ideas of community (Thompson & Mac Donald, 2005): Community of Practice (Wenger, 1998) , Virtual Community (Johnson, 2001; Rheingold, 2000); Community of Inquiry (Garrison, Anderson & Archer, 2000; 2001). All these models are focused on learning as the main activity of the Community.

A different kind of community idea is described by the "Knowledge Building Community" model (KBC hereinafter), created by Carl Bereiter and Marlene Scardamalia, identified by 12 principles (Scardamalia, 2002; 2003; Scardamalia e Bereiter, 2003): they indicate a system of conditions implementing, within a group, the collective cognitive responsibility towards a progressive refinement of ideas and the building of increasingly complex theories concerning topics and problems connected to the tasks to be fulfilled. The focus of a KBC is not on learning but on knowledge building, that is, both on the creation and the development of ideas that are useful for the whole community: learning is a by-product of this process. In this sense, we can consider a KBC a Community of practice where the practice is knowledge building, a Community of inquiry, because people activate a research activity on common problems, and a Virtual community if people use on line environment to work

collaboratively. In this context, the knowledge building activity in an on-line collaborative environment, is based on writing and reading activities, enabling the production and the appropriation of ideas among the members of the community. Social interaction in knowledge building activity has a pivotal role as described in the Symmetric Knowledge Advancement Principle (Scardamalia, 2003, p.11): "Expertise is distributed within and between communities. Symmetry in knowledge advancement results from knowledge exchange and from the fact that to give knowledge is to get knowledge". As well known, also Wenger (Lave and Wenger, 1991) describes the evolution of the knowledge exchange in a community with reference to the social interaction, in terms of *legitimate peripheral participation*: people who at the beginning of the community activity are at the edges, due to their lower level of expertise, eventually tend to move towards the center of the community interactions.

With reference to the KBC model and Wenger's ideas on participation, it seems important to understand the complex relationships between knowledge building activity and social interaction in an on line environment. In other words, we can study what happens in terms of people involvement in the knowledge building activity and in terms of their social position within the community in on line interaction. Merging the Knowledge Building Community Model with the Wenger's social learning theory we can define knowledge building in terms of production and appropriation of ideas in on line activity, and social position in terms of sociometric status (Markell & Asher,1984; Reffieuna, 2003), in the participation within this exchange from the beginning to the end of the community's on line activity.

In this study, then, we are interested in analyzing the involvement of pre-service teachers in a KBC working through an on line collaborative environment. In particular, we are interested in verifying if the participants in such a community tend to maintain or not the same level of activity in the on line production of ideas, based on writing, and in the on line appropriation of ideas, based on

reading, during the on line course, and if these are two interconnected activities. We also wonder if social position in production and appropriation of ideas interactions tend to change during the development of the on line course and if there are some connections between the two kinds of social position.

Method

Participants

15 students of the Faculty of Education at University of Valle d'Aosta participated to the on-line course in Educational Psychology during the Academic Year 2004-2005. All the participants were students-workers aged from 25 to 40 years old. We have to add to the group of students, the teacher and the tutor of the course itself, who took part to the activities.

On-line Environment

The 4.5 version of Knowledge Forum (KF hereinafter) issued in June 2003 was used. It consists of a common database where the users can write notes, that is to say written texts, with either graphs or images (see Figure 1, on the right side of the screen). These are visible to all members of the discussion group and are shown either in light blue (the text has not yet been read) or red (the text has been read) .

Figure 1 A Knowledge Forum view with a note.

The notes can be organized in *views*, that is to say notice-boards devoted to a specific topic of discussion (e.g.: in Figure 1 it's possible to see a 'view'). Every authorized user can connect to the database, read someone else's notes and insert comments / further notes that can be connected to the others through links. In this case the linked notes are called *Build on*. This happens in general if the author thinks that the note he/she is writing is relevant to the text it is connected to, and for this reason it represents a further development of the knowledge on the discussed topic. The author can either *quote* other notes or highlights *key words* in his/her text so that the note is easily located via a *search* tool. To support the discussion there are some pre-defined linguistic structures, called *Thinking Types*, which provide a supportive scaffold of new, common categories designed to stimulate constructive discussion.

On-line Course

The Educational Psychology on-line course was organized implementing the KBC model. It was articulated in nine weeks and divided into four modules, corresponding to the same number of parts of the program. At the beginning of the on line course a meeting was foreseen, a preliminary and important point in order to get familiar to the reference theoretical model and with the on-line environment used as part of these meetings, a *modeling* session was presented, using a self-presentation activity, to enable the tutor to demonstrate the degree of interaction which was possible in the KF.

At the start of each module the interaction began with a face-to-face meeting. The aim of the meeting was to introduce the topic for discussion, while the teacher was present, and to identify the problems to be investigated. These problems would be discussed through KF over the next 15 days, coinciding with the interval between the two face to face meetings in the seminar.

The conclusion of each module took place through a face-to-face meeting where the elements arising from the on line discussion were synthesized in an oral interaction and possible unsolved questions were discussed with the teacher. In the last on-line discussion and in the last face-to-face meeting, the participants, through guided questions, faced one another in the evaluation of the produced knowledge and in the work strategies undertaken during the course.

Observed variables

There are four observed variables that are relevant for this study:

a) *on line production of ideas,* measured by the number of the notes produced in KF by each person;

b*) on line appropriation of ideas:* measured by the number of the notes read by each person;

c) *social position in the on line production of ideas:* measured through the socio-metric status of each person in the group production of ideas. The socio-metric status is a concept derived by the Social Network Analysis; in this case it is calculated through the sum of the build-on produced and received by each participant concerning the number of all the other participants in the group. It is identified

using the following formula:

$$\text{Status (i)} = \sum_{j-1}^{g} (Xji + Xij) \times 1/g\text{-}1$$

where “i” is the index of each participant , “g” is the number of the participants in the group, “Xji” is the number of the build-on produced by the participant “j” towards the participant ”i” and “Xij” is the number of the build-on produced by the participant “i” towards the participant ”j”.

d) social position in the on line appropriation of ideas: measured through the socio-metric status of each person in the group appropriation of ideas, measured in the same way explained in the previous point, with regard to the notes read instead of build-ons.

Data analysis

For quantitative-like data we used a software called Analytic Toolkit (ATK), supplied to KF users. ATK allows to track the interactions among the students and the on-line environment, and can provide the matrixes needed to carry out network analyses on the interactions and data on the usage patterns of various of the network-related features provided by KF. The elaborations to obtain the socio-metric status were managed using the AGNA software (freely available at http://www.geocities.com/imbenta/agna), providing support both for Social Network Analysis statistics and visual representations of the networks.

We used Pearson Product Moment Correlation to study the relationship between on line production and appropriation of ideas, and also to analyze the change in social position with regard to on line production and appropriation of ideas.

Results

The results presented in Table 1 show that people tend to maintain the same level of activity in the on

line production of ideas (writing): all the correlations between the number of written notes by each person in different modules of the on line course are statistically significant.

Table 1 around here

We can see a similar situation in Table 2, concerning the on line appropriation of ideas: the number of notes read by each person have a significant correlation among the different modules of the on line course. Then also the on line appropriation of ideas tend to be, for each person, stable: in means that there are some people with an high level and other people with a low level of this activity during all the on line course.

Table 2 around here

Furthermore, both on line production and appropriation of ideas' activities are not interconnected neither globally (correlation: r= 0,20, p>.05) nor considering the correlation in each single module (correlations 1st module: r=0,14, p>.05; 2nd module: r =0,13, p>.05; 3rd module: r =0,18, p>.05; 4th module: r =0,39. p>.05).

We can look now at the results concerning the social position. As showed in Table 3, people tend to maintain their social position in the web-forum activity in on line production: also in this case, in fact, the correlations between the socio-metric status in different modules (except for the 3rd Module) are statistically significant.

Table 3 around here

Also the on line appropriation of ideas' social position tend to be stable. As it is possible to see in Table 4 (except between Module 2 and Module 3) the correlations between socio-metric status are statistically significant.

Tab 4 around here

In addition, the social position in production and the appropriation of ideas are interconnected both

globally (correlations: r= 0,87, p<.01) and for each module (correlations 1st module: r = 0,76, p<.01; 2nd module: r =0,74, p<.01; 3rd module: r =0,75, p<.01; 4th module: r =0,84. p<.01).

Discussion

The goal of this study was to verify if people tend to maintain or not the same level of activity in the on line production of ideas, based on writing, and in the on line appropriation of ideas, based on reading, during an on line course, and also if these are two interconnected activities. We also wondered if social position in on line production and appropriation ideas interactions tend to change during the development of the on line course and if there are some connections between the two kinds of social position.

The results of this study show that the on line production of ideas, based on writings messages in the on-line environment and the on line appropriation of ideas, based on reading messages, seems to be stable during the time of the community activity. Furthermore the two activities are not interconnected. These aspects are very interesting for teachers using an on-line environment with a community approach in classroom, because underline two important aspects. First of all we can expect different level of activity by the participants, either in production or appropriation of ideas using an on line environment: it seems important to understand what kind of conditions can favour the involvement in writing and reading activities. In this sense an important role could be played by the diffusion in classroom of a collaborative culture: the more positive is a student's perspective on a collaborative approach on learning, for instance, the more a student tend to participate in an on line forum (Hsu, 2004). Then we can hypothesize that a high activity of on line appropriation of ideas is not necessary in order to carry out a high activity in production of ideas and viceversa. The preference either in reading or writing in on-line environment could correspond to an interactive learning style of current on-line environments with connection to people's personal cognitive features (Liang and

McQueen,1999).

Also with regard to the social position the situations seem quite stable during the whole period of the community's activity. We have also seen a correlation between on line production and appropriation of ideas in social position: It means that a person who is highly involved in social interactions concerning writing is also highly involved in social interactions concerning reading. In order to give an interpretation of the results, we can hypothesize that a person who is highly active in on line production of ideas, probably tends to stimulate more reading activity from the others members of the group. In this case people answering to his or her messages, also stimulate him or her to read more. This "virtuos circle" can explain why the social positions in reading and writing are interconnected and why writing and reading activities are not: only if a person receives many answers to his or her messages (high social position in writing), tends to read more messages, with, as consequence, a high level of social position in the reading activity. With regard to these results it is important to consider that some studies (Dawson, 2006; Beaudoin, 2002) demostrate the existence of a significant relationship between a student's frequency of communication and the levels of students' satisfaction: Students interacting more with their peers and the teaching staff show more satisfaction with their course of study. Then, it is important to undertstand, for future teachers working with this kind of technology and approach, why some students within the community tend to remain isolated and other members tend to be at the center of the interactions. In this sense, since on line interactions can be tracked, it is possible to examine group processes from a social learning perspective, using the techniques as Social Network Analysis, and to apply these analyses to the class (Philip, 2006). In the perspective of the *legitimate peripheral participation* (Lave and Wenger, 1991) we can expect a change in the social position, but at least in this case, this change in the on-line interaction could not be so easy. Then, it is important to understand, as a future direction of research, which kind of cognitive and social processes, and which kind of structure of the activities in an on line environment

can introduce a passage of people from the edge to the center of a community interactions.

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Table 1

On line production of ideas: correlation between the number of written notes in the different modules of the on line course

Formattato: Tipo di carattere: Non Grassetto

Eliminato:

	Module1	Module2	Module 3	Module 4	Total Modules
Module 1	1				
Module 2	0,74**	1			
Module 3	0,74**	0,52*	1		
Module 4	0,83**	0,68**	0,70**	1	
Total Modules	0,95**	0,79**	0,86**	0,90**	1

** p< 0,01 (2-tailed).
* p< 0,05 (2-tailed).

Table 2

On line appropriation of ideas: correlations between notes read by each person in the different modules of the on line course

	Module 1	Module 2	Module 3	Module 4	Total Modules
Modules 1	1				
Module 2	0,59*	1			
Module 3	0,64**	0,47°	1		
Module 4	0,73**	0,52*	0,57*	1	
Total Modules	0,91**	0,76**	0,79**	0,84**	1

**p< 0,01 (2-tailed).
*p< 0,05 (2-tailed).
° p=.05 (2-tailed)

Table 3

Social position in on line production of ideas' interactions: correlations between socio-metric status in different modules

	Module 1	Module 2	Module 3	Module 4	Total Modules
M1	1				
M2	0,59*	1			
M3	0,30	0,15	1		
M4	0,80**	0,60**	0,43	1	
Total Modules	0,93**	0,72**	0,49*	0,90**	1

** p< 0,01 (2-tailed).
* p< 0,05 (2-tailed).

Table 4

Social position in on line appropriation of ideas' interactions: correlations between socio-metric status in different modules

	Module 1	Module 2	Module 3	Module 4	Total Modules
Module 1	1				
Module 2	0,51*	1			
Module 3	0,87**	0,43	1		
Module 4	0,90**	0,57*	0,85**	1	
Total Modules	0,95**	0,67**	0,91**	0,94**	1

**p< 0,01 (2-tailed).
*p< 0,05 (2-tailed).