Effective Discussions, Social Talks and Learning: A Paradox on Learning in Discussion Forums

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Abstract. It is generally accepted that social talks have nothing to do with on-task discussion, or even that they are to be discouraged in the interests of effective learning. However, from a community-building perspective, social interaction is key to the sustainability of a learning community. An apparent paradox seems to exist in that, while social interaction is critical for community cohesion, social postings do not contribute to effective discussion. The authors argue that previous research using postings as the unit of analysis has failed to discover the context in which effective learning took place. Using threads as the unit of analysis, this study is able to explore empirically the relationship between effective discussion and social talks in CSCL environment. Based on an analysis of 321 longer threads (consisting of 10490 postings) in which the structure of the threads, the components of the threads, and the order of different categories of postings in some of these threads were defined, this study reveals that genuine effective discussions and social talks cannot be viewed in isolation nor does there exist a wall between them. The roles of social talks in CSCL are rediscovered and discussed.

Keywords: social talks, "off-task" interaction, effective discussions, thread

INTRODUCTION

CSCL is normally aimed at providing new opportunities for designing and implementing advanced learning, such as deep learning, sustained and critical discourse, and effective discussions (e.g., Guzdial & Turns, 2000). Current insights into the CSCL-environment also suggest that social interaction is important for a community that supports learning (e.g., Kreijns, Kirschner, & Jochems, 2002). It seems that both effective discussions and social interaction are the focus of learning in a virtual community. However, despite their respective importance in learning, there is little research on the relationship between effective discussion and social interaction.

A body of research does articulate the negative effects of social talks on effective discussion. Researchers have claimed that social talks fall into another category of activity, one which prevents students from learning effectively. For example, Hara and colleagues (Hara, Bonk, & Angeli, 2002) examining the relationship between cognitive processes and social cues in a study conducted on a graduate level course, reported that social cues appeared separately from content discussions and that the number of social cues decreased as the semester progressed. During later weeks, students engaged in intense online discussion and were highly focused on the task. They described social cues as taking a back seat to student judgment, inference, and clarification. Walther (1996) also argues that the more effective CMC is, the less socio-emotional communication is present. Similarly, some research done by exploring the percentage of on-topic and off-topic discussion concluded that the ratio of the two determined the effectiveness of learning. Lipponen and colleagues (Lipponen, Rahikainen, Lallimo, & Hakkarainen, 2001) conducted an online science discussion with elementary students and reported the proportion of on-topic notes to be 63% with off-topic notes totaling 37%. They were disappointed in this ratio, having expected the discourse to be more oriented to the subject matter and practices of inquiry than it turned out to be. They sought a higher on-to-off topic ratio assuming that the more the discussions were oriented towards learning topics, the more students would learn. Furthermore, Badri, Grasso, & Leng (2003) developed a "filter" to distinguish relevant contributions from irrelevant contributions and to help instructors to identify students who constantly disrupted conversations with off-topic contributions. These studies all seem to regard effective discussion and social talks as existing in conflict with each other, the one, constructive, and the other, distracting.

There is also a body of research revealing the positive effects of social talks on effective discussion. Steinkuehler and colleagues (Steinkuehler, Derry, Levin, & Kim, 2000) were the few researchers to make an effort to code the "seemingly effortless social interaction" into categories. Based on their data, "off-task"

discourse was placed into four coding categories: housekeeping statements, social talk, tangent topics, and "null" statements. They found that the majority of off–topic content appeared to consist of social talk. Both housekeeping statements and social interaction were considered necessary to keep the general conversation on task, to maintain an amiable conversation, and to serve as a base to insure that participants understand one another. Furthermore, Hobaugh (1997) emphasizes that problems with social dynamics among group members are often a major cause of ineffective group action. Gunawardena (1995) claims that these kinds of "failures tend to occur at the social level far more than they do at the technical level". Their findings revealed the value of social interaction to effective discussion.

From a community perspective, the position of social talks in discussion forums was illuminated further by Wegerif (1998) who pointed out that: "Many evaluations of asynchronous learning networks (ALNs) understandably focus upon the educational dimension, either learning outcomes or the educational quality of interactions, overlooking the social dimension which underlies this." He noted that "forming a sense of community, where people feel they will be treated sympathetically by their fellows, seems to be a necessary first step for collaborative learning. Without a feeling of community people are on their own, likely to be anxious, defensive and unwilling to take the risks involved in learning". Rourke (2000) found that certain conditions must exist before students will offer tentative ideas to, or critique the ideas of peers, and before they are willing to interpret criticism as valuable rather than as a personal insult. These findings suggest that group cohesion is required for effective discussion.

Moreover, research also attempted to explore the context of "off-task" on the effectiveness of "on-task". Erickson & Kellogg (2003) investigated the content of conversations and concluded that "In theory, more topic-oriented discussion is 'supposed' to take place in specific topics; in practice, work talk often grows out of social discussions." Kreijns, Kirschner and Jochems (2002) concluded that, although social interaction in the social-psychological/ social dimension has little to do with task execution, we expect that various non-task contextual settings will foster this dimension of social interaction more than a task context would.

The investigation of this study aims to provide a better understanding of how learning takes place in online discussion forums through exploration of the relationship between effective discussion and social interaction. By examining the activities of learners in discussion forums, we attempt to trace the trajectories of online group learning.

THE RESEARCH QUESTIONS

The research on the relationship between social interaction and effective discussions is, however, anecdotal and speculative, rather than empirically grounded. The authors in this study approach the underlying structures between these factors with two methodological considerations. First, most of the research done on computer-mediated discourse analysis considers postings as the unit of analysis (Drie, Van Boxtel, Erkens & Kanselaar, 2004). Using this criteria, all of the postings are sorted into different categories according to their attributes. Postings are therefore isolated from each other and the context of the dialogue in which they appeared is missing entirely. However, in a threaded discussion, postings exist within a contextual atmosphere and a posting cannot be fully understood merely by the content of the single posting itself. Better insight into effective discussions can be gained from a macro-view of the threaded context.

Secondly, definitions of "effective discussion", as applied to performance in discussion forums, vary a good deal. The term "effective discussions" is widely and variously used to characterize positive group learning. For example, Guzdial & Turns (2000) applied the term "effective discussions" to discussions sustained and focused upon topics related to class learning goals. Hsi & Hoadley (1997) used "productive discussion" to refer to situations in which all students "participate actively, generate comments containing a repertoire of scientific ideas, and in a group, students elaborate their own ideas, and propose new ideas." It appears that what they call "effective discussion" referred to "cognitive" , "on-topic" , "on-task" , and "sustained" learning processes and clearly excluded the "off-topic" , "off-task" , "social interaction", and "social talks" activities. Must effective discussions be sustained and be on-topic? Who determines whether the discussion is "effective"? Whose perspective is being used?

Our question, then, is how to identify "effective discussion" from the perspective of the learners themselves, which data may then be used to explore empirically the relationship between effective discussion and social interaction. In this paper, we argue that isolated postings in discussion forums cannot serve as the unit of analysis for defining a picture of effective group learning. We introduce our tool, "Pick-n-Choose", with which learners identify the important posts in the threaded discussions of their joint tasks. Using the thread as a unit of analysis instead of discrete posts, we demonstrate how an effective thread containing identified important postings is structured, composed, and developed by interwoven postings in the three categories: task, coordination, and social talks. Our discussion focuses on two facets: rediscovering the "social talks" aspect of

discussion forums, and identifying the effective discussion that takes place in "social talks". Through this examination, we are able to deepen our understanding of "how learning happens in discussion forums".

METHODS

The community & the tasks

The online community was formed for a web-based science contest in an inquiry-based learning environment called Learning Atmospheric sciences via the Internet (Lain), which was created primarily to allow high school students to participate as a virtual summer camp. Those volunteer individuals who chose the same topic from a list of five topics were sorted into a set of groups of 5-7 individuals each. Members of a single group did not normally know each other, nor did they engage in face-to-face communication throughout the activity. This web-based science contest lasted six weeks with one stage scheduled for each week. The six stages were: Individual claim formulation, Team hypothesis creation, Detailed planning, Data location, Data transformation, and Hypothesis justification. Participants in this activity qualified for a certificate if they went through the process and completed all required tasks. However, as there were multiple summer programs from which to choose and some participated in more than one, some students were absent for a few days, more or less, during the six week course.

The "Pick-n-Choose" tool in the discussion forum

Much research effort has been put into designing scripts or scaffolds to support effective discussion. Scripted encounters may work because they allow learners to push for deeper understanding and eliminate extraneous fruitless activity but this also raises the issue of over-scripting. For example, the self-coding activity (note-type or classification) may result in bored and faked entries. The "electronic anchor" , a document or topic which students may be interested in discussing (in CaMile discussion forum), is designed to elicit sustained discussion. However, we are still not in a position to judge whether it is "who", "what topic" or "when the statement is posted" that attracts people to join the discussion forums.

"Effective discussion" in previous research has been studied but only loosely defined (e.g., sustained, on-topic, on task…). In this study, we introduce the concept of "Important Posting" (IP), that which is identified by the learners as important and useful for later discussion, and "Important Thread" (IT), that which provides the environment within which the "IP" appears in order to empirically capture the context of important learning moments as "effective discussion."

Each group had its own discussion forum and permission to post in group discussion forums was restricted to the legitimate group members. They were read-only to non-members. The discussion forum was composed of threads, each a mini-discussion, triggered by the group's members. There were four prompts in each week's worksheet. Worksheets were designed around the scientific process skills at each stage of the week in order to anchor the discussions. As many community members were absent for short periods, and there were a vast number of threads and postings, the authors designed a "Pick-n-Choose" process for the following purposes.

The focusing features.
The focusing features helped group members to focus upon specific important elements among the dozens of threads. As the group was formed virtually, members of the group had to take an active role in building a shared mental model for the collaborative project. Any group member had the right to choose the posting that s/he thought important, and put it in a "Pick-n-Choose" collection. Later on, when working on the worksheets, completing their group tasks, and generating their final products, they had that shared mental model upon which to focus.

The Meta-cognitive features.
Differing from some of the self-coding interfaces in which learners were asked to classify every single post of their own dialogue (Dillenbourg, 2003), the "Pick-n-Choose" process was carried out only after the statement had been posted and whenever necessary. Therefore, not every single post had to be coded. This variation would not reduce the meta-cognitive and the methodological advantages of that approach.

The portfolio features.
One promising outcome of this process emerged. A troublesome paradox exists when the quality of the discussion process seems disconcertingly inconsistent with that of the final product -- when, for example, the discussions are sustained and on-topic, but the final products are poorly presented, or the final product is fascinating but there is little corresponding evidence in the discussion process. This presented problems in the evaluation process. "Pick-n-Choose" was designed to overcome this difficulty by requiring group members to

choose important discussion segments from among the postings thus causing the artifacts to be more closely related to the final products.

The Sample

The four hundred and eighty seven (487) high school students who participated in this activity were sorted into 82 groups of 5-7 individuals each. The six-weeks of inquiry-based online discussions consisted of 42567 total postings in 7037 threads. The number of postings and threads produced by the groups averaged 519 and 86 respectively. The average number of postings in each thread was 6.8. Of these postings, 7943 (19% of the total) were included in the "Pick-n-Choose", "Important Posting" (IP) collection. The number of Important Threads (ITs) containing IPs, was 2220 (30% of the total). In order to explore the underlying structure of the more sustained ITs, we first chose the top 25% of groups (by thread length -- the number of postings per thread) and then from among these, chose the IT threads that were above the average (68%) (we will analyze the remaining 32% of ITs that were not "sustained" in another paper). As a result, 321 threads containing 10490 postings (of which 2688 were IPs) were selected as the sample for further investigation.

This is an environment designed for asynchronous discussion. However, due to the popularity of MSN Messenger, some of the groups communicated with each other in a synchronous way, as in a chat room. In this particular context, both real-time and delayed, spontaneous discussion and considered postings were documented and recorded.

Data analysis

In order to explore empirically the relationship between effective discussion and social interaction, this study developed a "Pick-n-Choose" tool for learners to identify the IPs and the ITs. The 321 ITs in our sample were first analyzed in the following ways.

Identifying the positions of the IPs within their ITs
The purpose of this analysis was to reveal the position of the IPs in each IT. Since probably more than one posting were designated as IP in an IT, we arbitrarily divided all the threads into 3 sections: the Beginning part, the Middle part, and the Closing part. A frequency count was kept of postings which fell within each part. Our assumption was that if an IT was socially constructed, the IP would appear in the Closing part. On the other hand, if an IP appeared at the Beginning or in the Middle part, then what took place after the IP? In other words, from a knowledge-building perspective, an IP would be expected to emerge from the latter part of a thread. That is what a "meaningful" sustained discussion meant. Treating the thread as the unit of analysis, the contextual cues were utilized to explore the interrelationship among postings of IPs and non-IPs in ITs.

Coding the postings in the ITs
Except for the presence of IPs, what characteristics distinguished ITs from other threads? We were interested in what fostered the IPs. Postings did not occur in isolation but emerged as part of an ongoing dialogue, and by analyzing the attributes of the postings in an IT, we were able to reveal the distinctive qualities of an IT. For maximum effectiveness, we coded a sampling roughly 1/10 of the total, or 28 threads with 962 postings. The coding scheme was modified from Dillenbourg's (2003) work on the three concurrent processes involved in collaboration: the domain, the organization or coordination, and the social talks. The purpose of codifying these three categories was to explore the weighting of each category in the ITs.

Uncovering the interweaving of postings of three categories within ITs
The aforementioned 28 threads, with each posting codified, were then represented in a figure to show the interweaving of these ITs. The relationship between the effective discussion and the social talks was vividly revealed.

Based on this basic information, further analysis of the dynamics within threads followed, defining the profile of the threads qualitatively. Based on the data represented in Figure one, we blocked a few typical sections of the interweaving of postings distributed among these categories and illustrated them in a detailed manner. The representation of the juxtaposition of these sections is used to uncover the placement and context of effective discussion.

RESULTS

In this section, we will report the quantitative results of the context in which IP's appeared. By identifying the IPs in ITs, we were actually looking at the role of social talks in these ITs, and clarifying the interplay between effective discussion and social talks. We first give a profile of the important ITs, by paying attention to how these IPs are surrounded by the non-IPs and are supported and enabled by them. Then, using selected sections

from ITs to illustrate how the online discussions were overwhelmed by the phenomenon of "on-task" postings going hand in hand with "off-task" postings, we reveal how learning actually occurs.

The surroundings of the IPs in their own ITs

From a total of 10490 postings, 2688 IPs were identified in 321 threads. 37% of them emerged in the Beginning part, 34% in the Middle part, and 28% in the Closing part. The IP frequency count in the Closing part differed significantly from that of the other two parts. It is surprising that IPs did not overwhelmingly emerge in the Closing part of ITs, that, on the contrary, they were developed more frequently in the earlier parts.

At first glance, the non-IPs in Closing parts of the ITs were full of tangential topics or housekeeping statements, but when the ITs are viewed as a whole, complete with the non-IPs, the contextual cues are seen to support IP development in a meaningful position. Here are two examples illustrating the context of an IT with no IPs in the Closing part and their connection to the rest of the non-IPs in the Closing part of the IT.

Table 1 the distribution of the position of IPs in two selected ITs

thread ID	# of postings	Life span (day)	The Beginning part			The Middle part			The Closing part			# of IP
Categories of the postings D = Domain C = Coordination S = Social			D	C	S	D	C	S	D	C	S	
A5_43	68	8	143 IP)	0	0	5(2 IP)	2	7(1 IP)	0	7	33	6
C6_10	22	5	1	2	4	2(2 IP)	1	4	0	2	6	2

Example one: the last 45 postings were non-IPs in an IT consisting of 68 postings. (See thread 1 in Figure 1)

There were 3 IPs (6th, 12th, 13th) in the Beginning part and 3 IPs 3 IPs (20th, 21th, 23th)in the Middle part of the IT. In the Beginning part, the group members focused on the variables to be chosen and how to represent the relationships between the variables. Upon trying different ways of showing the results, one team member accidentally discovered a new relationship between two variables. In the Middle part, they discussed the difference between radical moisture vs relative moisture and revised their representation. In the Closing part, they uploaded their artifacts and finished their tasks for the week. They felt relaxed and began to be curious about who was not online during these busy days and what school each other attended. One member observed the artifacts done by other teams and regretted not being as good as they were. Another team member comforted her…..

Huan: I discovered that someone has not shown up so far. We have six people together but only five left messages. One is still unknown.

Yeh: Who? I know. Its shu-shu. She showed up at the first week, and then gone.

Huan: What's your plan for high school?

Yeh: Art program in Shin-Gu Girl's school.

Huan: Good luck! You will be very busy if you attend that program because the annual exhibit will keep you work around the clock.

Huan: By the way, did you get a chance to look at the artifacts of the other teams? Team A-16 did an excellent job. I really envy about it. They are very good at a special software for presenting the artifacts. Ummmm….

Yeh: Don't be frustrated. They have their advantages. We have ours too. Even though ours are not as good as them, we tried our best!

The group members engaged in serious discussion only on domain-related tasks, after which they simultaneously engaged in social talks. It seems that, after a stint of heavy-duty office work, they needed a "coffee break" for a while. If these postings had been examined and sorted in isolation and out of context, they would be interpreted as digression and reflective of a non-concentrating team. However, analyzing the extended thread consisting of 68 postings from a macro-view, the role of these social talks suddenly became apparent: the participants were relaxing after their task-related discussions. The thread did not conclude with serious task discussions, but, as in face-to-face interaction, people need to maintain shared regard and to structure possible future activity (Jucks, Raechter, & Tatar, 2003)

Example two: the last 13 postings were non-IPs in an IT consisting of 22 postings. (See thread 2 in Figure 1)

There were 2 IPs (8th & 9th) in the Middle part of the IT. After an exchange of information on individual experiences with fog, some discussion ensued about the reasons for previous absences, the division of labor, and who would volunteer to do which parts of the project. Others were concerned about the unavailability of networking capability some members were suffering due to technical problems.

Angela: I feel embarrassed that I will go out to have fun tomorrow. I will be back very late. So please do not wait for me. I will be online on Saturday for sure…..My computer isn't work very well. I don't know why.

Little grass: Anyone who is going to upload our artifacts please read the information on benchmark section 7 "how to hand in assignments." I bet everyone should read it too because maybe you have to do this next time.

Latte: Can we negotiate who is responsible for upload our assignments? …. If everybody is busy, maybe I can do it this week. ….By the way, does anyone know when Yeh is going to be back?

Latte: I thought Rita mentioned before somewhere he is having a summer camp soon. I bet we can expect his back soon. That's what I thought…..Don't worry too much. Angela, if you feel that something wrong with your computer, you can scan it. Mine is too. If we don't do something, it will be sent out for repairing right away.

Little grass: hello, Latte and Angela, make decision on who is going to upload the assignments…….. I don't know when Yeh will be back. But I believe it will be soon. Cheer up!

During that week, this group lost more than 3 members who left or were planning to leave for another summer camp. This situation bothered the remaining members a good deal. Although the remaining members made progress, they spent a lot of time discussing and figuring out the fluctuation in membership. They then announced anticipated absence days to let their partners know. It was because they cared that they didn't disappear silently. The forum is not a place reserved exclusively for the handing in of tasks; it's a place for them to live and to be together.

The distribution and the interweaving of varied categories of postings within ITs

962 postings from 28 threads were sorted into three categories: domain, organization or coordination, and social talks. 48% were in the domain category, with 22% in organization or coordination and 30% in the social talks. Using these coding results, the interweaving of different categories of postings within the 28 ITs are represented in Figure 1. In this figure, each line represents one IT, with black, shaded, and white representing the Domain, Coordination, and Social talks categories respectively. IPs are represented by bars of double height.

It seems clear that ITs are found with various combinations of the three post categories. The ratio of postings in the three categories was roughly 5:2:3. Few threads were composed of only domain-related postings, and task-related discussions tended to be mixed together with coordinated discussions and were frequently surrounded by social talks. What roles do coordination and social talks really play? We will take a few selections of ITs as an example.

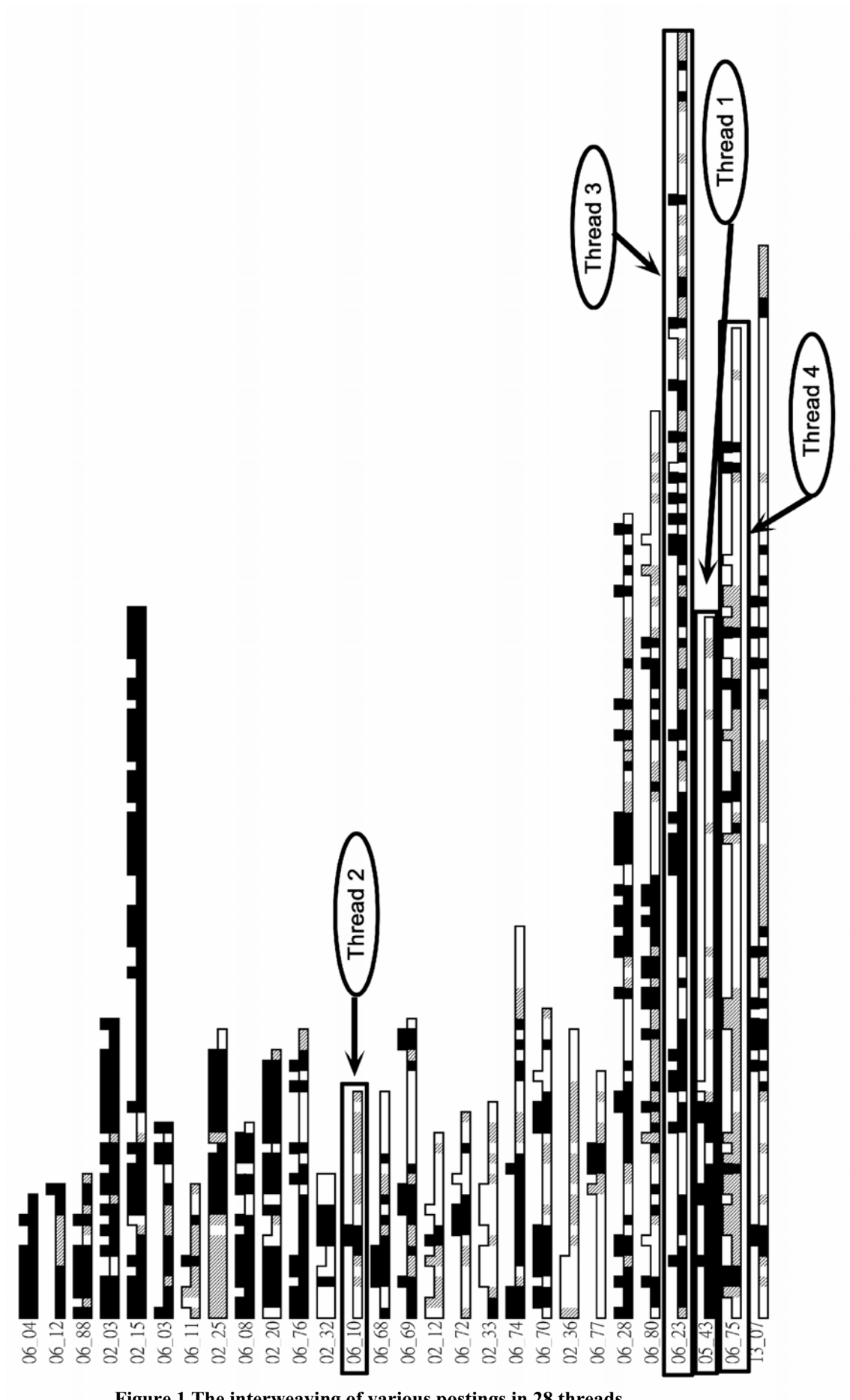*Social talks as required greetings in the online world.*

A thread may last from several hours to a few days. Each time group members logged in, they would say hello to their group colleagues, and would later say goodnight as well. (See thread 3 in Figure 1)

Yeh: Sorry, I have not dare to speak up for quite a long time. Since Grass encourages me a lot, I am eventually delurking. I fee sorry about that.

Grass: Hello, A-nei, are you online? Latte is online too. Angela~~~ Long time no see~~~~

Grass: What a pity! A-nei just got off a moment ago while you login.

While in the face-to-face environment we say "goodbye!" to mom when going to school, she would kiss us and say "Be careful on the road!"; and when returning home, we say "Mom, I am back" and mom would say "All right! There is a cake in the refrigerator." In contrast, in online discussion forums, one cannot tell who is coming because there is no noise (i.e. as there would be when someone enters a room) when somebody comes (logs in) or leaves (logs off). Therefore, whenever group members log in, they announce that fact, posting, for example, "Sorry, I had a good sleep and just woke up." Or "Because of ……….., I finally am here." In short, Just as people say "Hello!" and "Bye!" in face-to-face daily life, when they meet and depart, group members in discussion forums express their greetings by leaving a written record of having arrived and departed.

Figure 1 The interweaving of various postings in 28 threads

Thread 3

Thread 1

Thread 4

Thread 2

06_04 06_12 06_88 02_03 02_15 06_03 06_11 02_25 06_08 02_20 06_76 02_32 06_10 06_68 06_69 02_12 06_72 02_33 06_74 06_70 02_36 06_77 06_28 06_80 06_23 05_43 06_75 13_07

Social talks as the context in which the division of labor is negotiated

In an online group discussion forum, the learning activity does not take place in a serious and concise atmosphere. Instead, give-and-take collaboration quite often develops in an indirect way through social talks. In the following posting, for example, Latte mentions daily life in the real world a good deal, but mixes it together with an account of her expectations of group members and their mutual responsibility. (See thread 4 in Figure 1)

Latte: I really want to go to bed. Grass, I want to ask you one thing. Was the one you sent to me the second figure in case #8? I told you that I was planning to think about it for a while. Actually I was trying to figure out how to conduct that figure. I almost knew it except not knowing how to change the Y-axis all at a time. I was trying to log in last night, but I failed. I think it was probably because the University server's turned off. So I played the game instead, but I dare not to wakeup my mom. So I have to log off. Tomorrow I am going to conduct the second figure. But you must modify it. When you get home around 10pm, you will receive that figure, and of course we have to discuss how to conduct the third figure very soon…..)

Figure one reveals the genuineness of learning within online discourse. There is no clear demarcation between task and "non-task" contexts. The repertoire of these threads broadens our vision of online discussion. Threads easily and frequently switch in and out of on-task and non task contexts, focusing for a short while on social issues and then returning to the task at hand. (Kreijns, Kirschner, & Jochems, 2002). But the alternation between the black and white blocks in figure one and its significance to online learning is deserving of further exploration.

DISCUSSIONS

We began this paper by arguing that the examination of effective discussion was an interesting subject of study due to the ambiguous role that social talks play in effective discussion. In order to explore the substantive dimensions of group learning in online discourse, we first asked the question of how to identify effective discussion, not from the perspective of designers or researchers seeking an appearance of interaction (i.e., sustained, on-topic), but based upon concrete evidence provided by the learners themselves. Rather than identifying "effective discussion" by the learners individually, we proposed the concept of "Important Postings" (IPs) as perceived by members of the group themselves. A "Pick-n-Choose" was implemented to support learners in identifying the IPs from among the hundreds of postings. The "important threads (ITs)" were also identified.

Referring to the view put forth by Lave and Wenger's work on communities of practice (Lave & Wenger, 1991; Wenger, 1998), we found that learning in online discussion forums is also inseparable from the identity and life of the online community. Based on the findings of our study, we argue that a theory of learning that ignores these connections cannot account for when, how, or what people learn. Therefore, the findings are discussed based on the perspective of social theory of learning (Wenger, 1998).

From this perspective, learning is a kind of social participation. It is a process involving active participants in the practices of social communities and of constructing identities in relation to these communities. What we should be looking at in online discussion forums is not only the kind of action (i.e., postings), but also a form of belonging. The process of learning is the experience of meaning; the product of learning is a sense of meaningfulness and belonging.

However, many discussion forum research methodologies ignore the factor of an educational cue arising from a sense of belonging. Using ITs as the unit of analysis, we realized that identity is not all that abstract. It manifests itself in what learners say, the perspectives they adopt, and the way in which they react to certain statements. People's participation in a discussion reflects the way they look at the world, and therefore the trajectory that has led them where they are (as well as their sense of where they are going) (Wenger, personal communication, October 08, 2004).

Rediscovering the "social talks" in discussion forums－－a picture of group identity

From the results of this study, we have gained a better understanding of the social nature of online discourse. But are these social talks really "off-task" or "off-topic"? In online discussion forums, participants discuss "soft" things more than task-related material because they care about each other. They announce their daily schedules because they have developed mutual accountability. They share feelings of loss when finding themselves to be the remaining members after the group has lost members because they have a sense of "our" group. What these social talks reveal is a picture of group identity. By examining the content of postings across each thread, the contextual environment of learning is uncovered. The cases discussed in this study indicate a kind of subtle

atmosphere within which important discussions are generated. It is the social talks that make the group cohere. As Gunawardena (1995) suggested, once a positive affective relationship and sense of community have been established, enhanced task accomplishment may be achieved. This study empirically justifies the existence of social talks in effective discussion and identifies them as an inseparable part of effective discussion.

From this perspective, the significance of postings such as greetings, shared regard, introductions, or inquiries about the social life of fellow group members in the real world becomes clear: those interactions are not irrelevant to learning. Instead, these postings are meaningful in that they are negotiating meaning. Getting to know each other, finding communal interests, giving and receiving regards, and showing responsibility to the group are all a form of participatory identity. During the process of developing this sense of belonging, their joint enterprise is continually being negotiated. It is not the tasks but the sense of belonging that contributes to learning. Therefore, in ignoring the part social talks play, we lose the opportunity to uncover the substantive dimension, the identification and negotiability of learning in online discourses.

Social talks are not irrelevant to learning but are important to group cohesiveness prior to effective discussion. Improvising social talks among group members provides a deep common ground for important postings as well as for important threads to be generated.

Rediscovering effective discussion through social talks－－discussions embedded in social talks are the complete picture of effective learning

In contrast to the claim that the success of systems in CSCL environment may rest on the satisfaction of non-learning goals as latent variables (Jucks, Raechter, & Tatar, 2003), this study found that there are facets to effective participation in an online community. As community knowledge involves not only facts (i.e., What factors influence the rainfall of a typhoon in Fall in Taiwan?) and skills (i.e., How to represent the relationship among four factors in a figure?), but also a knowledge of social relations and practices (Greeno, Eckert, Stucky, Sachs, & Wenger, 1999).

By analyzing the context of "IPs" (Figure one) , we discover that an IP occurs in a thread containing numerous social talks and much procedural coordination in addition to " the on-topic" activities sought in the traditional perspective. The extended sequences of threads show the various distributions of postings in different categories during asynchronous interaction. In terms of the category of IPs, important postings are not limited to the "Domain" category only. In terms of the combination and development of ITs, important threads may be initiated by a posting in any of the categories, Domain, Social talks, or Coordination.

This study reveals that social talks are so omnipresent in the process of negotiating meaning that we hardly pay attention to their existence in the discussion forums. In particular, the postings sorted as Social Talks occur in the ITs at any point, and are of varying length. On the one hand, it is obvious that most social talks do not serve as distractions, continuing to the end of a thread to the exclusion of other material. On the other hand, even though social talks do tend to aggregate at the Closing part of the thread, they are found to be serving as after-meal talk in contrast to the earlier hard work.

The positions of IPs in threads were also found to contradict common assumptions about the process of knowledge co-construction. The fact that important postings are distributed roughly equally through most of the threads alters the impression that the accomplishments of decision-making or meaning negotiation will commonly terminate a discussion. Learning takes place when cognitive and social interactions naturally intertwine, as they do in activities (Scribner, 1984). Effective discussion and social talks are thus interrelated. Accordingly, from a community perspective, meaning is negotiated continually, and learning takes place not only through doing (domain-related), but also through becoming, belonging, and experiencing (Wenger, 1998).

CONCLUSIONS

The major implication of this study is the value of coordinating on-topic and off-topic perspectives on learning in discussion forum. We empirically justify that "social talks" is neither a necessarily non-productive, nor an analytically separable type of communicative action. With the scope of analysis in the context of entire discussions (threads), we are able to reveals the social nature of online discourse in an inquiry-based learning environment.

Most recent research in collaborative learning focuses on characterizing the patterns of effective or productive collaboration. Traditionally, those patterns that are sustained and focusing on on-topic issues are considered as effective learning. However, this study showed on- and off-task talks not only co-occur, but also interweave in supporting an effective discussion. Without social talks going hand in hand with on-topic discussion, group identity may not form substantially. In order to one step further propose more off-task talks lead to more on-task talks or engagement in the task, further research with ethnographic methodology is warranted.

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