

Editor's Note: The increasing use of collaborative computing in all sectors of the economy gives added urgency and value to this research. Murphy and Laferrière examine factors, such as trust, that influence the ability of virtual communities to collaborate effectively. They use tools based on group development theory to measure relationships building through online facilitation and discussion.

Identifying and Facilitating Group-Development Processes in Virtual Communities of Teacher-Learners

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Keywords: Content analysis; online discussions; group development theory; computer-mediated communication; virtual communities; online facilitation

Abstract

Through analysis of the written trace of asynchronous communication messages among teacher-learners in a virtual community, processes of social interaction were investigated in order to gain insight into how communities of learners may collaborate. Using group-development theory focusing on how a group that is meeting face-to-face moves through stages of initial distrust to trust, an eight-point scale instrument was developed to code messages from two groups of teacher-learners participating in online discussions. Results indicated that there was growth leading to interinfluence but that the group did not fully reach a stage of shared understandings. Group development in virtual communities can be facilitated through use of the various assessment tools provided by group-development theory. Group moderators and participants can formatively evaluate group interactions through an ongoing analysis or monitoring of written traces of communication of electronic messages.

Introduction

Computer-mediated communication can facilitate collaborative learning strategies and approaches (Hiltz, 1990) thus providing opportunities for virtual communities of learners to collaborate in ways that lead to shared understanding of professional questions and issues. Facilitating such collaboration in virtual communities represents an aim for those interested in the design and delivery of such learning opportunities.

However, fostering real collaboration and coherence in such communities is not easily accomplished (Hewitt, Scardamalia, & Webb, 1997).

A virtual community of learners is a loosely defined notion, one that taps into the potentials of virtual collaborative spaces for geographically dispersed individuals. We conceive of learning as a construct mediated by language via social discourse (Vygotsky, 1978). The development of shared goals and understandings is seen as an ideal for those wanting learners to benefit from online written discourse (Harasim et al., 1995). Analysis of a group's written discourse in general and of specific communication messages between group members in particular, represents a means to gain insight into some of the processes that are conducive to building shared goals and understandings. Through analysis of the written trace of asynchronous communication messages among learners in a virtual collaborative space, we can investigate these processes of social interaction.

The aim of this investigation is to identify group-development processes that develop in asynchronous discussion in order to gain insight into how virtual communities of teacher-learners can collaborate in ways that lead to shared goals and understandings and to determine implications for online facilitation of group development. The specific objectives of this inquiry are to:

- Identify how group theory can inform the development of virtual learning communities;

- Identify group-development processes taking place in the context of a virtual community of teacher-learners participating in an ongoing asynchronous online discussion;

- Determine implications for facilitation of collaborative group-development processes in virtual communities of learners.

Theoretical framework

The opportunities for many-to-many-interaction which are made possible by the asynchronous, time-and-place independent, online classroom represent one of the essential attributes and potential of such forms of learning (Harasim, 1990): "Computer conferencing software, which automatically files notes into topical discussions and updates users on any new comments in a topic, is currently one of the most appropriate online environments for learning collaborations" (p.45). In relation to collaborative learning, conferences provide a "fertile forum for interaction", active involvement, socio-emotional engagement and for

construction of meaning among participants (p. 45). Online educational environments provide support for collaborative conversations and construction of understanding (Brown, 1990).

Virtual learning communities exist only because of individuals' visible engagement through writing and reading in dedicated online collaborative spaces. Engagement in learning as the first condition for learning is a well-known condition in the domain of educational psychology (Nystrand & Gamoran, 1991; Pintrich & De Groot, 1990) and among professional educators working in face-to-face and/or virtual learning environments (Hmelo, Guzdial, & Turns, 1999 ; Persell, 2004). Student engagement in online discourse is reflected in social interaction for learning purposes, which is another critical condition for learning (Vygotsky, 1978).

From a socio-constructivist perspective, the development of collaboration plays an important role in knowledge construction (Jonassen, 1994; Resnick, 1991). Understanding collaborative learning includes the understanding of how individuals function in a group. Group psychology has developed a body of knowledge on group processes that may apply to understanding and facilitating the development of virtual communities. This investigation focuses on group processes in order to gain insight into the level of collaboration reached and to determine how a group may reach a stage of interinfluence in accomplishing shared learning goals.

Theory related to group development is meant to provide insight into the processes at work when individuals come together as a group for specific purposes. One such theory was elaborated by Gibb and Gibb (1967). Trust-Level or TORI theory provides a framework from which to understand how group processes manifest themselves. TORI is an acronym reflective of four group processes: Trust formation, Open communication, Realization of goals, and Interdependence (here referred to as Interinfluencing). According to TORI theory, in group development, fears become superseded by trust. When trust is high, relative to fear, participants function well whereas when fear is high relative to trust, they break down or do not develop. The same is true for organizational systems (Dirks & Ferrin, 2001). Trust is the primary ingredient that enhances each of these processes while fear is the primary barrier.

Our working hypothesis is that when the focus is on communication for better professional action (task-oriented) rather than on interpersonal support (person-oriented), group processes and their evolution may therefore be apprehended through discourse analysis of a socio-cognitive rather than socio-affective nature. Applying the Gibb's theory, the growth of engaged participants occurs as a movement from fear towards

increasing trust. In this study, the primary correlates of this central process are the following four: movement from depersonalization and role taking towards greater personalization of learning intentions; from a closed, defensive system of communication towards more open exchange of intentions, questions, doubts and issues; from imposed learning objectives towards greater group (or community) self-determination; and from dependency towards one or a few leaders' greater interdependence and interinfluence (fluidity of leadership and membership).

Methodology

The inquiry involved teachers participating in a virtual learning community (Murphy, 2000). Two groups took part in the study: one group (CREDO) was anglophone and the other (CREO) was francophone. CREDO operated for a nine month period while CREO operated for an eight month period. While the composition of each group was international and thus geographically heterogeneous, participants had in common that they were teachers of French as a second or foreign language interested in using the Internet to advance their practice. There were 42 participants in the CREDO list and 23 participants in the CREO list.

Using group-development theory (Gibb, 1967; 1972; 1978), an instrument was developed to code each message using an eight-point scale centered on four main processes of **Trust formation; Open communication; Realization of goals; Interinfluence**.

Each of these four main processes was divided into two phases corresponding to what the Gibb (1978) describes in face-to-face encounters as:

1. Signs of early phases of development characterized largely by fear;
2. Signs of later phases of development characterized by trust.

For the purposes of this study and in relation to virtual communities and analysis of written traces of online discourse, we substitute the notion of distrust for Gibb's notion of fear. Indicators that could be visible online were retained. The instrument is presented in the following four tables according to the four main processes with corresponding indicators and illustrative examples taken from the coding.

Table 1

Trust Formation

| T1 | |
|---|--|
| Indicators | Examples |
| Formal behaviour Participants are in role & impersonal Formality Concern with membership | "I teach core French, Spanish and German." "Our school is a French Immersion school for kids from grades kindergarten to grade 6." |
| T2 | |
| Being personal Showing one's self Expressing enthusiasm re membership in group Describing personal goals Opening up of feelings | "I look forward to hearing about and using new ideas that might stem from the discussions" "Although I am familiar with the Internet, I have not yet made steps to use it in my teaching" |

Table 2

Open Communication

| O1 | |
|---|---|
| Indicators | Examples |
| Presenting official information and knowledge Building of polite facades | Here is the address of one interesting primary school... They have a very strong technology focus.. "I had students do research projects on topics like " La Musique" where they had to research a francophone singer and do a presentation online..." |
| O2 | |
| Expressing opinion Expressing personal beliefs Expressing concerns Candour & spontaneity Disclosing | Forgive me if I am sometimes quiet. In a crowded room, I tend to watch and listen more than participate." "I must confess that I am one of those teachers who believes that the Internet is a very useful teaching tool but have not yet figured out how to incorporate it into my teaching on a regular basis." |

Table 3

Realization of Goals

| R1 | |
|-------------------|-----------------|
| Indicators | Examples |
| | |

| | |
|--|---|
| Presenting an argument Creating boundaries Exerting pressure | The use of the computer and especially the Internet places the students more frequently at the centre of the learning process with the teacher now acting as facilitator and advisor." "The role of schools and teachers becomes one of guiding researchers to becomes powerful searchers in this information-rich environment..." "We must be careful and guide the students to appropriate websites that we have chosen and that we continue to monitor." |
| R2 | |
| Wanting help/advice Asking converging questions Giving advice Offering solutions Soliciting an opinion Real problems and issues are discussed Agreeing & sympathising Risk-taking | Participants may want to share websites they find interesting." "Has a similar situation happened to anybody while a large group of students tried to access the same site?" "The other solution was that many of the students had their own addresses at home." "I agree completely with your beliefs since I actually experienced this." |

Table 4

Interinfluence

| I1 | |
|---|---|
| Indicators | Examples |
| Challenging other's advice, goals, beliefs | "Something I gathered from reading the various mails is that most colleagues seem to 'test' all of this sites beforehand. I doubt that this is the use of the possibilities of the net to its full.." "Let's all be careful when talking about a 'digital approach' replacing communicative or any other teaching methodology." "I just wanted to point out that there may be reasons other than conceptual disagreements to not hurtle into using the internet as the primary resources for teaching. Vincent may be funded for revolution. I'm not even funded for status quo." |
| Critiquing an argument of a group member | |
| Authoritarian comment | |
| Expression of hostility | |
| Submissive behavior | |
| I2 | |
| Acting on group member's suggestions, advice | "Dear (Brigitte I am also a Core French teacher of grades 7-9. My grade 8's have visited your website and some are interested in corresponding with your students...I have told my students that I would let you know that letters might be forthcoming." |
| Co-operating | |
| Collaboration defining a problem | |
| Expression of a sense of belonging to a group | |

Prior to being coded, the messages were divided into three equal sets for each of CREDO and CREO corresponding to A the beginning period of the discussion, B the middle period and C the final period. Each message in CREDO and CREO was then coded based on which one of the four processes and their two phases the messages best represented. The coding involved focusing on each message holistically in an effort to determine which of the processes and phases was predominantly at play. The unit of analysis was that of meaning.

To ensure reliability, both researchers participated in and reached a consensus on codes assigned to units. Once all messages were coded, it was possible to begin identification of patterns in relation to Gibb's theory of the processes of development of trust leading to interdependence.

Results

The coding of messages using the instrument developed for the purposes of the present investigation is represented in Table 5. On the vertical axis are the four processes and the two phases related to each process (eight categories in total). The letters ABC in the row at the top correspond to the divisions of the messages into three equal sets with A corresponding to the first period of messages and C to the last. The numbers in each box correspond to the total number of messages representing one of the eight categories. The final columns for each of CREDO and CREO represent the total number of messages corresponding to a given category for the duration of each discussion (CREDO and CREO). The second stage of the analysis aimed to determine what patterns emerged from the coding. Table 3 provides a display of the data organized according to whether group development manifested itself more on a lateral level i.e. from the early phase to the late phase or whether the movement was more at the vertical level i.e. from the trust process to the interinfluence process.

Table 5

Results of coding of messages for CREDO and CREO

| | | CREDO | | | | CREO | | | |
|---|---|-------|------|------|-------|------|------|-------|------|
| | | A | B | C | ABC | A | B | C | ABC |
| | | %/45 | %/45 | %/46 | %/136 | %/14 | %/14 | %/15 | %/43 |
| T | 1 | 7 | 0 | 0 | 2 | 7 | 0 | 0 | 2 |
| | 2 | 13 | 7 | 0 | 7 | 7 | 0 | 0 | 2 |
| O | 1 | 16 | 29 | 7 | 17 | 29 | 21 | 33.33 | 28 |

| | | | | | | | | | |
|---|----------|----|----|----|------|----|----|-------|----|
| | 2 | 24 | 4 | 11 | 13.5 | 29 | 7 | 0 | 12 |
| R | 1 | 16 | 38 | 28 | 27.5 | 14 | 29 | 33.33 | 26 |
| | 2 | 24 | 22 | 43 | 30 | 14 | 43 | 33.33 | 30 |
| I | 1 | 0 | 0 | 9 | 3 | 0 | 0 | 0 | 0 |
| | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |

Table 6

**Results of coding of messages
indicating lateral and vertical development**

| | CREDO | | | | CREO | | | |
|----------|-------|------|------|-------|------|------|------|------|
| | A | B | C | ABC | A | B | C | ABC |
| | %/45 | %/45 | %/46 | %/136 | %/14 | %/14 | %/15 | %/43 |
| 1 | 38 | 67 | 43 | 49 | 50 | 50 | 67 | 56 |
| 2 | 62 | 33 | 57 | 51 | 50 | 50 | 33 | 44 |
| T | 20 | 7 | 0 | 9 | 14 | 0 | 0 | 4 |
| O | 40 | 33 | 17 | 30 | 57 | 29 | 33 | 40 |
| R | 40 | 60 | 72 | 57 | 29 | 71 | 67 | 56 |
| I | 0 | 0 | 11 | 4 | 0 | 0 | 0 | 0 |

Discussion of group-development processes in credo and creo

According to group-development theory, in best cases, group processes unfold from left (see number 1 in Table 6) to right (see number 2 in Table 6) and move toward interdependence (interinfluence) (see the letters T-O-R-I in Table 6). Initial concentration of processes on issues of distrust-trust such as those described by the coding with the number one are a necessary step toward more open communication. According to the Gibb's theory, the latter is also necessary for the group to reach self-determination and interinfluence. Therefore, in addition to a lateral move from a one to two in a given category of processes e.g. a move from a phase of T1 to a T2 phase, this analysis looked for development towards or a vertical move from the initial Trust process through the processes until the Interinfluence two (I2) is reached i.e. from the T process to the I process.

The coded messages, which provided the basis for an analysis of the patterns of group processes, indicated that there was progression in the CREDO and CREO groups. While there was not a definitive move from T1 messages towards I2, there was a definitive move toward R2-type messages. The dearth of messages coded as I2 suggests that the group interaction did not occur at the stage of shared understandings. One should keep in mind, however, that the instrument may not be discriminative enough at its higher end, and further refinement is needed in order to capture the specificity of shared understandings (or interinfluence), that is, messages that are beyond manifestations of trust, open communication, and self-determination.

Nonetheless, in spite of the lack of results at the higher level of the instrument, collaboration in this community of teacher-learners is visible at all three other levels. There was a marked progression in terms of building of trust and in terms of moving towards and with shared goals. We can interpret that since the groups were gradually progressing toward, interinfluence, that with more time they might have achieved shared goals. However, we have no evidence on which to confirm this interpretation and we have no reason to believe that duration of the group alone constitutes a variable that might influence the group's development. We do argue, on the other hand, that facilitation can influence a group, and that the above results can help guide the facilitator's own writing and its monitoring of participants' writing. We also argue that participants can learn to be more trustful, open, and to manifest agency and interdependence.

In terms of comparing the processes identified in the CREDO group with those in the CREO group, the coding made evident that the groups were similar in their progress towards shared goals and interinfluence. However, they differed in the patterns of progression. Patterns in the CREO group were less discernable than were those in the CREDO group. In the CREO group, there was more of a vertical movement i.e. from the T process to the I process whereas in the CREDO group, the movement was more lateral i.e. between the early and late phases of each individual process. This suggests that the number of messages (136 for CREDO and 43 CREO) is not influential here in terms of group development. Further investigation which includes methods of facilitation may provide more insight into this issue.

Implications for group facilitation

This case study has shown that there are processes at work in groups which can be monitored and, it is expected, facilitated with the aim of

orienting the group towards better levels of trust and open communication that lead to shared goals and understandings. The study has also shown that we cannot assume that simply because a group comes together within a virtual community with similar individual intents and purposes that it will eventually develop fully and be able to collaborate effectively in order to achieve common goals and shared understandings. For groups to develop to a point where there is interdependence or interinfluence, a conscious, systematic effort must be deployed. Such efforts can be supported by instruments which can be used by a group facilitator/moderator, and by group members themselves.

Group participants can be assisted in the process of becoming more effective members and in exercising distributed leadership in virtual group/communities through use of the various assessment tools provided by Gibb such as the TORI Group Self-diagnosis Scale (Gibb, 1972). These tools can be adapted for use in the case of online interaction and learning in the public domain as opposed to personal and interpersonal knowledge. The fact that written traces of communication are available to all participants means that the facilitator/moderator and participants themselves can formatively evaluate the interactions taking place with the learning goal of setting new directions, intervening, etc.

Group theory and the development of virtual communities

Group-development theory provides a means to understand processes at work within groups. Gibb's (1967,1972,1978) group-development theory was chosen as the framework with which to investigate the processes at work in a virtual community of teacher-learners. Other group-development theories (see Schutz, 1988; Tuckman, 1965; Fisher,1970; Tubbs,1995; Poole,1981,1983; Poole & Roth,1989) may prove useful in investigating group development in similar or in other contexts. These theories all have in common the fact that they delineate processes and phases each with marked characteristics which thus provide criteria from which to systematically evaluate a group's development.

Virtual groups and communities have the benefit of leaving a written trace of interactions which can be examined, monitored and analysed internally (by group members themselves or by the facilitator) or externally (by a person independent of the group such as a researcher) either in the course of the interactions for formative purposes or once the group has disbanded for summative purposes or for both. While the possibilities are numerous, what is important is that groups take advantage of the tools and opportunities provided by these theories in

order to inform and guide their actions in such a way as to enhance learning.

Conclusions

What is significant about the results of this investigation is that they do not reject Gibb's hypothesis that there are processes at work in groups and these processes can be identified. The results also indicate that we can make use of the body of literature on group development theory to design instruments that can be applied in the study of processes ongoing in online groups. Furthermore, these instruments can be used not only to identify processes at work. Participants in online groups and moderators of such groups can make use of the instruments to facilitate these processes most conducive to collaboration and to the sharing of understandings and goals. Such instruments might be useful not only for virtual communities of teacher-learners but as well in workplace environments where collaboration in online groups is valued.

As was noted earlier, there are many other group development theories besides those elaborated by Gibb. Which of these theories might be more suitable to identifying and describing processes at work in online groups? How can we develop instruments to assess processes at work in these groups? Can we develop instruments for use by managers/moderators and by group members themselves for both summative and formative purposes? These are some of the questions worth investigating in relation to the identification and facilitation of collaborative processes in virtual communities.

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