Perspective-taking in Structured and Unstructured Online Discussions

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This study analyzes the extent to which students using web-based discussion boards show an increase in perspective-taking in structured and unstructured discussions. Messages from fifty-six students enrolled in one of two courses were content analyzed using Jarvela and Hakkinen's (2003) expansion of Selman's (1980) perspective-taking coding scheme. There was a significant difference in the level of perspective-taking shown across the three periods of the semester. The level of perspective-taking in structured discussions was significantly correlated with learning. Class leaders showed higher levels of perspective-taking than did other students in the class. The results suggest a relationship between use of higher order perspective-taking and learning, particularly when instructors provide structure for student discussions.

It has become a routine practice for colleges and universities to provide web-based course management and discussion software to enhance the classroom experience. Instructors understand the importance of incorporating new technology into the classroom for a variety of reasons that range from providing students quick access to content to creating an opportunity for individualized progress monitoring. Whether the web-based instructional components help student learning is left for faculty to discover on their own. The existing body of research agrees upon the web's keen ability to serve as a repository of textual, graphical, and image-based course content, as well as to provide access and the time-shifting nature of computer-mediated communication (CMC). Yet, the capability of CMC for developing students' social interaction skills, particularly when it is channeled through web-based discussion boards, is less certain. One particularly important social interaction skill is perspective-taking. A certain level of perspective-taking is needed in order to support educationally relevant interactions (Jarvela & Hakkinen, 2000). Research suggests that learning requires perspective-taking and shows that higher levels of perspective-taking are related to increased communication competence (Mezirow, 1978; Shuang & Qinhua, 2001). Since using a web-based discussion board assumes an ongoing interaction with others in a mediated environment, understanding of the potential learning outcomes of this process can be achieved through the knowledge of general effects of mediated communication on learning and more particular effects of CMC on learners' ability to focus on others (engage in perspective-taking).

Learning and CMC

Berge and Collins (1996) note that using CMC in college courses can facilitate more flexible communication patterns, time-shifting, and a sense of equality through the social cues filtered out through the medium, so the unstructured mediated conversations among students may make communicating difficult for some. This idea is also emphasized by Allen et al. (2004) as they suggest that the student learning outcomes would differ, depending on the initial preferences and perceptions of CMC held by both students and instructors.

In college courses, web-based unstructured mediated conversations occur through a channel that provides minimal, if any, regulations on the content, structure, or focus of the conversation. Interactions in chat rooms and via instant messaging are most typically unstructured mediated conversations. Structured mediated conversations are characterized by rules or guidelines such as what is talked about, how frequently persons should participate in the conversation, and the allowable scope of the discussion. Web-based threaded discussions in courses in which the teacher assigns the topic of discussion and the parameters of how to use the discussion board is an example of structured mediated conversations.

The absence of physical copresence in a classroom poses a variety of questions with regard to student learning and instructional quality. On the one hand, presence of social cues allowing a student to identify others within a CMC process positively affects the formation of interpersonal perceptions. On the other hand, the perception of solidarity decreases as more cues are revealed (Tanis & Postmes, 2007). Thus, while the extraction of social cues is viewed positively as the means of creating a relatively comfortable and unbiased environment, it has a potential to decrease the students' interest in the learning process due to their inability to establish a meaningful connection with the instructor.

Despite the raised concerns, however, research shows that students can learn as well or better in CMC

classes than in traditional non-mediated courses (Chadwick, 1999). A review of the research literature from 1996 through July 2008 also shows that, on average, students learning via CMC outperformed students learning in face-to-face conditions (Means, Toyama, Murphy, Bakia, & Jones, 2009). CMC helps create a more interactive environment, connecting the students with each other and with the instructor. The lack of immediacy in CMC allows both parties to reconsider the wording and style of the feedback, allowing them to create a more positive and constructive communicative experience, hence, a more positive learning experience for the participants (Sutton, 2001; Hebert & Vorauer, 2003). Asynchronicity of communication also brings in some additional benefits, such as providing participants extra time to reflect on ideas, both their own and their peers' (Althaus, 1996; Hough, Smithey, & Evertson, 2004). A variety of studies also demonstrate that using web platforms helps expose students to others' perspectives that are not always available in a classroom discussion, thus providing additional means of practicing skills needed in the workplace and in team environments (Eastman & Swift, 2002; Heller & Kearsley, 1996; Hutchins, 2001; Kirkpatrick, 2005).

Learning and Perspective-taking

Thinking about one's self in relation to others is part of the perspective-taking process. Service-learning, as a pedagogy, provides experiential learning through a cycle of acting and reflecting as students seek to integrate knowledge of course content with an understanding of how their actions affect the people they are serving (Eyler & Giles, 1999). Providing a learning environment in which workplace skills and teamwork are embedded can be accomplished by building course assignments around consulting activities (Dallimore & Souza, 2002), which fits well with service-learning. Those activities teach students how to recognize and propose solutions to actual business problems, while not inhibiting coverage of course content. Incorporating service-learning into the class can further infuse course content into students' real-world activities while providing the additional benefit of allowing students to reflect on the value and meaning of those activities (Bush-Bacelis, 1998).

Part of the service-learning reflection process includes learning to understand the perspective of the other people with whom the students interact. Perspective-taking refers to the ability of a person to understand and incorporate another's perspective into one's own messages in order to engage in discussion with that other person. The ability to cognitively move from just a sense of self to a sense of self and others, then develop and articulate messages incorporating self

and other, is described further in the theories of individual and social development of Piaget (1926) and Mead (1934). Subsequent research found a relationship between the development of perspective-taking and communication competence both for constructing informational messages (Flavell, Botkin, Fry, Wright, & Jarvis, 1968) and persuasive messages (Clark & Delia, 1976). Further, the capacity for perspective-taking for communicative intent does improve as children develop (Clark & Delia, 1977).

Selman (1980) developed a coding scheme in order to study social perspective-taking in the development of communication skills in children. The author identifies five levels of perspective-taking ranging from basic to advanced: *egocentric*, *subjective*, *reciprocal*, *mutual* and *societal-symbolic*. At the egocentric level, individuals clearly differentiate between themselves and others as physical entities. As no psychological differentiation is developed at this stage, individuals tend to not recognize that others may perceive a similar situation differently.

Persons at the subjective level can distinguish between the potential presence of a subjective perspective of the other and relate perspectives solely with regard to the ones of the actor. Thus, communication of the perspectives occurs in one-way, unilateral terms. The reciprocal stage allows for a two-way connection that assumes that the actor and the other can have differences in perspectives. Individual value systems and objectives are recognized within the context of the interaction but outside of the entire relationship system between the actors.

At the mutual level of perspective-taking individuals are able to comprehend their interactions with others within an ongoing system where genuine understanding of the other is necessary. Therefore, at this stage individuals are capable of attaining a third-person perspective that lies outside of their own. The societal-symbolic stage is the most advanced as the actors are able to consider themselves and others within the broad context of society, structured around the social norms and values. In order to facilitate communication and reach accurate understanding, the actors consider the existing shared viewpoints of the system and simultaneously recognize the multiplicity of the individual perspectives that exist within the system as a whole.

Jarvela and Hakkinen (2000) extended the applications of Selman's approach to assess perspective-taking levels in asynchronous electronic discussions. The goal of Jarvela and Hakkinen's research was to determine if students are able to reach sufficiently high levels of perspective-taking in online discussions to support educationally relevant interactions. Their findings show that higher-levels of perspective-taking are related to higher-level

discussions. This finding was replicated in semi-structured web-based discussions as well (Jarvela & Hakkinen, 2002; Hakkinen & Jarvela, 2006). Shuang & Qinhua (2001) also found that students participating in a higher-level theoretical discussion exhibited the higher levels of perspective-taking (*i.e.*, mutual perspective-taking) compared to students involved in discussions where conclusions were developed mostly out of personal opinions. So, while there is a foundation of understanding that perspective-taking matters in online discussions, less is known about the relationship to structured and unstructured discussions.

One cannot necessarily conclude that individuals will always use the highest order of perspective-taking within any one conversation. In fact, it is likely that perspective-taking use is developmental socially as well as individually. That is, if a person can effectively use perspective-taking, they may take time within a social interaction to determine the extent to which that perspective-taking will be used and rewarded by others. O'Keefe and Johnston (1989) argue that "development occurs as a result of our interactions in the world and is deeply dependent on both our present ways of constructing interpretations (what we individually bring to an interaction) and the interactions in which we engage (our experiences with other persons)" (p. 21). Thus, perspective-taking should not be considered to be automatically present just because an adult communicator can perform it. If there is little use and/or reward by others, or if the situation is not structured to require it, then perspective-taking may not be needed or may be perceived to be risky to engage in. However, if perspective-taking affords some benefit, such as facilitating task completion, then it is likely to grow over time. Our first research question seeks to learn more in this area.

Question 1**:** Is there a change in the levels of perspective-taking demonstrated over time in a class?

Research shows that building problem-oriented case work and group reflection into a course can lead to higher-levels of perspective-taking in online discussions (Hakkinen, Jarvela, & Byman, 2001). Effectively, these researchers created a structured environment in which online discussions would take place. Their findings show that providing real-world experiences in the form of consulting-based / service-learning courses as a part of the overall educational experience is important. However, the study does not address the presence of differences in perspective-taking between two service-learning, consulting-based courses, which use structured and unstructured online discussions as the supplementary communicative means. Our second research question seeks to learn more in that area.

Question 2: Are there differences in perspective-taking between structured and unstructured online discussions?

Research on perspective-taking suggests that it is necessary for learning to occur, however, an individual's ability to engage in higher-levels of perspective-taking is related to the individual's communication competence (Mezirow, 1978; Shuang & Qinhua, 2001). Students use perspective-taking to move from relatively simple understandings of phenomena to more complex, interdependent understandings.

Proper assessment of student learning requires an established connection among course learning goals and student performances that directly demonstrate the acquisition and enactment of those learning goals. It is possible to design a grading system in which grades are based on student performance linked directly to the course learning goals (Palomba & Banta, 1999; Suskie, 2004). The courses, and their grading systems, used in this study were constructed in such a manner. In such a case, it is possible to determine if there is a relationship between the extent of perspective-taking used by a student and the grades the student receives in a learning environment. Accordingly, research question three asks:

Question 3**:** What is the relationship between the average level of perspective-taking a student uses and the grade that student earns?

An important property of the class that utilized the unstructured discussion form is its initial organization. The class consisted of six competing groups with nominated leaders, responsible for the group functioning and the term project outcomes. This circumstance created a unique opportunity for us to explore the differences in the ways leaders and followers acquire and develop their perspective-taking ability. Etzioni (1965) proposes that task-oriented groups tend to produce two types of leadership: an expressive (or social-emotional) leader, who ranks higher than other actors in such interaction categories as "showing solidarity" and "asking for suggestions;" the other, an instrumental (or task-oriented) leader, who ranks higher than other actors in such categories as "giving suggestions" and "showing disagreement" (p.689).

It is possible then to suggest that an instrumental leader could exercise his or her authority regardless of the perspective of others in order to accomplish the task. At the same time, an expressive leader will be more likely to seek other group members' input by advancing his or her own level of perspective-taking to accommodate or account for more than his or her own points of view. As the original postings on the

discussion boards included students' names, it was possible to distinguish between the postings of leaders and followers. Therefore, the connection between the leadership position and the perspective-taking ability is a focus of research question four:

> Question 4: Is there a difference in levels of perspective-taking between the leaders and the followers?

Method

The data for this study were collected over two 15-week semesters at a large Midwestern university. Two courses were used in this study: an undergraduate communication research methods course (n = 39) and an undergraduate/graduate student organizational consulting course (n = 17 [17 undergraduates who have used the discussion board]).

Both courses included service-learning components that allowed students to learn course content, apply the content to an actual organization, and reflect upon their service to the organization. Students in each course were divided into seven work groups. Course grading systems were developed based on guidelines suggested by Walvoord and Anderson (1998) in order to have grades reflect student learning based on course learning goals. The grading systems effectively served as an assessment of student learning providing direct evidence of the degree to which students achieved the stated course learning goals.

Discussion Boards Use

Two types of discussion boards are employed in the study: structured – used in the methods course, and unstructured – used in the consulting course. The participation in the structured discussion board is characterized by the focused development of discussion threads led by a discussion moderator. This type of discussion board presents a standard format with established boundaries of a) presence of a weekly discussion question, b) prescribed participation, and c) presence of a moderator assigned by the instructor. In structured discussions, the instructor provided the topic for discussion, linked to what was happening in the course and effectively setting the agenda on what would be discussed and the parameters of how broad the discussion would be. The moderator was a senior undergraduate student who had successfully completed the course in a previous semester. Structured discussion boards are initiated and developed by the instructor in order to facilitate instructor-learner communication.

Unstructured discussion boards are essentially different as they are developed as a supplementary tool that primarily facilitates student-student communication.

In the consulting class, the board was not monitored by a moderator or instructor, nor did it possess a pre-established structure (such as number of rubrics or a set of discussion questions). The discussion threads occurred sporadically based on the needs of the students, and participation in unstructured boards was not made mandatory by the instructor. Since the instructor did not provide any discussion parameters or an agenda, the discussion topics arose from the students themselves as warranted by the work the students did and their need for talking about things with other students.

Two electronic platforms were used for setting up the discussions in the classes. The methods course posted the messages on WebCT, while the consulting course used Appleshare discussion board. The functional difference between the two software products is that Appleshare allowed students to construct their own topics and discussion threads while WebCT was not configured to allow that functionality. No other substantive difference existed between the two packages. Students were provided in-class instructions on how to use the discussion boards and then began using them after the first week of the class. The use of boards terminated prior to finals week.

In the structured online discussion condition, the discussion moderator posted a question weekly on WebCT. The question related to the experiences students were having with course content, using information technology for course assignments, and applying course content to their partnered organization. The students were expected to respond to the discussion question during the week, comparing their experiences and thoughts with those of their peers.

In the unstructured online discussion condition, students created and used discussion topics via Appleshare to coordinate their activities and reflect on their experiences. In keeping with an unstructured format, participation in the discussion board was not mandatory.

Data Collection

The data for the study were gathered upon completion of each class. The messages were captured for analysis into a Microsoft Word file. Overall, 361 messages "structured" messages and 147 "unstructured" messages were collected, along with topic and date identifiers. All the messages were then coded according to the established coding scheme.

Coding Scheme

This study adapted Selman's (1980) original coding scheme and Jarvela and Hakkinen's (2003) expansion of that scheme to fit the communicative dynamics of asynchronous communication. The five codes, explanations of those codes, and examples of each are provided in Table 1.

Table 1
Perspective-taking Coding Scheme with Examples

Code	Explanation	Example
Egocentric	Participants express their opinions in an egocentric and subjective manner. Opinions, suggestions and concerns of other people, if mentioned, are not taken into consideration by the author of the message. Task-oriented, directive and fact inquiry messages are included into this category.	Hi all, I will talk with you in class to discuss forming our final information about what will and what will not work for methods.
Subjective	Participants recognize, implicitly or explicitly, the involvement of other people in the discussion. They also recognize that other people could be affected by the results of the discussion or action. The recognition, however, is not followed by expressing agreement or arguing with the other existing point of view. The messages focus on the author's understanding of the situation.	Hello, I know that we will be receiving a lot of information in the next few weeks. I do anticipate that each of us will have a hand in different aspects of the audit, so the expertise on certain areas will be expected.
Reciprocal	The authors acknowledge the presence of other perspectives and may engage them. The recognition could be followed with a reaction such as approval, counter-argument, encouragement or expression of gratitude.	I think there are many, many pressing communication-related issues facing us today and it's hard to narrow it down to just one. I do agree with Annie, though, and believe a major issue is the lack of communication within marriages.
Mutual	The authors acknowledge other people's perspectives and also their effect on their own perspectives and opinions. These messages demonstrate the dynamics of engagement in other perspectives. Messages of this type also express group identities and discuss the subject matter from a third-person or "generalized other" perspective.	We met as a group tonight and did discuss some of the topics that the group commented on. One main topic was the fact that patients feel that their doctors sometimes have too many patients and they can't fully answer some of the questions that they have. This made us realize that they might resort to communication between their pharmacist or others within support groups. This made us realize that we should also touch on assertiveness in communication and the important of getting help and your questions answered.
Societal-Symbolic	The authors could consider multiple perspectives of many or all people who potentially could be affected by the outcomes of the discussion. These messages could contain references to various opinions and suggestions expressed by other discussion members. Subject matter of these messages are analyzed from theoretical, cultural, moral and societal perspectives. No societal-symbolic messages were encountered during the analysis, thus, no examples provided. The absence of these messages was also experienced in part one of Hakkinen, Jarvela, and Bynam's 2001 study.	We did not encounter a societal-symbolic message in the data. A theoretical example of such a message would be, "We know from our coursework that a variety of theories can be used to explain human behavior in organizations. If we encounter a situation in which that behavior creates conflict, then in order to help resolve that conflict we will have to be aware of each person's paradigm for their role in the organization, the organization's goals, and our own conflict resolution skills."

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Data Analysis

Before performing the coding of the entire data, two weeks of the WebCT messages and two categories of Appleshare threads were randomly selected for the coders'

reliability test. Each set of messages was individually coded by the authors and then compared to determine intercoders' reliability using Scott's pi (π = .902). Lombard, Snyder-Duch, and Bracken (2002; 2003) state that coefficients of intercoders' reliability of .90 and above are always acceptable, providing the basis for randomly dividing the remaining messages into two equal parts that were coded separately according to the scheme

The first research question seeks to find the dynamics of advancement in perspective-taking levels over time. For this purpose the data were divided by the weeks of the semester during which the messages were posted. Both classes posted online messages over a 13-week period. In order to create comparable units,

Table 2
Longitudinal Change in Perspective-taking
Levels in Both Classes Combined

	Section of the Semester			
Perspective-taking code	Weeks 1-5	Weeks 6-10	Weeks 11-15	Total
Egocentric	76	94	72	242
Subjective	38	96	37	171
Reciprocal perspective-taking	6	45	28	79
Mutual perspective-taking	2	12	2	16
Total	122	247	139	508

Table 3
Number of Perspective-taking Messages
by Time Period for Each Class

Message Type	Weeks 1-4	Weeks 5-9	Weeks 10-13	Total
Egocentric				
Structured	70	47	36	153
Unstructured	6	47	36	89
Subjective-role-taking				
Structured	36	88	27	151
Unstructured	2	8	10	20
Reciprocal perspective-taking				
Structured	3	25	16	44
Unstructured	3	20	12	35
Mutual perspective-taking				
Structured	2	11	0	13
Unstructured	0	1	2	3
Total				
Structured	111	171	79	361
Unstructured	11	76	60	147

the data were split into three sets: the beginning (weeks 1-4), the middle (weeks 5-9), and the end (weeks 10-13).

In order to trace the changes over time, a series of cross-tabulations was performed for each group individually. The chi-square tests were requested for testing the statistical significance of the findings. A series of simple linear regressions was performed for each group to establish a presence of association between the level of perspective-taking engaged by students and the progress of time across the semester.

The answer to the second research question required a comparison of means between the two samples. Therefore, an independent sample t-test was performed. Analysis of research question three required the creation of a separate dataset where two new variables were computed: the average level of perspective-taking for each individual participating in the discussion boards, and the final grade received by each individual at the end of each course. Correlations were run in order to establish a presence of the association between the two variables in order to answer the fourth research question and determine whether there is a difference in assumed levels of perspective-taking between the leaders and the followers in the unstructured class (the only set that had

a division between the leaders and followers), a t-test and a cross-tabulation with chi-square procedures were performed.

Results

The first research question attempted to discern changes in the levels of perspective-taking students employed over the length of the semester. The results of cross-tabulation for the entire set of messages for both classes combined demonstrated the presence of a change in perspective-taking levels in messages throughout the semester (Table 2). A chi-square test showed a presence of statistically significant association ($X^2_6 = 31.382$, $p < 0.001$).

Closer examination of each class separately, however, showed a presence of two different dynamics (Table 3). The structured discussion experienced a decrease in the number of "egocentric" messages in the third part of the semester, compared to the first part, and the number of egocentric messages decreased in the middle of the semester, compared to both the first and the third parts. The number of "subjective" and "mutual" messages increased during the middle of the semester and decreased during the last third. The number of "reciprocal" messages increased by the

second part of the semester and showed only a slight increase during the third part of the semester. Results of the chi-square test for this group showed to be statistically significant ($X^2_6 = 48.477$, p < 0.001).

The evolution of the unstructured postings was different. The number of "egocentric" messages posted increased during the middle part of the semester and decreased in its third part. The "subjective" and "reciprocal" messages followed a similar pattern; yet, the decrease in the number of "subjective" messages in the third part of the semester was minor. There were only three "mutual" messages in this group throughout the semester. A chi-square test showed no presence of statistically significant association ($X^2_6 = 2.735$, p = .841, n.s.).

These results were extended by performing simple linear regressions for the structured and unstructured sets of messages. The regressions were performed for the purposes of verifying the existing relationships between the two variables: students' perspective-taking and time in the semester. The linear regression analysis for the structured discussions resulted in an $R^2 = .030$, SE = .788, with an $F(1,359) = 10.921$, p < .001. Thus, there are grounds to suggest the presence of a relationship between the variables as well as the existence of patterns in individual perspective-taking across the semester. However, the linear regression analysis for the unstructured discussions did not show statistical significance ($R^2 = .000$, SE = .911, with an $F(1,145) = .022$, n.s.).

The second research question asked if there were differences in perspective-taking between structured and unstructured online discussions. An independent sample t-test was run to determine differences in students' use of different levels of perspective-taking between the two classes. The analysis indicated the presence of statistically significant differences (F=14.188, p<.000).

In order to answer the third research question, correlations were performed to determine if the students' level of perspective-taking and grades were significantly related. Level of perspective-taking and grades were significantly correlated in the structured discussion class (r = .365, p < .05) but not in the unstructured discussion class (r = -.331, p = .210, n.s.). For the structured discussion class, regression analysis shows that 13 percent of the variance in grades can be explained by the extent and levels of perspective-taking used ($R^2 = .133$, SE = .571, with an F (1,36) = 5.370, p<.05). The results of a regression analysis for the "unstructured" class showed no significant association between the variables ($R^2 = .110$, SE = .527, with an F (1,15) = 1.724, n.s.)

The investigation of the fourth research question focused on examining the difference between the levels of perspective-taking assumed by leaders and followers.

The dataset used for the analysis was limited solely to the class that used the unstructured discussion format. The results of a t-test showed insufficient difference in means between the groups (leader=1.61, follower=1.81). The cross-tabulation demonstrated the comparison of various perspective-taking levels in postings between the leaders and followers (Table 4), and the chi-square results showed no statistical significance to substantiate the difference ($X^2_3 = 6.720$, p = .081, n.s.). It is, however, important to notice the difference in the actual number of messages on the subjective role-taking level: the leaders produced fewer than half (42%) the messages of this level than the followers. The followers, however, did not exhibit any mutual perspective-taking level in their messages, while leaders produced three.

Table 4
Difference in Perspective-taking
Between Leaders and Followers

Category	Follower	Leader	Total
Egocentric	50	39	89
Subjective role-taking	14	6	20
Reciprocal perspective-taking	16	19	35
Mutual perspective-taking	0	3	3
Total	80	67	147

It is also important to notice that examination of these relationships among the entire pool of leaders' messages and the messages produced by the followers demonstrated that the difference between the groups is statistically significant ($X^2_3 = 24.378$, p <.0001). Despite the fact that such a result could be attributed to the susceptibility of the chi-square test to the sample size, this does not fully explain the difference between the groups, leaving the question open for further investigation.

Discussion

Changes in levels of perspective-taking did occur in the structured discussions but not in the unstructured discussions. In the structured discussion class, low-level perspective-taking messages (i.e., egocentric) started high, dipped, then ended up higher. Mid-level perspective-taking messages (i.e., subjective and reciprocal) increased drastically from the first to second thirds of the class, falling off or stabilizing at the end of the class. High-level perspective-taking (i.e., mutual) also showed a dramatic increase and then a falling off on a percentage basis, though in actual numbers, the change was small. This makes sense if one considers a typical class dynamic. At the beginning of a semester, students are concerned with understanding the class,

learning their role(s) in the class, and understanding how to orient to their work-group members. Egocentric levels of the messages at the beginning of the semester can potentially be attributed to Goffman's (1967) idea of building a socially acceptable perception of self and then maintaining it. Centering messages on one's perspective in this context is similar to the disclosure of personal details during regular, co-present, cue-filled interaction. Ramirez and Burgoon (2004) argue that initial interactions serve as a basis for further elaboration of the relationships given that various indications of "the degree of involvement, mutual co-orientation, perceived common ground and connection, mutual understanding, …and interactional coordination" (p. 439) are presented and exchanged by all the participants. According to our rubric, instrumental, task-oriented messages were associated with the lower levels of perspective-taking. At the beginning of the semester, students are attempting to present themselves as interested members of the group, willing to cooperate and exchange ideas. They present their ideas as pertaining to specific tasks and as their individual accomplishments, which is compliant with the egocentric level.

Low-level perspective-taking is not surprising as roles and relationships are being probed and defined. As those roles and relationships are understood and developed, toward the middle of the semester messages are needed to facilitate productive group interaction, the sharing of ideas, and the smoothing of budding conflicts. Thus, higher-level perspective-taking messages are in order. Toward the end of the semester, it is not uncommon for students to complain about the time demands they are under. Within a class, it is necessary to focus on the task at hand, particularly if good working relationships have already been established. If the group integration is lacking and the working relationships are not as productive, it is also important to stay focused on the task and communicate this focus through task-oriented messages in order to create the evidence of continuous work to support any potential dispute over the input into group work. Therefore, a reduction of higher-level perspective-taking messages should be expected in both scenarios.

The fact that no significant changes in the levels of perspective-taking messages occurred in the unstructured discussion class may rest on the students' task focus. Message trends were similar between both classes, but students in the unstructured discussion class focused their topics of discussion on tasks to be accomplished, letting reflective comments come up organically or using face-to-face group meetings to engage in those types of messages. It would be interesting to learn if a simple instruction given at the beginning of the class could lead to more, higher-level perspective-taking in an unstructured environment.

Such an instruction might tell students they are free to form their own topics, but they need to specifically build reflection into the discussion. This semi-structured approach warrants investigation. Similarly, capturing both the online and offline messages used by groups would tell researchers if the presence or lack of structure modifies what students talk about and in which venue they talk about it.

No differences were found in the average value of perspective-taking messages between the structured and unstructured discussions. Trends in differences in perspective-taking appear to be shaped by group formation and task activities in the structured class but only by task activities in the unstructured class. Calculating an average perspective-taking score across the semester, as we did to answer this question, hides the variance that was brought to light by research question one.

As with research question one, the investigation of research question three demonstrated that there is a relationship in the structured class but not in the unstructured class. We believe there exists a significant relationship between perspective-taking and grades across both classes, but because the unstructured discussions focused so heavily on task-oriented matters, the full range of perspective-taking was not made manifest online. Again, capturing messages on and offline would give us better visibility to this relationship. However, it is important that perspective-taking was found to be significantly related to grades in the unstructured discussion class. This provides some support for Mezirow's (1978) integration of perspective-taking into the learning process. Although future research will help investigate whether perspective-taking is related to or even increases learning across all academic disciplines and task domains, the present study demonstrates that various levels of perspective-taking can be used in the process of achieving learning goals ranging from gaining deeper understanding of a subject to learning how to implement a hands-on task in a timely manner.

Holding the assumption that higher-levels of perspective-taking are always warranted may lead to inefficiencies in the classroom and in the workplace for those learning and workplace situations that do not benefit from messages coming from higher-levels of perspective-taking. The evidence of this is rooted in the initial differences between the investigated populations, as the earlier studies (Piaget, 1926; Mead, 1934) suggest.

Regarding the inquiry into the differences in perspective-taking between the leaders and the followers, no significant difference was found. This question, however, remains open and has potential for future investigation, as the limitations of the current study could have constrained the findings in a variety of

ways. Should this question be addressed again in the future, the following steps would allow determining its viability: a) an initial assessment of the leadership styles should be conducted to provide an insight into the potential influence of the style on the level of perspective-taking assumed by the leader throughout the duration of the group work, and b) a requirement to share thoughts online on a regular basis should be set up for both leaders and followers in order to create an environment conducive for a variety of messages, not only instrumental and task-oriented but also reflexive and cooperative.

Limitations

The main potential limitation is the lack of the initial appraisal of the leadership styles to determine the inclination of the leaders' to produce messages on a particular level of perspective-taking. The fact that only one class employed the system of leaders and followers potentially constrained the analysis as the number of messages in the set was limited. The examination of this relationship with a larger sample size could provide an important insight into our understanding of the issue.

Some readers may argue that the level of the two classes may be problematic, as the structured discussion class was at a lower level in the curriculum than was the unstructured discussion class. If course level in a curriculum mattered, we would expect to see higher-levels of perspective-taking in the higher-level course. That was not the case here. That all of the students in our sample were able to engage in perspective-taking further supports our contention. Allowing topical choice and students' use of the online discussion for task completion in the higher-level class is what explained the differences in perspective-taking.

Conclusion

There appears to be evidence that teachers can structure online discussions to increase the levels of perspective-taking and to increase students' learning as measured by grades. This finding extends the research on the use of online discussion. Previous research has shown that such online discussion can approximate the robustness/dynamics experienced in face-to-face discussions (Jarvela & Hakkinen, 2000; Shuang & Qinhua, 2001). This study extends the findings of that research by showing a connection between perspective-taking in online discussions and student learning: presented with a necessity to maintain regular theoretical discussions, the students demonstrated a longitudinal increase in their level of perspective-taking, while students that were presented with instrumented tasks did not demonstrate a similar change.

This study shows that students do engage in different forms of perspective-taking when they communicate with each other during online discussions. This may be useful information in the course development process, particularly for online course creation. With increased attention being placed on student learning outcomes and assessment, gaining visibility to how students orient to each other through their discussions can help show personal growth. To the extent that such growth is part of a learning goal of the course, the academic program, or the institution, the methods used in this study provide one method for assessing the attainment of that learning goal. This is especially useful to teachers and designers of online courses who are looking for ways to build community and engagement as part of the class culture.

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