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# How may e-learning groups interact?

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## ABSTRACT

How may e-learning groups interact? According to Wheelan (1994), for physical groups there are several types of interaction: dependency, flight, fight, counter-dependency, pairing, counter-pairing and work. Our study adopts the content analysis approach to investigate how virtual groups from a cyber-university interact over a period of twenty weeks. Our findings suggest that those e-learning groups flight, work, fight, and pair. Flights reinforce the cooperative relationships and then help building a stronger social relationship. Fights provide important diagnostic evidences to each member to assess and adjust his or her values and needs. Partners pair to demonstrate concerns and desire for satisfying others' personal preferences and wishes. Work appears swiftly and facilitates members to continually cooperate.

Keyword: virtual group interaction, e-learning.

## INTRODUCTION

The Computer-Mediated-Communication (CMC) technology provides a unique opportunity for learning and sharing knowledge free from constraints of time and place. A variety of learning technologies have already been developed, incorporating advanced technologies such as live video, and multimedia animation. Several researchers have suggested that this group-based, work-oriented learning in the Internet environment allows members to develop forms of expression that enable them to communicate social information, codify group-specific meanings, negotiate group specific identities, and create norms that serve to organize interactions and to maintain desirable social climates (Rafaeli, 1988; Rheingold, 1993). For e-learning, a virtual group is also characterized by its work-orientation, meaning that the group has a specific objective or

recognizable goal to be attained and members must coordinate with one another to set policies, make plans, execute these plans, and monitor their own activities to achieve this goal (Hogg, 1992). How can such virtual groups interact to become productive in their work?

According to Wheelan and her colleagues, there are seven categories of physical groups' interaction: dependency, flight, fight, counter-dependency, pairing, counter-pairing and work (Wheelan, 1994; Wheelan, et al., 1993, 1996, 1998). Wheelan's work suggests that the link between group interaction process and working effectiveness is conspicuous (Wheelan, 1994). That is, over time a work-oriented group will exhibit an increasing degree of maturity and performance if members succeed in overcoming the barriers. Is the same true for CMC (Computer-Mediated Communication)-based work-oriented groups? Since there has been little empirical research on virtual groups' interaction (DeSanctis & Monge, 1998), we may assume that the virtual groups interact with the similar verbal categories. Our objective is to investigate how virtual groups interact in their work.

## **GROUP INTERACTION CATEGORIES**

Recently, there has been significant interest in the interaction process conducted by groups. For example, Wheelan (1994) identified seven verbal categories in the interaction process to observe the group development. Garrison and colleagues (1989 & 1990) showed that interaction is the core of the collaborative learning groups and the interaction process is fundamental to the effectiveness of e-learning groups. Fulford and Zhang (1993) and Kearsley (1995) demonstrated that the interaction process was as important as the learning process. In order to understand the relationship between interaction and learning, Henri (1992) also proposed an analytical framework to assess the interaction process in a collaborative computer conferencing environment. Harad et al. (2000), McDonald and Gibson (1998), Newman et al. (1995), and Gunawardena et al. (1997) utilized Henri's model to study the characteristics of each interactional stage for collaborative learning groups. This line of research showed that if learning was indeed constructed within a group of participants, analyzing the interaction process should give us a view of how virtual group learned. However, these studies observe the characteristics of the interaction process.

In this research, our objective is to investigate how e-learning groups interact with the group development based on Wheelan's model. Wheelan (1994) has summarized the previous studies (Tuckman, 1965; Wheelan

& McKeage, 1993) and concluded that for all types of groups, there are more similarities than differences in their interaction verbal categories. She suggests that group interaction verbal categories can be characterized by seven: dependency, flight, fight, counter-dependency, pairing, counter-pairing and work.

Dependency statements are those that show the inclination to confirm with the dominant mood of the group, to follow suggestions made by the leader, and generally, to demonstrate a desire for direction from others. Flight statements are those that indicate avoidance of task and confrontation. Fight statements are those that convey participation in a struggle to overcome someone or something; they imply argumentativeness, criticism, or aggression. Counter-dependency statements are those that the assert independence from and rejection of leadership, authority, or member attempts to lead. Pairing statements are those that include expressions of warmth, friendship, support, or intimacy with others. Counter-pairing statements are those that indicate an avoidance of intimacy and connection and a desire to keep the discussion distant and intellectual. Finally, work statements are those that represent purposeful, goal-directed activity and task-oriented efforts.

## **METHODOLOGY**

We have chosen virtual groups from a cyber-university for our study. The class we observed lasted over a period of twenty weeks beginning on March 25, 2000 and ended on July 25, 2000. Among the total of one hundred and fifty-eight participants thirty-five were female. Their occupations were diversified, including teachers, programmers, managers, journalists, project leaders, doctors and company workers. They were assigned to twenty-five groups and were required to meet face-to-face in the first week of the semester. In average, there were 6-8 persons per group. In the virtual class, students and the teacher had on-line cyber-office hours every week. Students were evaluated based on the quantity and quality of their contribution to the discussion and the final project report. There was also a BBS (Bulletin Board System) per team for students to collaborate with one another. They held another two face-to-face meetings with teachers in the middle and the end of the semester.

### ***Tasks***

In this study, McGrath and Hollingshead's (1994) task design for group development was followed. Students were asked to accomplish a complex group project, which was consisted of four sub-tasks arranged

sequentially: (1) to generate ideas, (2) to choose a preferred solution, (3) to negotiate, (4) to execute. Initially all groups were asked to determine the subject that they wish to pursue for the semester. Participants must focus on generating ideas and setting goals. Next, each group had to submit a project proposal. It required members to divide the tasks and set up the coordination mechanism so as to keep the work running smoothly. Third, members must execute the sub-tasks, which include searching for information, exchanging this information, clarifying task description, and monitoring performance. Finally, groups are to turn in a written report with related documents. A formal, face-to-face presentation is also required at the end of the semester.

### **Content Analysis**

Our study has adopted the categories that Wheelan (1994) has developed and that may represent the types of verbal statements associated with the various stages of group development outlined in the research literature (Wheelan, 1994). Content analysis could reflect cultural patterns of groups and reveal the focus of individual, group, institutional, or societal attention (Krippendorff, 1980; Weber, 1985). It also reveals how themes or topics of conversation emerge, travel, and gain acceptance in a set of interacting groups.

The primary coding categories of group interaction verbal categories were references to (1) dependency, (2) flight, (3) fight, (4) counter-dependency, (5) pairing, (6) counter-pairing, and (7) work (Wheelan, et al., 1993, 1998). Two or more researchers perform content analysis separately and compare their findings to ensure that the results are reliable. They were trained in order to ensure coders' skill and reliability in placing the unit into a proper category. Several rounds of training practice were necessary and the training was considered complete only when the reproducibility reliability of the results from the two coders exceeds 90% (Krippendorff, 1980; Weber, 1985). In the fifth training round, this reliability index of group development reached 90.10 percent. The training was then stopped and official coding began. Like in training, the reproducibility reliability of the official coding between the two coders must be assessed for the official coding. The reproducibility reliability of the group interaction category was 94.61 percent. For the present study, two hundred and fifty discussions were used and the inter-rater reliability was 94.37 percent.

### **Result**

A total of 12,567 verbal statements were obtained across twenty weeks of twenty-five groups in spring semester 2000. Of these, 1,477 units (13.32% of the total) could not be classified into one of the seven categories of the integrated group development process because these units were either duplicated or fragmentary. Therefore, the number of units used in the various analyses totaled 11,091.

Figure 1 displayed the pattern of each category. The frequency of dependency was high in the early weeks; and so was flight. Fight sentences peaked in the middle weeks, and work was high during the later weeks. The proportion of pairing increased during the last weeks. Note that Figures 1D and 1F show that very low number of counter-dependency and counter-pairing verbal statements were generated at all weeks, indicating a possible difference between e-learning groups and physical groups.

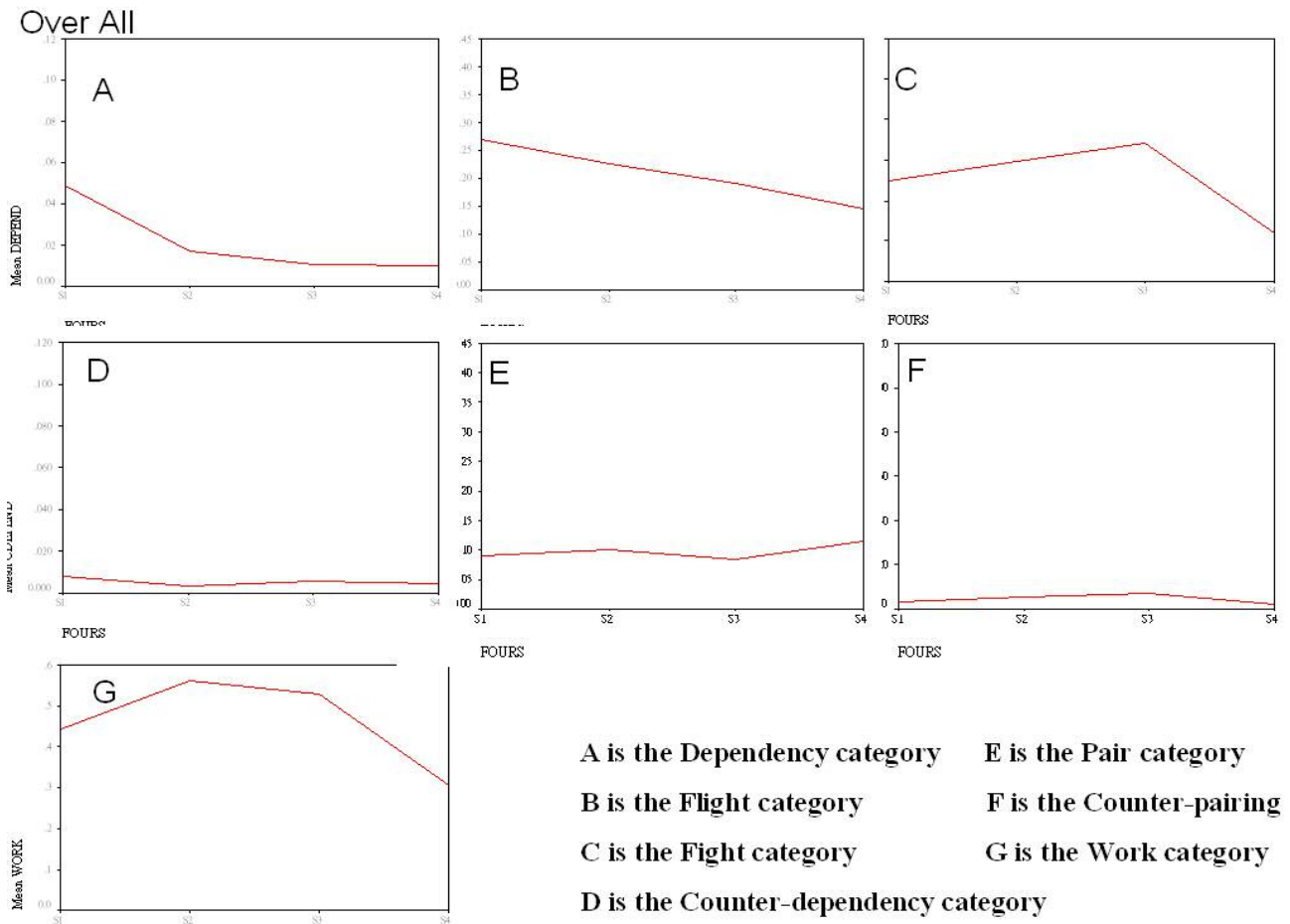


Figure 1. The Virtual Groups Development Process

**Dependency and Flight**

Consistent with the study by Wheelan (1994), all of the e-learning groups generated a large number of dependency and flight-type statements in the early weeks (see Figure 1A and 1B). A typical example of this sort of expressions was "no problem, we will follow the leader's commands ..." (in groups H2, L5, L17) or "our team members are experts.....I believe we could accomplish our mission successfully.... This is great....and I will follow it..." (in group H4).

A profusion of positive feelings and idealization of the members characterized typically the beginning of the group development. Members tended to be overly polite and tentative in an attempt to ward off potential group rejection, and they always conform to the leader to reduce their anxiety. Dependency and flight communication reinforced the cooperative relationships and then helped building a stronger social relationship among the team members. Consequently, in this stage members' focus was largely on generating warm feelings to maintain a good group relationship.

### ***Fight***

When words are said but results are not delivered, members could not accomplish their mission and become frustrated. Conflicts at this time become inevitable. Thus, our study shows that in the third stage of the virtual group development, the number of fight statement peaks (see Figure 1C). For example, expressions such as "I do not agree your arguments...," "This approach is not appropriate...," and "Our project is not qualified...The problem is..." appeared in many groups.

According to the Wheelan's study (1994), fights pave the way for resolving conflicting needs and preference differences, allowing the partners to further solidify their state of corporation. That is, when fights emerge and are resolved successfully, members' relationship could be permanently stabilized (Lewicki & Bunker, 1996). H5 is an example of success resolving conflicts. Members expressed doubts, such as "It is not a good idea... we could try another method..." or "You need to revise..." Yet, at the same time, they gave warmth and support to encourage their partners, like "You did a good job...," "We could overcome it together...," or "I can provide you some relevant information about..." After several weeks, H5 team members figured out the project schedule together and expressed sense of satisfaction through on-line discussions. At that time, they already agreed to a common goal and shared a structured communication process. One of them said "I enjoyed very much working with you. This is an impressive negotiation process..." and another said "I think it is a great

experience that we could build our ideas upon this project....” Ultimately, H5 members dealt with conflicts successfully.

However, conflicts may also lead to dysfunctional groups, partly because members failed to act as expected and partly because this questioned about one’s own initial judgment concerning the categories obtained earlier. L3 is an example of group development failure. From the second stage to the third stage, L3 members disagreed with their final report draft and had a heavy fight. The leader said, “You should be more responsible! Didn’t you promise to have an interview with a manager of that company? Look at what you have handed in!” One member did not accept the leader’s critique and responded by saying “It is unfair.....I have done everything I could ...” Other members also failed to act as expected, and negative emotion prevailed. Ultimately, L3 group failed in their final project. Members thought that their group was unreliable and felt frustrated. Their cooperative relationship was then broken.

To sum up, conflicts are of value and importance to productivity virtual group. For virtual groups, as is for the physical groups, members’ fights are critical to the success or failure of group interaction. Fights provide important diagnostic evidences to each member for virtual group to assess and adjust his or her values, needs, and preference in order to make successful transition into the next stage. If virtual groups avoided fights or either withdrew from problem solving, they lose opportunities to evaluate problems in groups.

### ***Pairing***

The percentage of the pairing statements peaked in the later weeks (Figure 1E). By this time, members of successful groups were confident that they could successfully deal with conflicts within their relationship. To repair the wounds caused by conflicts, partners must demonstrate concerns and desire for satisfying others’ personal needs, preferences, and wishes. They could then freely encourage others to express their concerns. For example, the leader of H7 invited every member to solve problems together when members had conflicts. They said things like “This idea is great and we need to talk about it together...,” “Your suggestions help us to think about it more detailed...,” or “We would like to know everyone’s comments...” In essence, partners truly felt they were accepted as the way they were, and developed mutual understanding. In such situation, participants’ expectations generally fit into their general set of solidarity involvement. Moreover, for successful group development, a sense of trust and identity of the group could grow based on one’s assessment



of the feelings and attitudes that the partners have toward one another. For example, in group H2, members in the third stage had fights by saying "Our project is not qualified...The biggest problem is...". But in the third stage, they also claimed "I feel proud of our group, and I know you do your job very hard....." "I know we could do it...." or "We could overcome it together....." The above statements made H2 members believe they could accomplish the group goal in spite of the conflicts they had.

## **Work**

In our data, the middle period was characterized by a surge of pairing and work-type statements, although pairing statements would surge again in the fourth stage. However, many of the work statements may not bear relevance to the accomplishment of the group goal. For example, "I found several relevant documents for our work. Please refer to <http://.....>" or "I think that this attached file is helpful for our project.

For groups that are formed for temporary purposes and that are under pressure to work, members emphasize speed and confirmation information in the beginning (Meyerson et al. 1996). As such, a person's work-type statements may serve to provide assurance to the group, therefore allowing one to maintain his or her reputation. Furthermore, this role-based interaction allows participants to cooperate with one another without spending time building relationships. Such swift surge in work and trust may occur in both the physical and virtual teams (Meyerson et al. 1996, Jarvenpaa & Leidner, 1998). More importantly, in the virtual world, category information based on the role can exert heavy influence in the early stage of group formation. According to the SIDE theory (Social Identification/ De-individuation Theory), individuals in temporary groups make initial use of category-driven information process to form stereotypical impression of others (Spears, et al., 1992; 1994). The categories affect expectations of good will or ill will and encourage swift work and swift trust. For examples, in the virtual world, the categories such as "leader" or "active participant" were quickly confirmed by their statement. In group H5, the leader always encouraged Mary to join their team work actively even she has no experience of learning in the cyber-university. To be a "good" member, Mary always posted her class notes, homework, technical reports, and interesting URL on their group board. She said "These documents are my collections from magazines web sits, newspapers....If you need more information, please let me know....." Thus, members of virtual groups rely heavily on category information at the beginning of group development and act accordingly. Jarvenpaa and Leidner (1998) have confirmed this in their study of trust development for virtual groups.

Note that the work statements may not be useful for completing the group project directly. Work-type statements are frequently made by individuals to indicate to other members their willingness to contribute, leading to the possible establishment of a cooperative and responsible group. However, fights will be inevitable since many of the work statements are nothing more than empty promises if they are not sustained by further work.

In short, e-learning groups produce dependency, flight, work, fight, and pairing statements throughout all weeks, although the number of counter-dependency and counter-pairing statements are few. In our study, dependency, flight, fight, pairing and work statements characterize the e-learning group interaction process.

## **Conclusion**

In this study, we have investigated how e-learning groups interact. Our findings suggest that e-learning groups often flight, work, fight, and pair in their interactions. Dependency and flight statements reinforced the cooperative relationships and then helped building a stronger social relationship among the team members. Fights provide important diagnostic evidences to each member to assess and adjust his or her values, needs, and preference in order to make successful transition into the future. Pairing is important to demonstrate concerns and desire for satisfying others' personal needs, preferences, and wishes. Finally, work-type interactions allow participants to work as a team and facilitate members to continually cooperate.

Our study contributes to the research of e-learning groups in that, we have applied the method of content analysis to observe and analyze the interaction process among learners in the virtual classroom. We have found that conflicts provide the opportunity to clarify psychological boundaries. Conflict has been described as essential to the development of cohesion (Coser, 1956; Northen, 1969). In this study, we discover that conflict content is important for the e-learning group to establish a mature negotiation culture. In our study, there is a higher quantity of fight statements than counter-dependency statements. These fights aid cohesion, cooperation, and group integration if the groups pass through the fight successfully. However, counter-dependency may make groups members feel hurt and become hostile or aggressive. Thus, in our study, it appears that, in order to create a less anxiety-ridden negotiation environment, participants would rather use fight statements to focus on their work than use counter-dependency statements to break the superficial peace.

Positive conflict includes honest differences of opinion, agreeing to disagree, and debates to clarify positions. The absence or suppression of such conflict can lead to disastrous consequences like groupthink. Negative conflict, on the other hand, has its roots in personality conflicts, personal hatred, prejudice, and refusal to cooperate. Both fight and counter-dependency verbal, if not managed well, can be disruptive to the group development process. In well-developed virtual groups, members, while maintaining differences of opinion, learn to handle major sources of conflict that could tear the group apart.

According to Wheelan, group interactions change develops gradually over time: dependency and inclusion, counter-dependency and fight, trust and structure, and work. However, our data present pairing statements appear frequently during early stages. We suspect there exist difference between physical groups and e-learning groups. In our data, pairing statements emerge quickly through the expectations, experience, and stereotype in the first stage. For example, participants in H2 and H4 groups identified their old groups' strong local character and colorful leader in its early semester. They often said "In the last semester, we have a great leadership..." or "...I remember we have a great group and I believe we will. ...". In H2 group, they said "I am so happy to work with these old friends and I believe we will have a wonderful semester..."

According swift trust (Meyerson, et al., 1996), virtual groups' members under time pressure make greater use of category-driven information processes. Categories invoke to speed perception reflect role, industry recipes, cultural cues, and occupational and stereotypes. Thus, all of valuable things can be entrusted to individuals who seem to fit category-driven information (Mcknight, et al., 1998). For e-learning groups' members, their present behavior is also shaped by their past experiences in the group in our study. Thus, category-driven information might allow members to trust their group quickly and work as a team rapidly in the cyberspace. In another word, category-driven information is helpful for e-learning group members to import trust to work initially. This differ the e-learning groups from the physical groups.

There remains are several issues for future research. First, studies are needed to examine if all of these seven categories work as well for virtual groups as for physical groups. Also, groups having specific goals share common properties with which people carry on their discussion with others. They perceive human

feelings and they form interaction process with their members on the web. Therefore, future research is needed to address how to create sustainable, intensive interaction process exists such the e-learning groups can accomplish the group goal. Moreover, there is a need to go beyond the coded interactions for e-learning groups. The effect of the non-language behavior can be an important assistance to online interaction. Finally, the interaction process of male may differ greatly from that of female; studies of these differences may enable us to better understand gender differences that may exist in the cyber world.

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