

Identifying Learner Behaviors, Conflicting and Facilitating Factors in an Online Learning Community

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The purpose of this study is to identify patterns of learner behaviors, conflicting and facilitating factors during collaborative work in an online learning community(OLC). This study further seeks to investigate the difference of learner behaviors between high- and low-performing groups, and conflicting and facilitating factors. The online postings from four groups(19 students) in the spring semester(study 1) and six groups(24 students) in the fall semester(study 2) were analyzed. A coding scheme was generated based on constant comparison using the qualitative data analysis tool, NVivo. The analysis identified 7 categories of learner behaviors in both studies. Among the seven categories, information seeking and co-construction were most frequently observed in both studies. One evident difference between the high- and low-performing groups was that the high-performing groups revealed more incidents of learner behaviors in both studies. In addition, six categories of conflicting factors and five categories of facilitating factors were emerged in both studies. The inefficiency of work category was one of the most frequently observed categories in both studies. Interestingly, the high-performing groups showed more incidents of conflicting factors than the low-performing groups. This study revealed two different types of conflicting factors and there is a need for different moderating strategies depending on its type. Based on the results of the study, effective design strategies for an OLC to facilitate active learning were suggested.

Keywords : Conflicting factors, Facilitating factors, Online learning community, Learner behaviors

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Introduction

With the increasing popularity of online learning, the instructional approaches and strategies applied in its environments have become more diverse (Kirschner, Strijbos, Kreijns, & Beers, 2004). Working collaboratively in groups to achieve common learning goals results in significantly higher achievement and retention than does competitive learning (Dyer, 1993; Hooper & Hannafin, 1988; Johnson & Johnson, 1996). In addition, incorporating computer-mediated communication (CMC) in networked environments has been expanded the learning spaces and pattern of learner behaviors as they engage in learning activities. This stretched learning environment benefit students by providing opportunities to extend their experiences by sharing their ideas and receiving feedback from peers (Palloff & Pratt, 2005). In addition, learning together provides chances for students to improve collaboration and communication skills that are required on the job (Bennett, 2005).

In this new and expanded learning environment students have to cope with “ambivalence” (Dirkx & Smith, 2005). It is derived from mixed feelings of wanting to be responsible for oneself and being independent in one’s learning, and of expecting to be dependent on one’s belonging group during learning activities. Students experience fear of being isolated from the community. In addition, in collaborative group work the authority of teachers is diminished and students need to adapt to a changing role carrying out group tasks on their own and making decisions.

Although studies have been conducted to identify the patterns of group interactions performed via asynchronous CMC little attention was made to the learner behaviors in conjunction with the conflicting factors as well as facilitating factors as learners encounter while engaging group work. A major focus of CSCL (Computer-Supported Collaborative Learning) has been providing better ways for learners to communicate and collaborate so that they can achieve a common

learning goal (Kirschner et al., 2004). Yet, group synergy created by collaboration is not fully explained in CSCL theory and still remains an abstraction (Stahl, 2006). In addition, very few research has focused on whether the identified pattern reveals any differences between high- and low-performing groups.

In order to ensure quality of learning and that students have a positive learning experience overall, efforts to identify these tensions and interventions to resolve them are essential. The prerequisite tasks for proper intervention and facilitation are to grasp a clear picture of the collaboration in an OLC and to identify conflicting and facilitating factors in reaching a common goal. The purpose of this study is to identify the emerging patterns of online learner behaviors in an OLC and to identify facilitating factors and conflicting factors while learners engaged in group work. This study also seeks to determine whether high performing groups show different patterns of behaviors, and conflicting and facilitating factors from their counterparts. The implications drawn from the research findings may provide directions for effective designs and facilitating strategies that are congruent with nontraditional pedagogies of learning, such as an OLC.

This study sought to address the following questions:

What are the emerging patterns of learner behaviors, conflicting and facilitating factors in an online learning community?

How do the high performing groups differ from the low performing groups in learner behaviors, and conflicting and facilitating factors?

Theoretical Background

An online learning community (OLC) is a learning environment based on constructivist learning theory. The term community has been used in many different fields of study with different meanings. Rheingold (1994) defined an

online community as “a group of people who may or may not meet one another face-to-face, and who exchange words and ideas through the mediation of computer bulletin boards and networks” (Rheingold, 1994, p.57-58). In educational settings, an OLC is defined as a group of individuals who interact with each other through computer-mediated communication, sharing knowledge and experience to achieve a common goal of constructing new knowledge as well as experiencing growth both individually and as a group (Kang & Lim, 2002). In an OLC, learning is not only viewed as acquiring knowledge but as a participatory process which includes performing, belonging, and transforming (Ng & Hung, 2003).

Though OLCs come in different sizes and forms, they have common characteristics. First, the members of an OLC share their experiences, information, and resources to understand topics that the community is pursuing. Second, the members of an OLC assume their responsibilities and duties in making decisions together. Third, the activities of an OLC produce learning outcomes continuously and autonomously like a growing organism and these activities lead to improving collective knowledge. Fourth, an OLC has a cohesive nature and a learning culture in which its members take part collectively to understand the topic. Fifth, the members of an OLC share values, beliefs, and language, and construct knowledge through sharing and learning of how to learn from each other (Bielaczyc & Collins, 1999; Kang & Lim, 2002). For an OLC to grow continuously, it needs explicit components and implicit criteria. The explicit components include community members who actively participate and play their roles, reasons to be part of the community, rules and policies to abide by, and a support system to ensure efficient social interactions. The implicit criteria which are composed of honesty, responsiveness, relevance, respect, openness, and empowerment govern the quality of OLC experiences.

The importance of online learning communities in learning and teaching has been addressed in many studies (Harris & Muirhead, 2004; Rovai, 2002; Swan, 2002; Tu & Corry, 2001). The research has been extended significantly beyond a

simple survey, experiments, case studies, and quantitative analyses (Mason, 1992). The studies took a wide range of perspectives and with a variety of approaches. Some research investigated students' experiences and their perceptions by using an ethnographic method (Kitchen & McGougall, 1999), and others examined the effectiveness of different tools, techniques, and learner outcomes in collaborative learning environments (Alon & Cannon, 2000). The most salient trend is the research pursued from the sociological perspective. In this view, learning is considered as a social process and evaluated in the social context. Social presence is considered to be a factor that instigates and supports critical thinking in an OLC (Rourke, Anderson, Garrison, & Archer, 1999). Social context, online communication and interactivity were identified as three dimensions of social presence (Tu & McIsaac, 2002).

On the other hand, researchers examined the productivity of collaborative learning by analyzing students' reports and group interviews (Ronteltap & Eurelings, 2002). In doing so, they sought to see what types of learning issues (practical issues vs. theoretical issues) generate the most interactions and the highest level of information. They classified documents according to whether learners' activities are low level ones such as cutting and pasting or higher level postings that require summarizing, synthesis, interpretation, and reflection.

Collaborative learning is empowered by language and its support of social interactions. Researchers took a linguistic approach and proposed a model that allows learners' language acts to generate specific learning situations (Cecez-Kecmanovic & Webb, 2000). Based on Habermas' theory of communicative action, the model classifies students' linguistic acts (i.e., seeking understanding, establishing rules, expressing personal views, etc.) constituting collaborative learning processes in two dimensions: the dominant orientations of learners (learning, achieving ends, and self-representation) and the domains of knowledge (subject matter, norms and rules, and personal experience). The model made it possible to identify the type and degree of collaborative learning (Treleaven, 2004).

Some studies were interested in investigating the source of tensions and frustrations that learners experience in collaborative work. Analyzing interviews with graduate students, researchers identified reasons of students' resistance and reluctance towards group work (Dirkx & Smith, 2005). The results showed that one of the main causes of this phenomenon is the changing roles of instructors and learners. In traditional learning environments, instructors control the flow of information and activities, and have absolute authority. In collaborative learning, however, learners play a major role in planning and managing their own activities, while instructors become moderators or facilitators. Learners experience contradictions when they accept this change and adapt to their new roles. The study also revealed that another reason for the negative experience was derived from inter-subjectivity and interdependence required in community activities. In an OLC, learners are required to share their ideas and opinions with other members of the community and should recognize that members depend on each other to achieve a common learning goal.

Method

Participants and Context of the Study

Study 1

This study selected a college-level course offered in the spring semester of 2006 at a university in Seoul, Korea. The class selected for this study used an online learning environment called "Cyber Campus" provided by the university. Through "Cyber Campus" the university offers online courses and provides online space for offline courses. Instructors can customize the menu as necessary. The functions include sharing course material, discussion board, chat room, collecting reports, administering online quizzes, etc. The name of the course was "Introduction to

Educational Technology” and it lasted for a semester of fifteen weeks. The class met weekly on a regular basis but the major portion of students’ learning efforts consisted of the online group project. The main goal of the course was to learn about the key areas of educational technology: design, development, utilization, and evaluation. Each group was given a designated online discussion board accessible only to group members, the teaching assistant, and the instructor. Each group was assigned a project topic and the team collaboratively researched the topic, interviewed an expert who was working in a related field, created a final report, and gave a class presentation.

Out of ten groups in the class, four groups (19 students) were selected based on group performance as evaluated by the instructor. Two groups were the top performing groups and the other two were the bottom two performing ones. The group project accounted for 50% of the grade. Among them 30% was a group score which was given equally to all group members and the other 20% was given individually depending on each student’s participation. Students were encouraged to plan and discuss the group project in online discussion board although they scheduled offline meetings to discuss about the group project as they met to attend the lecture. The data collected for Study 1 included 451 messages posted on each team’s online discussion board, and documents and products the participants produced related to the group project. The two high performing groups had 171 and 111 messages, whereas the low performing groups had 83 and 86 messages, respectively. They were all female students including 12 freshmen, 2 sophomores, and 5 juniors.

Study 2 (Confirmatory study)

As a confirmatory study another course of a different learning context offered in the fall semester of 2006 in the same university was selected. The name of the course was “Information Society and Education” and it lasted for a semester of fifteen weeks. The class met weekly on a regular basis but the major portion of students’ learning efforts consisted of the online group project. Through the

course, the students learned about different online learning methods (i.e., web-based instruction, problem-based learning, goal-based scenarios, resource-based learning, WebQuest and etc.). In addition, this class offered an offline lab in which students learned how to use software needed to implement an online course for their final project.

Out of fourteen groups in the class, six groups (24 students) were selected for Study 2. Three groups were from the top performing groups and the other three were from the low performing groups. Performance was based on the evaluation of the group project by the instructor. The group project accounted for 50% of the grade. Among them 40% was team score which was given equally to all team members and the other 10% was given individually depending on each student's participation. The team score was measured in four areas: completeness, relevance, interface design, and activity design. The total number of messages was 554. Three high performing groups posted 321 messages (180, 107, and 34, respectively), whereas the three low performing groups had 233 messages (56, 122, and 55, respectively). They were all female students including 17 freshmen, 4 juniors, and 3 seniors.

Data Analysis

The procedures of data analysis are outlined in figure 1. Step 1-4 show how the initial coding scheme was generated, steps 5-8 represent an effort to ensure its reliability, and steps 9-11 were efforts to identify emerging patterns of learner behaviors, conflicting and facilitating factors. In step 1 and 2, the researcher free coded Study 1 data and Study 2 data. The coding scheme was combined in step 3. In step 4, the researcher and the 2nd researcher reviewed the coding scheme examining definitions of each code, categories, and its mutual exclusiveness.

In step 5, the sample data was selected. Out of 19 participants' data in Study 1, 4 participants' data (two from the top performing groups and the other two from the low performing groups) were selected for comparison. Likewise, out of 24

participants' data in Study 2, 6 participants' data (three from the top performing groups and the other three from the low performing groups) were chosen. The researcher and an independent coder separately coded the sample data set. In step 6, the coding results were compared and the two coders resolved the discrepancies by refining ambiguous code definitions. The two coders iterated this process until they reached the inter-rater reliability .82. in step 7. In step 8, the researcher and 2nd researcher reviewed the coding scheme and asked two external researchers to review the codes and their definitions.

In step 9, the researcher coded entire data set including Study 1 and Study 2 with NVivo. In preparing this step, the researcher imported online transcripts from the system and created a file for each participant. In step 10, the researcher generated frequencies of codes in each category. In step 11, the researcher further examined the data by top and low performing groups in both studies.

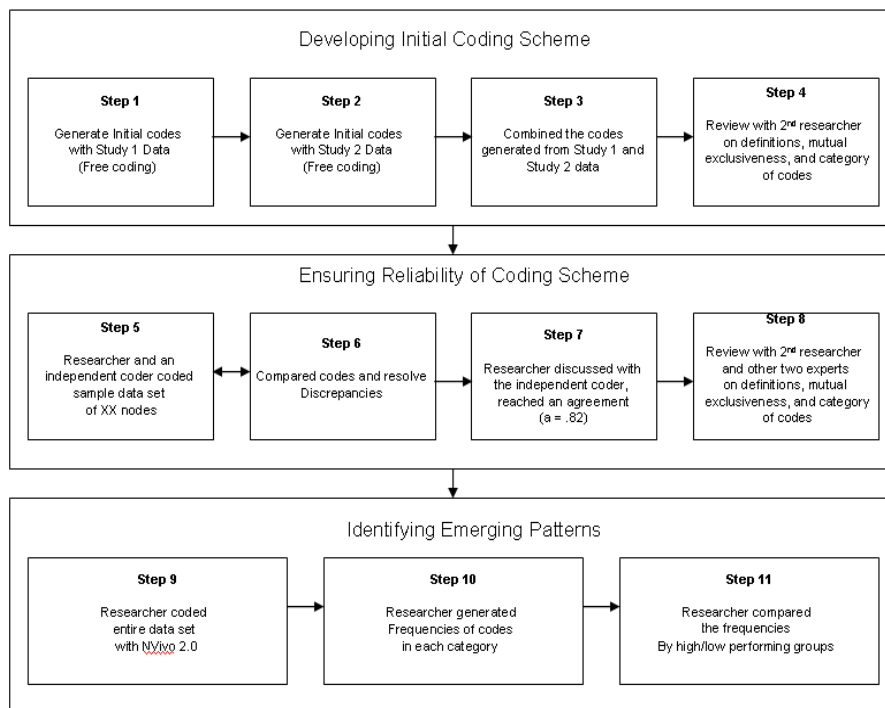


Figure 1. Data Analysis Procedure

Results

Emerged Learner Behaviors in an OLC

The analysis revealed 29 codes in Study 1 and 25 codes in Study 2. Out of those codes, 7 categories of learner behaviors emerged: information seeking, extraction of relevant information, idea generation, co-construction, division of tasks, making/conforming to rules, and evaluation in both studies 1 and 2. The codes belong to each category and their definitions are summarized in Table 1.

Information seeking

Information seeking represents learner behaviors that collect information necessary to complete the group project. Learners tried to understand what they need to do and with whom they need to work. Learners shared the channels of communication such as cell phone numbers, online chatting IDs, and email addresses. At the same time, they shared personal schedules so they could meet online or offline. As learners searched for information that seemed to be related to the topics they researched, they shared them with their fellow team members.

At this time, learners were not sure how valuable the information they shared was. For example, one participant in this study posted a statement:

This is material called "Analysis of learner characteristics!" I am not sure if this is accurate information.. In fact, I am not sure how to research learner characteristics; I am uploading this because it tells what categories we can research regarding learner characteristics. I hope it can be a good reference <http://education.korea.ac.kr/innwoo/edu261/2002/list.htm>

Table 1. Learner Behaviors Category, Codes, Definitions

Categories	Codes	Definitions	S1	S2
Information seeking	Share material	Share related information, URLs, a list of books among team members	O	O
	Share contact info	Share email addresses, cell phone numbers, or messenger IDs among team members	O	O
	Share personal schedules	Share personal schedules to decide the time and date for group meetings	O	O
Extraction of relevant information	Summarize material	Make a summary, condense or extract relevant materials	O	O
Idea generation	Suggest an idea	Suggest or provide an idea pertaining to proceeding with the group project	O	O
	Request an idea	Ask for, or require an idea needed to proceed with the group project	O	O
	Collect ideas	Assemble team members' ideas to make a decision	O	O
	Ask questions	Ask questions to get an answer or to get a clarification	O	O
Co-construction	Outline tasks	Analyze the group work and build action items to complete the group project	O	O
	Suggest a meeting	Suggest an online or offline meeting to discuss or to make a decision	O	O
	Suggest group work	Suggest collaborative work to resolve issues or integrate individual work	O	O
	Request feedback	Ask if there is something wrong with or missing from individual work from team members	O	O
	Request to do work	Ask team members to do something to complete the group project including modifying files, or combining files, etc.	O	O
	Modify material	Edit files to correct errors, add information, or change the format	O	O

	Submit a report	Upload the required outcomes for the instructor to review	O	O
	Submit a status report	Upload a status report	O	X
	Submit a project plan	Upload a project plan	O	X
	Remind of things to watch	Remind of the rules or conventions on how to work efficiently	O	O
	Write meeting minutes	Summarize and outline what was discussed or decided in a team meeting	O	O
Division of tasks	Divide tasks	Divide tasks required to complete the group project and assign them to each team member	O	O
	Redistribute tasks	Redistribute the tasks among team members due to any changes	O	X
	Create a table of roles	Create a table of roles to communicate who is doing what	O	X
Making/Conforming to rules	Suggest a rule	Suggest rules among team members to achieve the goal	O	O
	Share template	Create and share a template for team members to use to complete the group project	O	O
	Remind of schedule	Remind of a schedule including the due date of outcomes, meeting date, or time, etc.	O	O
	Raise an issue	Alert team members when the content is not relevant or they do not conform to the rules or directions	O	O
	Remind of guidelines	Remind of the instructor's directions or guidelines	O	O
Evaluation	Evaluate material	Evaluate the quality or relevance of shared material	O	O
	Evaluate self or peer work	Evaluate the quality of the work done individually or in a group	O	O

* S1 and S2 represent whether each code was found in Study 1 and Study 2.

Extraction of relevant Information

Extraction of relevant information represents learner behaviors that condense or summarize information to be used for the group project. Through discussions with team members learners became more familiar with the topic they researched. Learners summarized, condensed, or extracted relevant information from what they had found. One example from the data was, “I summarized what the presenter would need. Page1[1].hwp. This is a rough outline.” Towards the end of the project, learners were able to tell what needed to be in the final outcome and what did not.

Idea generation

Idea generation shows learner behaviors that generate and seek ideas to proceed with the group project. Learners asked questions or clarifications, suggested or requested ideas, and collected ideas to make a group decision. The questions learners asked varied in terms of level of difficulty. They asked a simple question like “when are we starting the group project?” Also, they asked the teaching assistant (TA) for help when team members did not know how to proceed with the project. Learners provided their ideas and constantly requested other team members’ ideas. For example, one participant in this study posted the following statements:

Why don’t we add the disadvantages along with the advantages in Number 2?
This is what I thought. If there are things need to be modified, please leave replies. Your ideas are very important. Please tell me if you have any better or different ideas.

Also, when learners needed to make a decision such as deciding on a title of a report or when to have a group meeting, they collected ideas from all members at the same time.

Co-construction

Co-construction represents learner behaviors that execute tasks to produce output collaboratively. There were various types of learner behaviors that fell under

this theme: outlining tasks, suggesting a meeting, writing meeting minutes, suggesting group work, requesting feedback, requesting to do work, modifying material, reminding of things to watch, submitting a project plan, submitting a status report, and submitting a report. As learners actually made progress toward the final outcome, they outlined the tasks that they needed to complete. For example, one sample transcript showed:

I have outlined the things we need to investigate and summarize:

- (1) concept of evaluation – terms or meaning
- (2) types of evaluation – target, content, areas, criteria, functions (this is in the text book)
- (3) models and theories of evaluation – (there are more models that are not in the text book)
- (4) evaluation methods – observations, interviews, etc. (this is in the text book but it seems we need to investigate more)
- (5) procedures – (it is in the text book as well but we need additional explanations)
- (6) case studies
- (7) interviews and field visits.

Learners suggested group meetings to discuss what they needed to do and who would be doing what. In order to co-construct the final outcomes, learners asked for feedback from other members and modified documents reflecting the feedback. Also, learners suggested group work when they felt they needed to work together.

Division of tasks

Division of tasks illustrates learner behaviors that divide tasks and distribute them to team members. Learners divided tasks required to complete the group project and assigned them to each team member. In doing so, they had offline or online meetings. In order to formalize the roles and responsibilities, learners created a document that contained a table of roles and shared it among the team members.

In fact, this course required participants to submit the list of roles.

In addition, when there was a need to change the division of labor, learners adjusted accordingly by taking on more tasks. For instance, one of the students decided to drop the course and the group redistributed the tasks accordingly. One participant posted this message at that time, “Miran is dropping the course. We will have to take her share of the work as well although it will difficult for us.”

Making / Conforming to Rules

Making/conforming to rules depicts learner behaviors that create rules and conforms to them as well as the instructor's directions. Learner behaviors that fell under this theme included suggest a rule, share template, remind of schedule, raise an issue, and remind of guidelines. There were two different kinds of rules. One was instructor’s guidelines, evaluation criteria, and project deadlines, etc. Learners kept reminding each other of the guidelines and schedule, and raised issues when they were not adhered to. For example, one participant raised an issue and posted this statement, “I understand you worked hard to find the information but this article seems to have nothing to do with learner analysis.”

The other kind of rules were practical group rules such as how learners can work together to achieve the group goal efficiently. One example from the data was, “The professor said the ppt presentation is for five minutes. Therefore, all you need to upload is just a summary and cases.” Also, learners created templates and shared the information using the templates among team members to make it easy to produce the final outcomes.

Evaluation

Evaluation reflects learner behaviors that evaluate the quality or relevance of material or work done by themselves or others. As learners sought and shared information from and among their fellow team members, they commented whether it was valuable to the final outcome in terms of quality or relevance. Learners had certain criteria about the scope of the project and evaluated the shared information

based on them. One participant posted this message, “This is good material but we shouldn’t go this far.”

In addition, learners evaluated their own work and made comments about their peers’ work. Learners pointed out incorrect or missing information and encouraged their peers as well. For example, one participant commented regarding Dahae’s work as, “Good job, Dahae! By the way, instructional cases are missing.”

Comparing Frequency of Learner Behaviors of High and Low Performing Groups

Among the seven learner behavior categories, the two most frequently observed categories in both studies were information seeking and co-construction (see Figure 2). In Study 1, information seeking had more incidences than co-construction, whereas co-construction had more incidences in Study 2. Comparing the high performing groups with the low performing groups, the high performing groups revealed at most about 1.6 times more incidents of learner behaviors than the low performing groups. This phenomenon was evidenced in both studies. In terms of types of learner behaviors, however, there was no difference between the high and low performing groups. The information seeking category revealed a large difference in the high and low performing groups in Study 1, whereas the co-construction category showed a big difference in Study 2 (see Figure 2).

Emerged Conflicting Factors in an OLC

Learners faced contradictory situations as they proceeded with the group project. The analysis revealed 17 codes and 18 codes in both studies, respectively. Out of those codes 6 categories of conflicting factors emerged : inefficiency of work, unfamiliarity, difficulty in communication, issues of roles, conflicting schedules, and technical difficulties. The codes belong to each category and their definitions are summarized in Table 2.

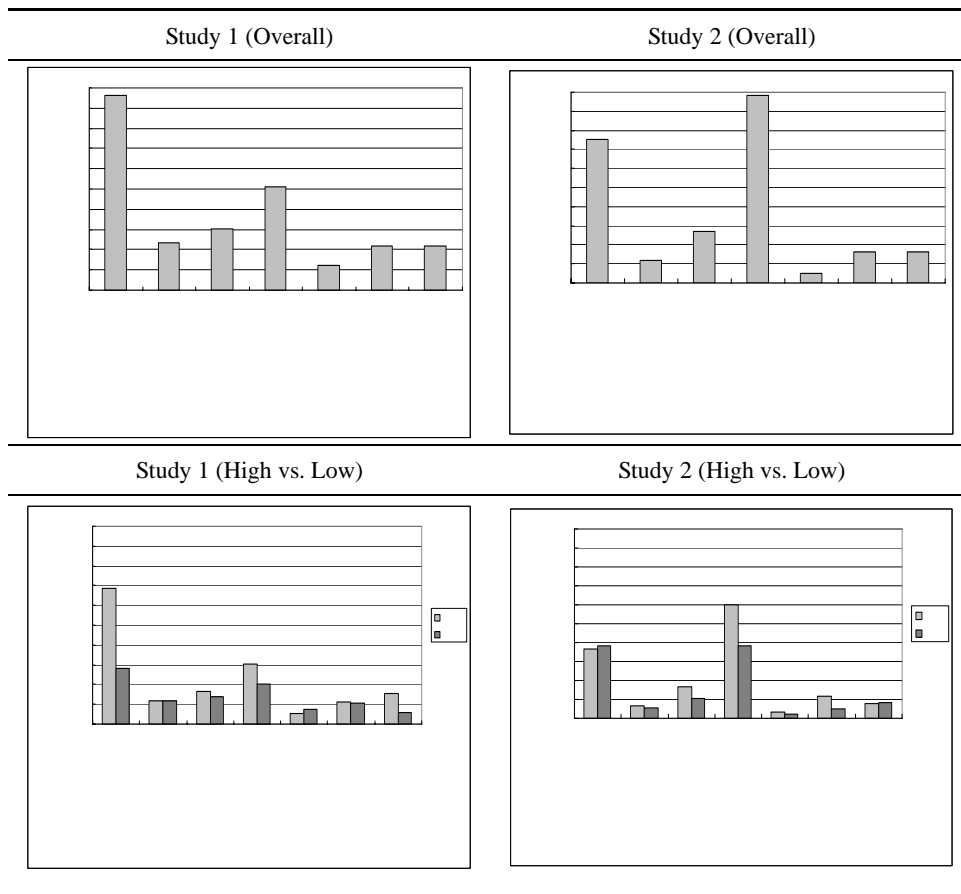


Figure 2. Frequencies of Learner Behaviors

Inefficiency of work

Inefficiency of work reflects the situations that can lead to obstacles in completion of the group project. The indicators of inefficiency of work included applying inefficient methods, lack of resources, lack of group rules, difficulty with finding the relevant information, and sharing unrelated information. One participant pointed out her team’s inefficiency of work by posting this message, “Freshmen material team, please read!!! By looking at the material we shared, I realized we are doing our group work incorrectly. We have not divided up the tasks and there were many overlaps and useless material.”

Another participant recognized her own inefficiency by posting a message, “I don’t know what to say. Just take a look at it. It is difficult to upload material without any framework.”

Unfamiliarity

Unfamiliarity refers to frustrations or discomfort due to the unfamiliarity with processes, topics, or team members. First, learners expressed uneasiness when they were not familiar with how to proceed with the group work. One participant was not sure about what were the best methods to share the information. She posted this message, “I am searching material in the National Assembly Library. Specifically, how shall I share the information? Shall I type everything? Or take screenshots?” Second, learners expressed discomfort when they were not familiar with the topic that they researched.

Table 2. Conflicting Factors Category, Codes, Definitions

Categories	Codes	Definitions	S1	S2
Inefficiency of work	Applying inefficient methods	Work is not performed efficiently due to the fact that a team member used inefficient methods to complete the group project	O	O
	Lack of resources	Work is not performed efficiently due to lack of resources to complete the group project	O	O
	Lack of group rules	Work is not performed efficiently due to the absence of rules defined by team members to complete the group project	O	O
	Difficulty with finding the relevant info	Work is not performed efficiently due to that fact that team members do not know how to find relevant information	O	O
	Share unrelated info	Work is not performed efficiently due to that fact that team members share unrelated or irrelevant information	O	X
	Lack of skills	Work is not performed efficiently due to a team member's lack of skills regarding tools (e.g., Photoshop, Flash) required to complete the group project	X	O

Identifying Learner Behaviors, Conflicting and Facilitating Factors in an Online Learning Community

Unfamiliarity	Unfamiliarity with processes or methods	Frustrations due to unfamiliarity with how to proceed with the group project and with what methods to use	O	O
	Unfamiliarity with topics or material	Frustrations due to unfamiliarity regarding the project topic or the relevant material	O	O
	Unfamiliarity with team members	Feelings of discomfort towards team members because they do not know each other well	O	X
Difficulty in communication	Uncertainty	Difficulty in communication caused by not understanding what other team members exactly meant	O	O
	Nonparticipation	Difficulty in communication due to the fact that a team member did not participate in a decision making process	O	O
	Difficulty with relationships	Difficulty in communication due to discomfort among other team members especially when there are age differences	O	O
	Delayed feedback		X	O
Issues of Roles	Work delays	Issues of roles due to the fact that a team member does not complete one's assigned work on time	O	X
	Team members dropping out	Issues of roles due to the fact that a team member drops the course	O	X
	Varying levels of contribution	Issues of roles due to the fact that a team member recognizes inequality of efforts made by each team member	X	O
	Issues of role assignment	Issues of roles due to the fact that roles were not assigned equally.	X	O
Conflicting schedules	Conflicts with other personal commitments	Schedule conflicts among team members due to jobs, part-time work, or other personal commitments.	O	O
	Conflicts with other subjects/exams	Conflicting schedule among team members due to other subjects or exams	O	O
Technical difficulties	System issues	Issues with sharing files due to the learning management system	O	O
	Corrupted or incompatible files	Issues with sharing files due to corrupted files, or incompatibilities between different versions of software, etc.	O	O

* S1 and S2 represent whether each code was found in Study 1 and Study 2.

One participant posted this message, “I wonder if this case can be included in our project...” Third, learners expressed awkwardness when they were unfamiliar with each other. One participant posted this message, “The first report is due on April 5 and therefore we need to meet right away. We still don’t know each other >.< because we were so busy with the quiz.”

Difficulty in communication

Difficulty in communication represents communication issues that learners come across. These difficulties were caused by lack of clarity, lack of participation, and overall discomfort with communication. Sometimes learners did not understand what other team members exactly meant. One participant expressed her frustration by posting this message, “Minyoung, I did the audio material. I meant to say ppt yesterday;,,,,;”

Another incident of difficult communication was due to the fact that a team member did not participate in the decision making process. For example, one participant posted this message, “I have not been online for a while and I missed it [the decision].”

Issues of roles

Issues of roles refer to tensions caused by delayed work or unexpected extra work load. First, the tension was caused by the fact that a team member did not complete her assigned work on time. One example of the transcript was, “Sorry!!! I slept last night [and I didn’t upload the file]... Please forgive me~~.” Second, another tension was caused by the fact that a team member dropped the course in the middle of the group project. One of the participants posted a message, “Sunghee is dropping the course. She called me this morning. It seems that we have to divide up her tasks. Let’s work hard although it will be difficult for us.”

Conflicting schedule

Conflicting schedule refers to the situations in which team members have a hard

time to decide when to have a group meeting or to complete assigned tasks due to other subjects and exams, or personal commitments such as full- or part-time work, or volunteer work, etc. Two participants posted the following messages, “I can’t get there until 6pm because someone passed away. Would that be too late?”; “I will look for the cases but now I need to finish other assignments first.”

Technical difficulties

Technical difficulties refer to issues with sharing files due to system issues or files being corrupted or incompatible. One participant was puzzled by how the system worked and posted a message, “I tried to upload the pictures at school. The file just disappeared. So strange... Oh, my~ what a mistake...; I attached all the files..but they must have been too big. None of them were uploaded.”

Some other cases were just due to corrupted or incompatible files. One participant could not find what role she was assigned to and left a message, “I can’t open the role assignment file.. I keep getting error messages whenever I try to open it on my computer at home---. Sorry, but can someone write down what role I was assigned here??? Please-----” This issue surfaced quite often when learners used different versions of the same software programs.

Comparing Frequency of Conflicting Factors of High and Low Performing Groups

Among six categories of conflicting factors, unfamiliarity, inefficiency of work, and technical difficulties revealed relatively high frequencies in both studies. Comparing the high performing groups with the low performing groups, the high performing groups showed either more or an equal number of incidents than the low performing groups in both studies. The high performing groups revealed about twice as many incidents than the low performing groups at most (see Figure 3).

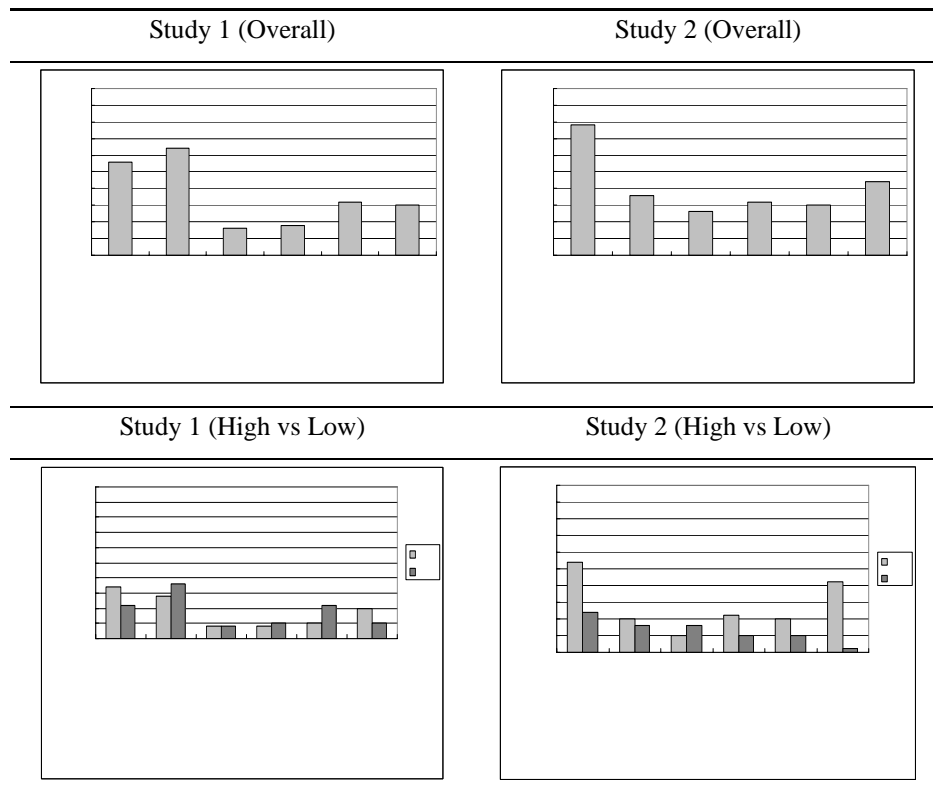


Figure 3. Frequencies of Conflicting Factors

EmergEd Facilitating Factors in an OLC

The research sought to identify facilitating factors that are positive or supportive to attain the goal of the group work. The analysis revealed 14 codes in both studies and out of those codes 5 categories of facilitating factors emerged : efficiency of work, effective communication, the competence of team members, group cohesiveness, and goal orientation. The codes belong to each category and their definitions are summarized in Table 3.

Table 3. Facilitating factors Category, Codes, Definitions

Categories	Codes	Definitions	S1	S2
Efficiency of work	Applying efficient methods	Work is performed efficiently because team members use efficient methods to do the group project	O	O
	Conforming to rules	Work is performed efficiently because team members follow the rules defined by the team to do the group project	O	O
	Flexible role assignments	Work is performed efficiently due to the fact that team members are flexible to take a role	O	O
Effective communication	Honesty	Team members talk straight regarding the way or the quality of peer work	O	O
	Proactiveness	Team members show eagerness or take an initiative in communication.	O	O
	Timely decision making	Team members make a decision through responsive communication	X	O
Competency of team members	Responsibility	Team members are responsible for the assigned task or the project overall	O	O
	Competency of tools	Team members are competent with using tools required to complete the group project	O	O
	Previous experience	Team members have previous experiences or prior knowledge to do the group project	O	O
Group cohesiveness	Intimacy	Team members feel close to each other	O	O
	Sense of community	Team members have a sense of community, referring to the group as 'we', 'us', or 'our'	O	O
	Encouraging others	Team members encourage each other to keep up the good work	O	O
	Trust	Team members are reliable and trustworthy	O	X
Goal oriented	Sense of competition	Team members have a sense of competition with other teams (performance goal)	O	O
	Excellent outcomes	Team members strive to create excellent outcomes (mastery goal)	O	O

* S1 and S2 represent whether each code was found in Study 1 and Study 2.

Efficiency of work

Efficiency of work refers to team members aiding in the completion of the project by applying efficient methods, conforming to rules, and flexible role assignments. One participant urged team members to use efficient methods by posting a message:

This is a must read for those who search for the material~!!

What we are doing is analyzing learner characteristics and the reason we are doing it is to access the learner's condition and to teach effectively.. From now on, when we search for information it will be better to find the ones that show how they analyzed learner characteristics (prior knowledge, gender, age..). Also, if we find a case, we'd better find one that shows how learner characteristics are analyzed.

Also, a participant recognized that her team members conformed to rules by stating, "Our team members replied promptly, met on time, and searched for the information diligently." Even though the roles were already defined, team members were willing to adapt changing roles. For example, one participant posted the message, "It is me, Minjung. I was supposed to summarize theories. But the team leader is busy with managing the project, so I will take her summarizing task as well."

Effective communication

Effective communication reflects honest and proactive communication among team members that aid in the completion of the project. Honesty implies that team members talk straight regarding the way or the quality of peer work. An example from the transcript showed this message, "Juhee, as for the core human resources material~ it is helpful information ^^ but it is off track. This material explains how the company should do HRM, rather than how to analyze learner characteristics..."

Proactiveness means that participants show eagerness or take an initiative in communication. A participant showed enthusiasm in her response. The message she posted was, "Yes, yes. That's a good idea. It would be even better to attach

specific pictures.”

Competency of team members

Competency of team members reflects team members’ ability or characteristics that aid in the completion of the project. The indicators included responsibility, competency with tools, and previous experiences. Learners recognized that it was helpful to have team members who are responsible and competent with the tools required to complete the project. One participant posted this message, “Our leader, Miree Un-ni, you made a big contribution by making the PPT and using computers. ^^ And also, Bora Un-ni, I can’t even imagine how you could make such complete report...”

In addition, learners recognized that it is helpful when they have team members who have previous experiences with similar projects. One participant expressed her feelings in this posting, “I am so relieved because the seniors were helping us to proceed smoothly with the project.”

Group cohesiveness

Group cohesiveness indicates a sense of community among team members that aids in the completion of project. The specific indicators of group cohesiveness were intimacy, sense of community, encouraging others, and trust. The messages posted included: “Uh~ Kyunghee Un-ni, You are the best!!!”, “Go, go, team! Next time, let’s chat offline, not just on MSN. Good night everyone.”, “I am so thankful that all of you relied on me and trusted me. Thanks a lot!!!!!!”

Goal oriented

Goal oriented represents team members’ awareness of the goal. First, learners showed a sense of competition with other teams by posting a message, “I think our team was the best !” Second, learners reminded each other of the evaluation criteria and showed awareness of the goal. One participant posted the message, “Here are the instructor’s evaluation criteria. Please take a close look at them and let’s try to

wrap things up!! ^.^”

Comparing Frequency of Facilitating Factors of High and Low Performing Groups

The most frequently observed category was group cohesiveness in both studies. This category was composed of intimacy, sense of community, encouraging others, and trust. On the other hand, the frequency of all other categories was minimal. When the high and low performing groups were compared, the low performing groups revealed 1.8 times more incidents of facilitating factors in Study 1 although there were a similar number of incidents in Study 2 (see Figure 4). The high numbers were mostly due to a single factor, group cohesiveness.

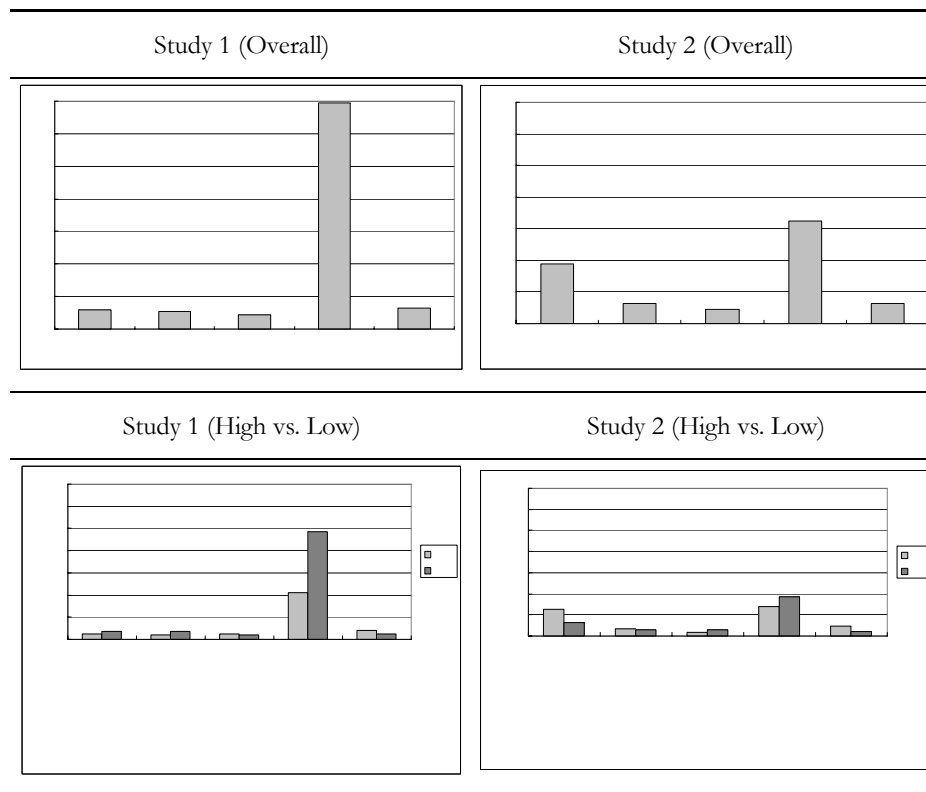


Figure 4. Frequencies of Facilitating Factors

Discussion

Learner Behaviors

The analysis identified 7 categories of learner behaviors in group work: information seeking, extraction of relevant information, idea generation, co-construction, division of tasks, making/conforming to rules, and evaluation. The patterns of learner behaviors identified in this study have areas common to most frameworks for group development and collaborative work. Hung and Chen (2000) identified querying, clarifying, hypothesizing, elaborating, and synthesizing as core behaviors in group work. Addressing norms and rules governing the process of collaborative learning was identified in the analysis of collaborative learners' linguistic acts (Cecez-Kecmanovic & Webb, 2000). In addition, Palloff and Pratt (2005) revealed that online groups move through phases such as a normative phase, a problem-solving phase, disagreement or conflict, an action phase, and termination.

Comparing the high performing groups with the low performing groups, high performing learners did not exhibit any specific types of behaviors that were not found in low performing groups. One evident difference was that the high performing groups revealed at most about 1.6 times more incidents of learner behaviors than the low performing groups. Although quantity does not necessarily reflect quality, this finding implies that active participation and involvement may be an allusion to positive outcomes.

Conflicting Factors

In terms of conflicting factors, 6 categories (inefficiency of work, unfamiliarity, difficulty in communication, issues of roles, conflicting schedules, and technical difficulties) emerged in both studies. These findings are consistent with those of previous research. Koh and Hill (2006) reported difficulty with understanding goals,

difficulty with communication, lack of time, difficulty with technology, unequal participation, and inequitable division of labor as challenging factors that students perceived in online group work.

The inefficiency of work category was one of the two most frequently observed categories in both studies. Indicators of inefficiency of work category were lack of skills, applying inefficient methods, lack of resources, lack of group rules, difficulty with finding the relevant information, and sharing unrelated information. Lack of skills was a new code found in Study 2. The course in Study 2 required students to learn necessary software and to implement online content on the Web. The students realized the gap between their current skill level and the proficiency level that they wanted to have in order to implement their final product.

This study revealed two different types of conflicting factors and there is a need for different moderating strategies depending on the type of conflicting factors. First, it was evident that some of the conflicting factors are not as harmful but can serve as an alert for interventions. For example, learners initially feel discomfort when they are unfamiliar with team members, processes or methods, and topics or materials. Providing ways to get to know other members before forming a team may help learners to feel more comfortable in their group activity. When team members express confusion about the project theme and the scope, it may be beneficial to set up online office hours for learners to ask the facilitator questions. It may be helpful to mentor the team leaders on managing intermediate milestones, dividing tasks, assigning roles, and handling conflicts. Also, conflicting factors such as difficulty with finding the relevant information can indicate where the students need guidance in collaborative group work.

Another type of conflicting factor is apparently harmful and can lead to negative learning experiences or deficient learning outcomes. These include work delays and team members dropping out, varying levels of contributions, and issues of role assignment. In online group work, learners depend on each other to achieve a common goal and therefore, work delays by some team members keep their team

from completing their project on time. An instructor or a facilitator should proactively monitor and intervene in the indicators in this category. In addition, the accountability of each member needs to be managed during the process. Rules need to be made and reinforced to ensure such accountability. Intervention mechanisms should be established and carried out as necessary.

Comparing the high performing groups with the low performing groups, the high performing groups showed either more or an equal number of incidents than the low performing groups in both studies. The high performing groups revealed about twice as many incidents than the low performing groups at most. This finding supports Engeström's point that development occurs when contradictions are overcome. According to Engeström, the human activity system is energized by conflicting factors or contradictions and their resulting instabilities. Resolution and innovations are subsequently created to reach equilibrium (Engeström, 1987).

Particularly, in Study 2, the high performing groups posted more messages regarding technical difficulties. This does not necessarily mean that the team members in the high performing groups were less skilled than those in the low performing groups. Rather this can be interpreted that team members were more exposed to the issues by looking at the posted messages related to technical difficulties, and responded to the messages accordingly in an attempt to reach equilibrium.

Facilitating Factors

The analysis identified five categories of facilitating factors: efficiency of work, effective communication, the competence of team members, group cohesiveness, and goal orientation in both studies. Categories similar to these five were also identified in recent research. For example, Brook and Oliver (2003) identified three critical factors to develop an online learning community: a significant purpose and benefits, regular and meaningful meetings, and feeling safe and trusting others. For

another instance, competence of team members was identified as a facilitating factor in collaborative group work (Han & Lee, 2005).

The most frequently observed category was group cohesiveness. This category was composed of intimacy, sense of community, encouraging others, and trust. Interestingly, the low performing groups revealed 1.8 times more incidents of facilitating factors than the high performing groups. The high numbers were mostly due to a single factor, group cohesiveness. It was apparent that expressing intimacy, referring to the team as “we,” “our,” or “us,” and encouraging other team members did not directly contribute to the quality of group work. For this phenomenon, two different interpretations are possible. One possible interpretation is that the “Go for it; Good job; Go, go our team!” type of messages were kept at the superficial level and became habitual, thereby meaning little to the team. Another possible interpretation is that there were other reasons for the low quality of team work. For example, even if the team work was excellent and the group felt strong cohesiveness, it is possible that there was a lack of leadership. In other words, even when the group cohesiveness is high, if the leader is not capable of managing the resources the quality of the outcome generated by the group may not be good enough. This possible cause of poor performance needs to be investigated further. A previous study reported that a sense of community correlated with perceived achievement and persistence (Rovai, 2002). This contradictory finding implies that more research is needed to investigate the relationship between a strong sense of community and actual performance.

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