The impacts of flexible facilitation in collaborative learning

Nant Jiramahapoka
Auckland University of Technology, New Zealand
nanjir93@aut.ac.nz


Abstract

People who work together for a common task need to work in harmony. The facilitator plays an important role to provide necessary rules and effective resources, so that the team can clearly communicate, and efficiently achieve successful outcomes. Internet technology is a challenging communication channel for group work in terms of any time and any place availability. This study aims to investigate the impact of process facilitation on the decision outcomes of the Internet-based group work. The international collaborative learning trial, conducted in the second semester of 2003 between New Zealand and Sweden students, was closely examined by applying the Extended Adaptive Structuration Theory (EAST). Some pieces of evidence show the impacts on the group meeting outcomes when facilitators improved their instructions for the process. Some unexpected results are explored.

Keywords

Collaborative learning, facilitation, extended adaptive structuration theory, EAST, groupware

1. Introduction

Group decision support system (GDSS) joins electronic communication, computing, and decision support technologies in order to improve meeting effectiveness of a group of people (DeSanctis & Gallupe, 1987). Presently, people generally work within groups, and they usually have to solve more complicated problems together. Many times, these people have to travel around while they still need to attend a meeting with their teams in order to collaboratively make a significant decision. Technologies, such as Groupware, allow them to meet each other even though they are not in the same place. According to Ellis, Gibbs and Rein (Ellis, Gibbs, & Rein, 1991), Groupware is a computer system that supports a group of people who are working together on a common task in a shared environment. They also categorized Groupware as time and space taxonomy based on real time or non-real time interaction, and same place or different place among the group members (Ellis et al., 1991).

Furthermore, nowadays, higher broadband network allows better communication from long distance among the group members. The Advanced Information Technology (AIT) not only brings a modern form of communications but also comes up with more complicated meeting issues. For example, DeSanctis and Poole (DeSanctis & Poole, 1994) observed that, in some electronic meetings, groups might not benefit from GSS because they did not know how to use the tools appropriately. A facilitator may assist by promoting GSS functions as the facilitator is supposed to understand the tools well. A recent research (Vreede, Davison, & Briggs, 2003) has analyzed electronic meeting case study of 15 organizations from four different countries and used grounded theory to identify five factors that cause GSS failures as following: problems with process design, problems with goals, problems with technology, problems with participants, and problems with the facilitator. Furthermore, a prior work (Romano, Nunamaker, Briggs, & Mittleman, 1999) suggested a set of rules for effective distributed GSS facilitation.

Miranda and Bostrom (Miranda & Bostrom, 1997) categorize facilitation into two types. Firstly, content facilitations refer to the objectives determined by group and the information shared
Within the group. Secondly, process facilitations concern about how the meeting is performed. They also classify facilitation into restrictive and flexible approaches. The restrictive facilitation means the process of the meeting is scripted and pre-determined. The facilitator requires the groups to follow those pre-defined steps. This approach is opposite to the flexible facilitation where the groups are free to adopt their own decision process. They find out that restrictive process facilitation is ineffective. Likewise, the other works (Dickson, Partridge, & Robinson, 1993; Khalifa, Kwok, & Davison, 2002) also suggest that the restrictive facilitation for GSS has negative effects on collaborative learning. This study aims to investigate which facilitative approach is effective for an international Internet-based group work in asynchronous GSS. The Extended Adaptive Structuration Theory (EAST) framework is considered for the investigation.

In the next section, the background to the study is presented. Then, the EAST model is explained. The data analysis methodologies are demonstrated in section four. The unexpected results are illustrated in section five. In section six, explanations and discussion of the results are provided. Finally, the conclusions are drawn.

2. Background

The international collaborative learning trial, conducted in the second semester of 2003 between the third year students at Auckland University of Technology (AUT) in New Zealand and the first year students at Uppsala University in Sweden, was in-depth examined.

This trial is a part of an Intelligent Business Systems course for undergraduate students. The trails have been continuously performed since 1998 in an iterated manner. There are two semesters annually. In the first semester, the trial is internally conducted at AUT in New Zealand only. In the second semester, the trial is performed between the two countries. As larger groups are likely to give information rather than asking opinion or showing agreement (DeSanctis & Gallupe, 1987), the participants are assigned to work together within small subgroups of two to four persons via the Internet-based GSS.

Generally, an exercise consists of two phases. Phase one is called the cyber icebreaker. The purpose of this phase is to let the team members to know each other on the net. At the end of phase one, the students are asked to evaluate and comment the icebreaker task. The second one is the group decision-making phase. For instance, in 2003 each group was supposed to discuss and evaluate three web sites in order to reach an agreement on ranking the sites. It is a preference task in which there is no best answer. To complete this task, each group must submit a confirmed ranking form. One assigned member from each group has to fill the top three websites and specify levels of group agreement in the electronic form. Again, each student is requested to submit a final trial evaluation form.

The GSS application used in the trials have been developed by the School of Computing and Information Sciences at AUT by using the Lotus Notes database. This database contains very rich information for data analysis to explore the collaborative computing issues including the meeting facilitation area. There are previous research articles (Clear, 1999a, 1999b, 2001; Clear & Daniels, 2000, 2003) using this database as relevant practical examples to develop more understandable knowledge in the collaborative computing.

Having investigated various versions of the trial databases, both technical and social issues on collaborative learning were evidenced. Many students commented that the graphic user interfaces that were not friendly enough and looked old fashioned. The navigation caused confusion. Security was not adequate, for example, people could edit or delete documents that did not belong to them. There was no validation for important fields. Some students complained about the response time and sometime the application hanged. These comments were helpful feedback for the software developers to improve the GSS features and functions. For instance, in 2000, the menu navigator was modified to be better organized. There were also a lot of social issues. For example, the members of the group did not participate at the right time or some body did not contribute to the meeting at all. Some students complained that the assigned tasks were too boring. Again, the facilitators have adjusted both tools and meeting procedures in order to improve the performance of the exercises. An interesting improvement was made in the second semester of 2003. The instructions of the exercise were modified to be shorter and simpler. This article focuses on this change in order to explore the impacts on the decision outcomes.

3. EAST: The Facilitation Framework
The appropriate framework selected here is the Extended Adaptive Structuration Theory (EAST). EAST (Clear, 1999b) combines the Mediation Activities and Group Support System Facilitation concepts with the Adaptive Structuration Theory (AST). AST supports structural meeting process for the group. According to Chin, Ghopal and Salisbury (Chin, Ghopal, & Salisbury, 1997), AST provides social aspects of how the group uses Electronic Meeting System (EMS) could impact their meeting outcomes. The three characteristics of these social aspects are faithfulness, consensus and attitude. They explain that faithfulness means how the group respects the structure's design features of EMS, consensus means the agreement of group members on how to use EMS, and attitude means the views of group members about using EMS.

Figure 1. Summary of major constructs and propositions of Extended AST (EAST) model (Clear, 1999b; Clear & Daniels, 2000)

Figure 1 depicts the EAST framework where the seven propositions interact and affect electronic group works. According to Clear (Clear, 1999b), mediating activities consist of establishment, reinforcement, adjustment and episodic change. The facilitators would, for example, setup the meeting objectives, design the meeting process, and prepare tools and technologies during establishment in the pre-meeting phase. In the reinforcement, the facilitators would, for instance, provide technical supports and train the participants. During the adjustment activity, the facilitators might modify the GSS to promote the usability of technology. Finally, the technology structure is developed and redeveloped over time through the episodic change during the post-meeting phase in order to improve overall decision outcomes. The four activities are categorized in terms of input-process-output, and they are added to the original AST model, so the model is called Extended AST model.

This paper focuses on the fourth proposition (P4) of EAST framework, namely New Social Structure, which includes the episodic change activity. The seventh proposition (P7), decision outcomes, is measured to evaluate the impacts of the changed facilitation approach.

4. Methodologies

The international collaborative trial database at http://online.aut.ac.nz was closely examined. The trial data in the second semester of year 2003 (2003/2) was chosen for two main reasons. Firstly, it was the most recent international trial, which could provide more learning aspects than the internal one. Secondly, the most important reason, the step-by-step instructions were changed in 2003/2 from the previous year. In order to measure the impacts of the changed
instructions, the data in the second semester of year 2001 (2001/2) was selected for comparison.

Although the data from 2002/2 was the closest previous international trial, it was not selected because its trial approach was absolutely different from 2003/2. In 2002/2, the students were separated by technology options consisted of Lotus Notes and Avatar. Lotus Notes was a two-dimensional traditional application developed at AUT. This software was used since the first trial in 1998. Avatar was a Java application which provided the three-dimension user interface of the virtual world (Clear, 2001). Not only was there a big difference on technologies used but also the trial instructions and the questions for the decision-making task in phase two were totally dissimilar. Instead of evaluating and ranking three websites, in 2002/2 the groups were assigned to rank their tool preference between Lotus Notes and Avatar software. In order to focus on the changes of written instructions, the data from 2001/2 seems to be more appropriate because other variables were not much altered.

The four criteria of the decision outcomes (P7) from EAST model were measured to evaluate the group performance. Firstly, the efficiency criterion could be measured by the number of groups that had completed their decision-making task and submitted only one confirmed form. Some groups were confused as they posted more than one confirmed form. So, this indicated that they were not efficient enough. Secondly, the consensus criterion could be measured by the degree of agreement which each group filled in the confirmed form. The numeric scale of agreements that runs from 1.00 for strongly agree to 0.00 for strongly disagree was computed to find the average score. Thirdly, the commitment criterion could be measured by the number of groups that had posted at least one confirmed form. Finally, the quality criterion is not applicable in this case because ranking the websites was a preference task. There is no correct answer to measure the quality of decision outcomes.

Apart from the decision outcomes criteria, the individual satisfaction was considered. The data from the individual cyber icebreaker evaluations and the final trail evaluation were also compared in order to determine the participants’ feedback and their satisfaction.

5. Results

In 2003/2, there were 50 participants from New Zealand and 43 participants from Sweden. They were separated into 15 groups within five topic areas which are data mining, data warehousing, expert systems, intelligent agents, and neutral network. Each group consisted of five to eight students from both countries. In 2001/2, there were 37 students from New Zealand and 69 students from Sweden. They were separated into nine groups. Each group consisted of 11 to 13 students from both countries, too. Although the studies in 2001/2 and 2003/2 were conducted on difference populations of students, they can be considered very similar in terms of educational and computer background.

According to Diana Kassabova, a facilitator of both trials, some participants had dropped out during the exercise. Some of them said that they had no time, some forgot, and some just dropped out without giving any reason.

Table 1 illustrates step-by-step instruction on the weekly basis in 2001/2 and 2003/2. As can be seen, the instructions of 2003/2 contained only 11 steps, which were less than a half of 25 steps in 2001/2. The instructions of 2003/2 seem to be simpler and more flexible, while the instructions of 2001/2 looked more restrictive. For instance, in 2001/p, the facilitators indicated that each group had to choose a leader while, in 2003/2, groups were free to manage their task.

Table 1. Comparison between the number of steps instructions in 2001/2 and 2003/2
Improving the instructions to be more flexible affects the group decision outcomes in very interesting way. Table 2 compares three criteria of decision outcomes in 2001/2 and 2003/2. The consensus of the outcomes significantly increases from 76.04% to 95.37%. On the other hand, the efficiency and commitment decrease from 55.56% to 33.33% and 88.89% to 60%, respectively. In 2003/2, only 9 groups had submitted the confirmed forms. Four groups submitted only draft forms, and other two groups did not submit any form at all. However, these groups show some meaningful discussions about their ranking. In 2001/2, only one group did not submit any form although it had evidences of few discussions among the members, too.

Furthermore, the participants were asked to individually submit two questionnaires, the cyber icebreaker evaluation, and the final trial evaluations. These evaluations represent the students' feedback and their satisfactions toward the collaborative exercise. In order to plot graphs, the numeric scale of answers that runs from 1.00 for strongly agree to 0.00 for strongly disagree was used.

<table>
<thead>
<tr>
<th>Week</th>
<th>2001/2</th>
<th>2003/2</th>
</tr>
</thead>
</table>
| 1    | • enter introductory statement  
• enter the clues  
• familiarize with the database  
• discuss in group  
• research assigned websites  
• enter the guesses  
• report individual progress  
• familiarize with assigned websites | • enter introductory statement  
• enter the clues  
• enter the guesses  
• view and score the guesses  
• tutors release introductory statements |
| 2    | • complete the guesses  
• view and score the guesses  
• agree on websites for ranking  
• report individual progress  
• individually post a websites review  
• individually rank the websites  
• select a leader for your group | • complete cyber icebreaker  
• group evaluates the assigned websites  
• participants view the group’s evaluation  
• group discusses for consensus on rankings |
| 3    | • complete cyber icebreaker  
• complete ranking tasks  
• confirm team leader  
• discusses for consensus on rankings  
• report individual progress  | • complete cyber icebreaker  
• group evaluates the assigned websites  
• participants view the group’s evaluation  
• group discusses for consensus on rankings |
| 4    | • report individual progress  
• final group consensus on rankings  
• enter final group rankings of websites  
• complete evaluation forms  
• post collaboration review and assessment | • enter final group rankings of websites  
• complete evaluation forms |

Figure 2. Comparison of cyber icebreaker evaluations in 2001/2 and 2003/2
Figure 3. Comparison of final evaluations in 2001/2 and 2003/2

Figure 4. Comparison of cyber icebreaker evaluations in 2001/2 and 2003/2 categorized by Sweden (SE) and New Zealand (NZ)

Figure 5. Comparison of final evaluations in 2001/2 and 2003/2 categorized by Sweden (SE) and New Zealand (NZ)
Figure 2 compared the cyber icebreaker evaluation between 2001/2 and 2003/2. As can be seen from the bar chart, in general, 2003/2 is lower than 2001/2 except two items which are the icebreaker helped to develop shared purpose, and the icebreaker task was easy. Similar to Figure 3 which confirms that, mostly, the participants’ feedback of the whole collaborative trial in 2003/2 had negatively affected. Only one item, the project enables to work together effectively, has increased.

However, considering the individual evaluation classified by countries, the findings are quite interesting. Figure 4 shows a comparison of the cyber icebreaker broken by countries. As shown in the graph, the Swedish students have negative impacts on most items but the easy item has sharply increased in 2003/2. Similarly, the students from New Zealand demonstrated negative effects on most items except the share purpose, and the easy item.

Figure 5 presents the final evaluations in 2001/2 and 2003/2 classified by countries. The responses from the Swedish students dropped on most items except the work together effectively item. In contrast, the participants from New Zealand had positive effects on most items except the valid learning process, and the database with no email is useful.

6. Discussion

In 2003/2, the facilitators obviously improved the step-by-step instructions to be simpler and more flexible. In order to indicate its impacts, three out of four criteria of the Decision Outcomes (P7) are measured. Surprisingly, although the degree of consensus on the decision outcomes has sharply increased, the efficiency and commitment criteria have significantly dropped. In 2003/2, 40% of groups did not submit the confirmed ranking form. Two third of these groups submitted only the draft forms. However, they had contributed and shared ideas through the discussion area. Perhaps, they had some commitment but they just did not send a confirmed form for unknown reasons. For instance, they might have forgotten to submit, they might not know how to submit, or they might submit but they just selected the "Draft" option instead of the "Confirmed" option on the ranking form.

These negative impacts seem to contradict the findings of previous works (Dickson et al., 1993; Khalifa et al., 2002; Miranda & Bostrom, 1997). However, Dickson et. al. (Dickson et al., 1993) performed their experiments by measuring only the degree of consensus. In this study, the consensus item had positive impacts too. The contradictions are on the efficiency and commitment items. One possible factor could be the usability of the GSS. In order to gain a high degree of consensus as well as increase the efficiency and commitment on the decision outcomes, perhaps, not only changing the facilitation approach but also other facilitation activities need to be done. For example, a facilitator could modify the GSS to promote its usability via the adjustment (P3), such as verifying the input form to ensure that each group can submit only one confirmed form so the efficiency rate could rise. A facilitator may intensively provide training, class discussion, and technical supports via establishment and reinforcement (P2) to make sure that the groups well understand what they are expected to reach their commitments and how to use the software.

Furthermore, considering the students’ feedback, most items in Figure 2 and 3 such as learning process and enjoyment have slightly dropped. Moreover, Figure 4, which shows the user satisfaction on the icebreaker task classified by countries, draws the same picture as Figure 2. That is, in general, the flexible facilitation negatively affects the students’ satisfaction. However, Figure 5 provides another meaningful finding. Although the Swedish students had lower satisfaction in 2003/2, the New Zealand students appear to have positive change in most variables.

According to Khalifa et. al. (Khalifa et al., 2002), the flexible facilitation in GSS-supported collaborative learning should be effective if the participants have enough prior knowledge in the learning task. As the Swedish were the first year students, they supposedly had less knowledge in the collaborative learning task than the New Zealanders who were third year students. Thus, the Swedish students did not gain benefit from the flexible facilitation.

In additional, Figure 4 and Figure 5 show that, in both years, the Swedish evaluated lower satisfaction than the New Zealand students in most items. This is probably because, according to Diana Kassabova, the trials are mainly managed and designed at AUT. So, the New Zealand students may have better support than the Swedish who are at the remote site. Therefore, the Swedish probably need more assistance and closer support from the facilitators.
7. Conclusions

This study investigates the impacts of flexible facilitation on the decision outcomes and the user satisfaction in collaborative learning. Mixed results are observed. Once the groups were free to manage their own decision-making process with less pre-defined step-by-step instructions, the consensus of the decision outcomes has increased. However, the efficiency and commitment of the group performances have significantly decreased. Indicating that, apart from written instructions, perhaps other facilitation activities are needed to improve the group performances. Hence, the facilitators might work through not only the episodic change (P4) but also the establishment and reinforcement (P2), and the adjustment (P3) in order to achieve the desired decision outcomes (P7) as they interact in the EAST framework. In other words, the facilitators could modify the groupware to promote its usability, such as validating important fields on an electronic input form to reduce human errors. They could also provide intensive training, class discussion, and technical supports to ensure that the groups clearly understand their task objectives and know how to use the groupware appropriately.

Another finding is that the participants, who have adequate knowledge in the collaborative learning task, seem to prefer the flexible facilitation. In contrast, the students who have less knowledge appear to have lower satisfaction, and suppose to require more restrictive instructions and closer guidance from the facilitators. Perhaps, there is no general best facilitation approach. The facilitators may need to tailor made the facilitation mode according to the group characteristics such as their background knowledge.

The limitation of this study is that only three criteria of decision outcomes (P7) from the EAST model can be evaluated. A future work would design a task that could measure the quality item. Therefore, all four criteria could be completely considered in order to develop more understandable knowledge in this area.

Acknowledgements

Special thanks to Diana Kassabova for her guidance and to reviewers for the constructive comments.

References


Khalifa, M., Kwok, R.-W., & Davison, R. (2002). The effects of process and content facilitation restrictiveness on GSS-Mediated collaborative learning. Group Decision and Negotiation,


Copyright © 2005 Jiramahapoka, N.

The author(s) assign to NACCQ and educational non-profit institutions a non-exclusive licence to use this document for personal use and in courses of instruction provided that the article is used in full and this copyright statement is reproduced. The author(s) also grant a non-exclusive licence to NACCQ to publish this document in full on the World Wide Web (prime sites and mirrors) and in printed form within the Bulletin of Applied Computing and Information Technology. Authors retain their individual intellectual property rights.

Copyright ©2005 NACCQ.
Krassie Petrova, Michael Verhaart & Christo Potgieter (Eds.)
An Open Access Journal, DOAJ # 11764120 , ( zotero)