A Model to Evaluate the Effectiveness of Collaborative Online Learning Teams – Self-Disclosure and Social Exchange Theory Perspective

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ABSTRACT

Collaborative online learning teams (COLTs) are teams that are comprised of groups of online students. Accompanying the popularity of online learning, both on campuses and as professional development within many industries, learning in groups has been attracting much attention. However, there is little research constructing intact frameworks to evaluate the effectiveness of COLTs. This study built a framework by incorporating six constructs: self-disclosure, social exchange, trust, cohesion, performance and satisfaction, and validated it by analyzing data from a five-week experiment. The results showed that social exchange had a significant impact on trust, but self-disclosure did not. Trust was significantly related to cohesion and cohesion was significantly related to performance and satisfaction. This study suggests that instructors should incorporate the number of students’ posts into parts of evaluation to facilitate self-disclosure, and to stop “social loafing” behaviors while encouraging social exchange activities.

Keywords: COLTs, Self-Disclosure, Social Exchange, Performance, Satisfaction

INTRODUCTION

Due to the fast development of online learning in campuses, the performance and satisfaction of collaborative online learning teams (COLTs) is attracting the attention of researchers and practitioners (Choy & Ng, 2007; Suthers et al., 2008). Sociability which focuses on how learners build up social relationships and work as a team is regarded to be essential for effective collaborative learning (Kreijns et al., 2007). Although scholars have proposed some antecedents that affected the effectiveness of COLTs, such as self-efficacy and computer anxiety (Ifinedo, 2006), and cognitive absorption (Saadé & Bahli, 2005), there is a lack of an integrated framework to understand how sociability affects the effectiveness of COLTs. Therefore, this study aggregates self-disclosure, social exchange, trust, and cohesion, forming an intact framework to present how these antecedents influence the performance and satisfaction of COLTs. The results can be a valuable reference for instructors to design courses.

When online students are working in teams, different backgrounds, different ways of thinking and unfamiliarity between members often lead the obstacles for communication. Due to the difficulties of conveying correct information through CMC
Computer-Mediated Communication), members find it difficult to build social relationships. Thus, Yum and Hara (2006) proposed that appropriate self-disclosure is capable of reducing uncertainty and unfamiliarity and further improving the relationships among online students. In the context of a COLT, students have to exchange information to accomplish the requirements of the subjects. During the process of discussions, students have to repeatedly communicate and negotiate in order to reach the consensus. According to Social Exchange theory (Homans, 1958), the relationships between students in COLTs are often based on the exchange of the resources they have. For the task-driven COLTs, the given assignments are the targets to accomplish. Exchanging information and knowledge they own is the only methods whereby to achieve the goals.

Self-disclosure is a process in which one person discloses the information about himself to another. It includes personal thoughts, feeling and experience (Dindi, 2002). Derlega and Margulis (1993) indicated five functions of self-disclosure: emotional catharsis, self-clarification, relationship development, social recognition and social control. From this, self-disclosure is able to identify individuals, develop intimacy and guide COLTs toward the right direction. Additionally, researchers found that higher levels of self-disclosure existed in CMC settings compared to face-to-face meetings (Joinson, 2001; Tidewel & Walther, 2002). The plausible reason is the anonymity of CMC. When group members communicate through face-to-face interaction, the embarrassment of confronting dispute may reduce the intention of disclosing themselves. In a CMC environment, group members do not need to face this stress; thus, they can freely express themselves.

Homans (1958) explained that the process of social exchange is a series of exchanging activities. Group members accomplish their jobs by successively exchanging the resources, such as possible solutions and complementary information, to achieve agreements and form the final solutions. Social exchange theory assumes that group members require others’ payback if they contribute to the team. The relationships between group members are built upon the balance of give and take. Group members would evaluate the cost and consequence of exchanging their resources and choose the ways benefiting themselves the most. During the process of exchanging resources, appreciation, a sense of responsibility and trust may occur because of the emergence of mutual benefits (Blau, 1964).
We regarded self-disclosure and social exchange as input factors, because both factors are the basic functions of operating COLTs. Prior to group members being able to work together, knowing each other in a certain degree is compulsory, and exchanging information and social cues is the only way to accomplish the given tasks. However, what factors will mediate the influences of self-disclosure and social exchange to the effectiveness of COLTs? Based on the research by Blau (1964) and Qian and Scott (2007), we selected trust and cohesion as the mediators that have been extensively researched and regarded as important variables in COLTs settings (Liu et al., 2008; Deeter-Schmelz et al., 2002). The effectiveness of COLTs was evaluated by two factors: performance and satisfaction. The former refers to the extent to which students sense their group productivity while the latter refers to the extent to which students perceive their group’s well being.

The framework and hypotheses building was introduced in Section 2. Section 3 introduced the experiment that was used to collect data to validate the proposed framework. Section 4 explained the validity of the measurement model and the results of data analysis. Discussion and conclusion was presented at the end.

HYPOTHESES BUILDING

Self-disclosure

Self-disclosure was defined as “an act of revealing information to others” (Archer, 1980, p.183) and was regarded as a major factor in the relationship's development, maintenance, and deterioration (Derlega et al, 1993; Laurenceau & Barret, 1998). The context of self-disclosure includes one’s personal thoughts, feelings, and experiences (Derlega et al., 1993).

Self-disclosure plays a key role in the development of social relationships, which have been increasingly significant in the development of COLTs (Newell et al., 2007). In target-orientated COLTs, self-disclosure contributes to establish, develop, maintain and disengage the relationships between students. The more information students reveal about themselves, the more complex cognitive models the recipients build, further developing trust. Past studies have concluded that a higher level of self-disclosure leads to social bonding (Ko & Ku, 2009) and social support (Barak & Gluck-Orfr, 2007), and further promotes trust between group members (Wheeless, 1976; Metzger, 2004). Thus, Hypothesis 1 is introduced.
Hypothesis 1: Self-disclosure has a positive impact on trust.

Social Exchange

Social exchange theory by Homans (1958) explained that social relationships between persons are based on the exchange of resources. Persons who give much to others try to get much from them, and persons who receive much from others are under pressure to give much to them. This exchange process works out at an equilibratory base that members give and talk at the same level. In this philosophy, the collective well-being of teams can be improved if everyone increases his own well-being by maximizing his profits that originate from exchanging resources with others.

Scholars have examined the relationships between social exchange and trust. For example, Gefen and Ridings (2002) studied social exchange and customers’ degree of trust in the CRM system and found that the social exchange construct (perceived responsiveness) had a significant impact on trust on the system reliability. Kollock (1994) examined the effect of uncertainty on the commitment and trust between sellers and buyers in an experiment with 80 students, participating in eight groups. This study focused on the exchanging information between sellers and buyers, and found that uncertainty had significant effects on the emergence of exchange structures and interpersonal trust. In addition, Molm et al. (2000) explained that the two forms of exchange, negotiated and reciprocal, produced stronger trust and affective commitment. By summarizing these studies, social exchange theory proposes that trust is more likely to develop between team members when exchange occurs without explicit negotiations or binding agreements. With this, the reduced perception of risk and uncertainty provides the opportunities for members to demonstrate their trustworthiness. In a CMC-enabled environment, COLTs could build up trust by exchanging their information and social cues. Thus, Hypothesis 2 is proposed.

Hypothesis 2: Social exchange has a positive impact on trust.

Trust

Trust is a complex factor that has been researched extensively. For example, McAllister (1995) classified trust as affective trust and cognitive trust. Ridings et al. (2002) regarded trust as two dimensions: ability of other members and benevolence/integrity of other members.
Building trust in a virtual environment is an interesting topic, especially in a text-based communication platform (such as Wiki). Traditionally, people need face-to-face contact to build trust, if signs and written messages are the only methods with which to convey social cues to build relationships in a CMC environment, will students still build trust? Hyperpersonal theory, coined by Walther (1996), provided the answer: people would still build trust as long as the span of time is enough. For example, Liu et al. (2008) studied online student groups and found that trust explained a 25.7% variance of students' values regarding to the teamwork process and explained that there was a 46.5% variance of overall teamwork satisfaction, which was far higher than other variables.

The need to belong to a group is a basic human instinct. People want to join a group that makes them feel intimate. Trust is a key ingredient in forming and maintaining a collaborative atmosphere and facilitates supportive behaviors, reducing detrimental conflicts, helping the successful development of solutions, and improving the effectiveness of teams (Kraut et al., 1999; Erdem & Ozen, 2003). Research has proved the strong relationship between trust and cohesion. For example, Webber (2008) found that affective trust and cognitive trust had significant connection to cohesion. A longitudinal study by Jarvenpaa et al. (2004) found that early trust had a direct impact on early cohesion, and that trust also played a moderator role between late communication and late cohesion. This study assumes that people trust others on the assumption that others behave according to the team norm, and that this will provide them with an expected desirable outcome. Consequently, trust will act like a glue to unite members like a team. Thus, Hypothesis 3 is described below.

Hypothesis 3: Trust has a positive impact on cohesion

Cohesion

Carron et al. (1985) defined cohesion as “a dynamic process that is reflected in the tendency for a group to collaborate and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs” (p. 245). Chidambaram (1996) explained cohesion as, “the extent to which the group members are attracted to the group and each other” (p. 148). Cohesion includes social and task cohesion (Chang & Bordia, 2001). The former refers to the need of belonging to groups, making them feel intimate; the latter refers to the perception of working like a team.
From a group’s point of view, cohesion was found to be the antecedent, but not the consequence, of group performance (Chang & Bordia, 2001). Cohesion has been found to be positively related to group performance. For example, Zaccaro & Lowe (1996) studied the groups formed by 158 students and found that high task cohesion facilitated team performance. Yoo & Alavi (2001) found that cohesion promoted task participation and further helped members reach consensus. Kankanhalli et al. (2006) suggested that cohesion was capable of reducing the conflict and facilitating the performance of COLTs. Thus, Hypothesis 4 is built:

**Hypothesis 4: Cohesion has a positive impact on the performance of COLTs**

**Satisfaction**

Satisfaction includes relational and procedural aspects of the activity, member contribution, and participation (Burke et al., 2001). Scholars have examined the relationships between cohesion and satisfaction in a variety of settings. For example, Burke et al. (2001) conducted two longitudinal studies on computer-supported workgroups and concluded that cohesion had a strong correlation with satisfaction. Carron et al. (2002) researched cohesion on basketball teams and soccer teams and the results indicated that cohesion was a shared perception, and it had a strong relationship with success of teams. DiMeglio et al. (2005) examined cohesion in a nurse setting and found that a higher degree of cohesion was able to improve the interaction between nurses, resulting in better job satisfaction and a diminished turnover rate. In an online learning setting, we believe that cohesion facilitates the well-being of teams and improves participation. Thus, Hypothesis 5 is introduced.

**Hypothesis 5: Cohesion has a positive impact on the satisfaction of COLTs**
The hypothetical model is shown in Figure 1.

![Figure 1 Research model](image)

**EXPERIMENT**

“Management Information Systems” is a foundation unit for Information Management undergraduate students in Taiwan. The unit aims to make students fully conversant with the role and place of information systems and information technology in business. Students from seven classes at three universities, located in three dispersed counties in Taiwan, were required to complete a given case study as their final report, which was a group writing assignment. It described a restaurant facing some serious problems and challenges such as the inefficiency of managing orders, the disorganization of stock management, and difficulties in calculating payroll and taxes. Four questions related to these issues were given and teams were asked to propose the solutions for the restaurant. Team members could only communicate with each other via a Wiki platform, and any other methods of communication were prohibited (such as MSN, email and phone calls).

The project operated for over five weeks. Students were chosen randomly from each class and were put into a group with five members. Some groups decreased to 4 members because some students dropped the course after the project commenced. This brought the number down to 65 groups, comprised of 302 students in total. Each group was pre-assigned to their Wiki working space and had to access their discussion boards to discuss and exchange information to complete the assignments, which were posted on the Wiki platform. To ensure their disability to contact others by other prohibited methods (such as email or msn) or even meeting face-to-face, three assistants checked the discussion boards two times per day in order to remove any personal contact messages posted by members, leaving warnings when this occurred. After completing the assignments, hard copy questionnaires were distributed in the lectures. Participants were
asked to use a 7-point Likert scale (1 for strongly disagree and 7 for strongly agree) concerning the questions related to the framework. 287 validated questionnaires were collected, giving a return rate of 95%. The average age of the respondents was 22.35, with a range of 20 to 26. The sample was 65.50% male (n=188), while 34.50% was female (n=99).

DATA ANALYSIS

Validity of Measurement Model

The measurement model for the six constructs derived their reliabilities from original studies. The measurement items for self-disclosure were from Wheeless (1976). Social exchange was evaluated according to the measurement items by Mohr and Spekman (1994). Trust was estimated by the measurement items developed by Ridings et al. (2002), while cohesion was estimated by the measurement items developed by Sargent and Sue-Chan (2001). Performance was measured by the items from Lurey and Raisinghani (2001), while satisfaction was measured by the items from Chidambaram (1996). Table 1 shows the validity of the measurement model.

Table 1 Descriptive statistics, correlation of constructs, Alpha, CR, AVE

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>S.D</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>Alpha (^a)</th>
<th>CR (^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1. Self disclosure</td>
<td>4.63</td>
<td>2.20</td>
<td>.51 (^c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.67</td>
<td>.65</td>
</tr>
<tr>
<td>C2. Social Exchange</td>
<td>4.29</td>
<td>2.15</td>
<td>.15</td>
<td>.79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.80</td>
<td>.81</td>
</tr>
<tr>
<td>C3. Trust</td>
<td>4.58</td>
<td>2.45</td>
<td>.05</td>
<td>.77</td>
<td>.83</td>
<td></td>
<td></td>
<td></td>
<td>.80</td>
<td>.85</td>
</tr>
<tr>
<td>C4. Cohesion</td>
<td>3.87</td>
<td>2.25</td>
<td>.24</td>
<td>.77</td>
<td>.82</td>
<td>.80</td>
<td></td>
<td></td>
<td>.90</td>
<td>.90</td>
</tr>
<tr>
<td>C5. Performance</td>
<td>4.58</td>
<td>2.42</td>
<td>.10</td>
<td>.78</td>
<td>.69</td>
<td>.67</td>
<td>.81</td>
<td></td>
<td>.89</td>
<td>.89</td>
</tr>
<tr>
<td>C6. Satisfaction</td>
<td>4.63</td>
<td>2.53</td>
<td>.05</td>
<td>.71</td>
<td>.68</td>
<td>.64</td>
<td>.80</td>
<td>.59</td>
<td>.74</td>
<td>.70</td>
</tr>
</tbody>
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\(^a\) Internal Consistency Reliability (Cronbach's coefficient alpha)  
\(^b\) Composite Reliability  
\(^c\) The diagonal (in italics) shows the average variance extracted for each construct.

Cronbach's alphas and measurement for all constructs are provided in Table 1, with all above 0.70 indicating an acceptable reliability of the measures, with the exception of self-disclosure, which is slightly lower. Confirmatory factor analysis was applied to
construct measurement models using maximum likelihood in LISREL. Churchill (1979) suggested that convergent and discriminant validities should be examined for construct validity. Therefore, we assessed convergent validity by examining composite reliability (CR) and average variance extracted (AVE). Except for self-disclosure (CR= 0.65), our CR values were between 0.70 and 0.9, and all are above the suggested minimum of 0.70 (Hair et al., 1998). The AVE values were all above 0.50, and these values provided further evidence of convergent validity (Fornell & Larcker, 1981).

Model Fitness and Hypotheses Examination

The resulting fit indexes indicated that the measurement model fitted the data well. Figure 2 showed the results of the Structural Equation Modeling (SEM). The overall fit of the proposed structural model was quite satisfactory (e.g. $\chi^2=603.65$, df=221, Root mean square error of approximation (RMSEA)=0.07, Comparative fit index (CFI)= 0.97, Normed fit index (NFI)=0.95, Goodness-of-fit index (GFI)=0.85, and Adjusted goodness of fit index (AGFI)=0.80). Although $\chi^2$ is a bit large ($\chi^2=603.65$), the value of Chi-square/degree of freedom (X$^2$/df=2.73) is less than 3 (Chin & Todd, 1995) and the GFI and AGFI are close to 0.90 (Hair et al., 1998). In addition, the RMSEA value is under the acceptable value of 0.08. The above figures implied good model fit (Brown & Cudeck, 1993).

![Figure 2 Structural equation model results](image)

$X^2=603.65$, df=221, $X^2$/df=2.73, RMSEA=0.07, CFI=0.97, NFI=0.95, GFI=0.85, AGFI=0.80

By observing Figure 2, it can be found that all paths are significant, except the path from self-disclosure to trust (alpha=0.05). Thus, the results of examining the hypotheses are: H2~H5 are supported; H1 is not supported.
DISCUSSION

The SEM result showed that self-disclosure had an insignificant impact on trust. One plausible reason is the inadequate experiment time, which only lasted for five weeks. According to hyper-personal relationship by Walther (1996), people require more time building relationships and trust when communicating via CMC, compared to face-to-face meetings. The limited time could hinder the extent and depth of establishing and developing trust through self-disclosure. Another possible reason is the pressure of an assignment deadline approaching. Although students disclosed themselves through a Wiki Platform, when the deadline was approaching, students reduced the degree at which they revealed themselves, unlike the beginning of the experiment, thereby, focusing more on the job distributions and discussions, instead. Therefore, we presumed that self-disclosure could have a significant impact on trust when the time is adequate, which calls for a longitudinal study.

Social exchange was proven to influence trust significantly. In a collaborative online learning context, the only way to accomplish the assignment is to exchange information to create solutions. Members posted their knowledge or the information they found on the Wiki platform, and gradually formed the answers for the given questions through their discussions. The concept of equilibrium of exchange is crucial in this process. Members expected others to respond to their posts, such as giving some advice or commenting, proposing opposite opinions, or even posting just a simple word such as “great!” This feedback maintained the enthusiasm and encouraged students to continue contributing their efforts to the assignments. Additionally, members also required counterparts to contribute as much as they did. They felt unfair and frustrated if others failed to contribute equally, which would arouse distrust and deteriorate the performance of COLTs. Therefore, social exchange plays an important role in evaluating the effectiveness of COLTs.

CONCLUSIONS

This study made two important contributions. Firstly, a new framework evaluating the effectiveness of COLTs was developed, derived from an extensive literature base and validated empirically. This framework depicted how self-disclosure and social exchange affected the performance and satisfaction of COLTs. Social exchange was found to be related to trust significantly but self-disclosure was not. Trust had a significant impact on cohesion, and cohesion was related to performance and satisfaction positively. Although
self-disclosure was not proven to be related to trust significantly, we believed that it should have a significant impact on trust once the adequate time was given. The results inspired a viewpoint: social exchange and self-disclosure are the input variables, and their influences require the mediators (trust and cohesion) to transmit to performance and satisfaction. This illuminates the need to explore in depth socio-emotional aspects in a collaborative online learning environment.

Secondly, we believed that self-disclosure and social exchange are crucial for the effectiveness of COLTs. Therefore, how to improve the extent and depth of reciprocal self-disclosure and the equilibrating contributions is important for the design of COLTs. Some ideas are proposed for the reference of instructors. Firstly, including the amount of posts to parts of the evaluation is recommended. When students are evaluated partly according to the amounts of their posts on the collaborative platform, it would force them to post their ideas on the discussion boards and increase the chances of responding to others’ threads. Once the atmosphere of responding reciprocally forms in a group, self-disclosure and social exchange would be preceded insensibly. Next, instructors should warn or discipline the “free-rider” to maintain the fairness and justness. Students may perceive the dispensability of their efforts and put less effort than others while working as a “free rider”. This “social loafing” behavior (Latane et al., 1979) may cause the process loss and deteriorate productivity of COLTs. Thus, once instructors realize the existence of “free rider,” an instant warning would be helpful to stop the contagion of “social loafing,” and prevent the deterioration of performance and satisfaction of COLTs.

REFERENCES


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