FACTORS AFFECTING KNOWLEDGE SHARING AMONG ESL UNDERGRADUATES IN COMPLETING COLLABORATIVE WRITING TASKS USING WIKI AND SKYPE

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ABSTRACT

Computer-mediated communication (CMC) has become increasingly necessary in tertiary education as it supports collaborative learning among students. Hence, interaction using social networks such as email, Facebook, Wiki and Skype, provides a way for students to collaborate and share knowledge about their studies outside the classroom. However, using CMC tools where English is used as the medium of communication in completing collaborative writing tasks can be a challenge to ESL students. Studies have explored the factors that affect students' participation and knowledge sharing in online collaborative learning such as social presence, trust, conflict, mutual influence, cohesion, and team leadership. Thus, this study aimed to find out which factors affect students' knowledge sharing in online collaboration, and to identify which CMC tools benefit or limit collaborative learning. Twenty five ESL undergraduate English Language major students participated in the study. The data was collected through a questionnaire distributed to students after they completed two project-based writing tasks asynchronously on Wiki and synchronously on Skype. The results of the study revealed that social presence and team leadership are significantly affecting knowledge sharing through online collaborative learning, and students' participation in online interaction is highly related to social presence and team leadership. Moreover, students indicated that Skype is more beneficial for collaborative learning, though they implied that Wiki can improve writing skills.

Keywords: online Interaction, collaborative learning, knowledge sharing, writing skills

Introduction

Computer-mediated communication (CMC) has become a necessity in tertiary education as it supports collaborative learning. This technology also benefits English language teaching and learning as it provides opportunities for ESL students to communicate and write using the language. Online collaborative learning involves sharing of knowledge among students, which is a crucial process in team work. Students need to share their knowledge at hand and construct new knowledge through reasoning, explanation, and reflecting from different angles. Knowledge sharing can be described as sharing common knowledge, individual beliefs and assumptions (Clark & Brennan, 1991), and it can effectively and efficiently aid working and interacting. Team members working in a group project need a shared understanding of each member, content, and process (Mulder, 1999). In order to work or learn together, team members also need to collaborate and share knowledge on what they are working on, how they are working, and with whom they need to work. Indeed, collaborative writing has become part of the assessment for undergraduates but the inexperience of students in the process has made the writing difficult to accomplish due to interpersonal conflict among team members (Chisholm, 1990). Moreover, it is possible that the use of new technologies may affect the process of knowledge sharing for collaborative writing.

Besides, students view collaborative writing as a social activity which involves knowledge construction with team members who can trust each other (Spigelman, 2000). Collaborative writing occurs within discussion boards, online chats, emails or wikis (Kessler, Bikowski, & Boggs, 2012). Hunter (2011) examined students' discussion through Wiki and found that collaborative writing can be established when the writers contribute more and less concern with issues of authorship. With CMC technologies, "the number of projects involving collaborative writing with three or more writers will grow in the future" (Kessler, Bikowski, & Boggs, 2012, p.92). Students learning through CMC tools need support and guidance from their instructor the same way as they are learning in the classroom. As English is used as the main language on the Internet, students need to realise the importance of learning and using the language for collaborative interaction, particularly writing. However, a search of the literature reveals a number of social factors which need to be taken into account when looking into knowledge sharing in online collaboration.

Some studies have explored the factors contributing to successful teamwork, such as student's trust and satisfaction (Mathieu et al., 2000; Johnson et al., 2007; So & Brush, 2008), and that knowledge sharing has been emphasised as an aspect positively affecting team effectiveness (Cannon & Edmondson, 2001).

Some of these factors that seem to have an effect on knowledge sharing in online collaborative learning are looked into in the present study.

One of the factors contributing to effective teamwork is social presence. Social presence has become known as a social and communication factor that is particularly crucial to distance learners with their instructor and peers (Gunawardena & Mclsaac, 2004). Social presence is defined as "an individual's ability to demonstrate his/her state of being in a virtual environment and so signal his/her availability for interpersonal transactions" (Kehrwald, 2008, p.94). Different types of communication media affect an individual's perception of social presence differently (Gunawardena & Zittle, 1997). Hence, the debate about social presence and communication media during the past three decades indicates a change in focus from comparing media characteristics to relating the dynamics of users' experiences and perceptions (Shin, 2002). Weinel, Bannert, Zumbach, Hoppe, and Malzahn (2011) reported that social presence may not have an effect on collaboration; however, it may affect the students' attitude towards collaborating on certain tasks. Researchers in distance education have also examined whether social presence is a critical factor affecting distance students' learning and recognised problems related to the lack of communication cues and immediate responses (Tu & McIsaac, 2002; Richardson & Swan, 2003). Furthermore, there is a lack of knowledge about the characteristics and effects of social presence related to communication media and users (So & Brush, 2008).

Another factor is trust among team members. Mutual trust is defined as the expectations shared by the team members that they will meet their commitments to each other (Dasgupta, 1988). Increased levels of trust lead to a higher level of knowledge sharing and constant communication exchange can build trust which enhances students' motivation to be involved in knowledge sharing (Anderson & Narus, 1990; Ardichvili, 2003). Furthermore, trust is viewed as helping to "improve the quality of dialogue and discussion and facilitate the sharing of knowledge" (Ichijo, Krogh, & Kleine, 2000, p.200). Kahn (2008) revealed that trust was developed among team members in successful online team collaboration. With trust, team members felt safe to speak openly to their peers, and confident that other members would work hard. In contrast, team members that have failed to build trust did not believe in others' intentions and doubted each other's competence. Besides, Rosen, Furst and Blackburn (2007) believed that trust among group members plays a major role in the quantity and quality of knowledge sharing within an online team, while Lee and Choi (2003) demonstrated that trust can help to manage conflict. If conflict was constructively dealt with, then exploring the disagreement and variances which caused the conflict could stimulate knowledge creation and develop new ideas.

Team conflict affects collaborative learning online when members' ideas and perceptions on a task differ. Jehn et al. (1999) define conflict as disagreement and divergence that occurs when team members possess different ideas, opinions, goals, or information about the task. Most people consider conflict as a bad thing and something best avoided, though conflict can indeed help manage differences (Kahn, 2008). Nevertheless, there appears to be inconsistencies in the literature concerning the impact of conflict on knowledge sharing. When team members work together, they may have different opinions, interpretations about and approaches to problem solving. Such difference may lead to further expansion of disagreement through the negotiation of the different meanings (Bossche, Seger, & Kirschner, 2006). Moreover, Panteli and Sockalingam (2005) illustrated conflict as a 'double-edged sword'. They claimed that in a complex situation, if the disagreement and divergence in a team are poorly understood and managed, then trust can be weakened. As a result, the relationships among team members will be damaged and thus knowledge sharing among team members will be a failure. Hence, certain behaviours such as social loafing and free-riding (Kreijin, Kirschnner, & Jochems, 2003) were found to contribute to team conflict. However, when the situation is well controlled, conflict can strengthen relationships and trust, and enhance knowledge sharing.

Anderson and Narus (1990) define mutual influence as the action and ability of team members that affect the interest of each other in completing tasks. It also affects collaborative learning in online teamwork, and the level of learning is largely dependent on the process of the students' discussion, problem solving, arguing, elaborating their viewpoints and listening to others' viewpoints (Jucks et al., 2003). Whipp and Chiarelli (2004) found that students "used the continuous feedback of their peers to make judgments of their work" (p.15). In addition, Lipponen et al. (2003) claim that students are particularly prone to influence each other's interest in a collaborative learning environment.

Consequently, cohesion is one of the most significant factors that affect collaboration and knowledge sharing in a team. Team cohesion is defined as the character and quality of the affective relationships and closeness among team members (Mullen & Copper, 1994). Different types of cohesion were distinguished, and the most popular two classifications were 'task cohesion' and 'social cohesion'. In their study to identify the social and cognitive factors affecting collaborative teamwork, Bossche, Segers and Kirschner (2006) found that task cohesion had a direct relation to the increase of commonly shared cognition. Moreover, task cohesion occurs when team members work together to achieve a targeted result that may not be possible to accomplish through individual effort (Tziner, 1982). On the other hand, research implies that CMC decreases the opportunities for social integration, where in such environment

learners concentrate more on task related work and pay less attention to social-emotional processes. As a result, online teams are more likely to be less motivated than students working face-to-face due to lower level of cohesion in an online learning environment (McGrath & Hollingshead, 1994).

Despite that, team leadership appears to be a determinant of team success (Misiolek & Heckman, 2005). There are two types of leadership, namely task-focused leadership and relationship-related leadership. Task-focused leadership focuses on the task at hand, while relationship-related leadership improves team cohesion (Yamaguchi, Bos, & Olson, 2002). Besides, in teams characterized by cohesiveness, the leaders allow members to carry out each part of the project based on their individual strengths (Ali, Pascoe & Warne, 2002). Nonetheless, Curtis and Lawson (2001) observed that there are two forms of leadership within online teams: leaders who made contributions such as organizing team work and initiating activities or those who made greater contributions like giving help and feedback. Alternatively, Zigurs (2003) proposed that in online learning teams, the role of leadership may change among team members, where each member may lead at certain points in the project based on their strengths. That means team members shared the leadership role where the members would rotate as team leader in different areas of the project or assignment. Thus, team members value and appreciate each other more in shared leadership. The evaluation of leadership in this study was adapted from Parker's (1998) Team Leader Assessment (TLA) concerning interpersonal behaviours, which include communication, openness, support and encouragement.

Objectives of the study

Despite the factors mentioned that may affect knowledge sharing in online collaborative learning, what motivates team members to continuously participate in the knowledge sharing process is not fully understood. Studies have looked into the relationship between these factors but have not examined the significant effect of these factors on students' knowledge sharing in online collaborative learning. Therefore, this study intends to investigate the factors that have an effect on students' knowledge sharing in completing their group projects using CMC tools. It aims to determine which factors significantly affect students' sharing of knowledge through online collaboration using Wiki and Skype.

Methodology

This study focuses on identifying the significant relationships between social factors and knowledge sharing in online collaborative learning. The student's profile questionnaire was distributed to survey demographic, language background, computer and Internet skills, experience of online learning and

familiarity of CMC tools. The population consists of undergraduate students enrolled in a full time programme majoring in English Language Study. The total number of students was 25, with 4 males and 21 females. The nationalities of the participants involved in this study include one Singaporean and one Thai, while the rest were Malaysians. The ages of the participants ranged from 20 to 30 years. Only 12% of the students speak English as their first language while 88% speak English as their second language. Most of the students started learning English during their primary education (52%) while others started when they were in pre-school (48%). In terms of ICT skill, most students were beginners to Wiki (60%) and Skype (52%) but advanced in using Facebook (64%) and Email (68%). For those who have used social network for communication, 64% of the students have used Wiki while 60% used Skype, and all students were familiar with Facebook and Email. A majority of students in the study have some experience in using CMC tools for online task (92%) before taking this course, and most of them used Facebook (60.9%) and Email (21.7%) for their tasks rather than Wiki (13%) and Skype (4.3%).

The students were assigned to groups of 4 to 5 members to work together to complete their project-based tasks entirely through online interaction. They were required to use only English language in their text-conversations. There were 6 groups altogether where one group has five members while the rest have four members in a group. There were two assignments for the groups to work on throughout the semester of 14 weeks. Each group had to discuss the first and second assignments with their members entirely online asynchronously on Wiki and synchronously on Skype, respectively. Upon forming a team, each group was required to nominate and agree on a team leader unanimously.

The approach of the study is quantitative and qualitative. A set of questionnaires was used for data collection. The items in the questionnaire seek to answer 'the social factors significantly affecting students' collaborative knowledge sharing in Wiki and Skype'. A five-point Likert Scale with a 52-item questionnaire was adapted from previous studies (e.g. Chang & Bordia, 2001; Jehn et al, 1999; Jarvenpaa & Leidner, 1999; Lipponen et al, 2003; Tu, 2002; Parker, 1998; Srivastava et al, 2006) to investigate student knowledge sharing through online collaborative learning using CMC tools. These items were divided into eight sections in order to gain more specific information on the social factors that may affect knowledge sharing through online collaborative learning, which include (A) Social Presence, (B) Mutual Trust, (C) Team Conflict, (D) Mutual Influence, (E) Team Cohesion, (F) Team Leadership, (G) Knowledge Sharing, and (H) Personal Comments. From the 52 items, only one item in the last section was an open-ended question asking for student comments about their online teamwork concerning the benefits and limitations of using Wiki and Skype. To analyse the

quantitative data, all statistical methods including normality and homogeneity test, one sample t-test and multiple linear regressions were done using SPSS Version 21. The qualitative data from the open-ended item was analysed to complement the quantitative data for in-depth understanding of the relationships. Thus, the students' comments on the benefits and limitations of Wiki and Skype for group tasks were categorised accordingly.

Results and Discussion

The findings are based on the Knowledge Sharing in Online Collaborative Learning Questionnaire. The items in the questionnaire seek to answer the 'social factors that are associated with knowledge sharing in Wiki and Skype'. For all dimensions including social presence, mutual trust, team conflict, mutual influence, team cohesion and team leader, the mean scores of related items were calculated and used for t-test and regression analysis. The following sections present the quantitative and qualitative results.

Quantitative Data Analysis and Discussion

Table 1 provides the means and standard deviations of each dimension. These were computed based on the mean in the Likert scale (1-5) and all dimensions were compared to the mean of scale (3) using the one-sample t-test. Thus, the results revealed that all variables were significantly different with the mean of scale (3) and it can be concluded that all the dimensions were at a high level among respondents. For instance, the mean score for social presence was the highest at 4.27 followed by team cohesion 4.19 and team leader 4.16. The lowest mean score was team conflict at 3.60.

Table 1
Means and standard deviations of social factors

	Minimum	Maximum	Mean	Std. Deviation	t	p value
Social Presence	3.10	5	4.27	0.56	11.23	<0.01
Mutual Trust	1.25	5	3.91	0.99	4.56	<0.01
Team Conflict	1.25	5	3.60	1.12	2.69	<0.05
Mutual Influence	3.00	5	3.98	0.52	6.94	<0.01
Team Cohesion	2.00	5	4.19	0.86	8.28	<0.01

Team Leadership	1.89	5	4.16	0.70	9.21	<0.01

Table 2
The model summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate
Model	0.677 a	0.458	0.406	0.543

a. Predictors: (Constant), team leadership, social presence

An R-square value of 0.458 implies that the two-predictor model explained about 45.8% of the variance in knowledge sharing (see Table 2). Based on the reported value of the F-statistic ($f= 8.869$, $p< 0.05$), the model fits the data. This means that the slope of the estimated linear regression model line was not equal to zero, thus confirming that there was a linear relationship between knowledge sharing and the two predictor variables – social presence and team leadership.

Table 3
Regression coefficients of social factors on knowledge sharing

	Unstandardized		Standardized		
	B	Std. Error	Beta	t	P value
(Constant)	-0.424	1.112		-0.382	0.707
Team Leadership	0.661	0.225	0.492	2.939	0.008
Social Presence	0.429	0.206	0.348	2.082	0.050

In the multiple regression models, team leadership and social presence dimensions were set as the independent variables and knowledge sharing was considered as the dependent variable. Standardized regression coefficients are presented in Table 3 to explain the importance of the two predictors (independent variables) in predicting knowledge sharing. An independent variable with a high beta coefficient is highly important in contributing to the prediction of the criterion variable. Based on the beta values obtained, the beta coefficient for team leadership was 0.492 and social presence was 0.348. This means that team leadership has a higher power relatively than social presence in predicting knowledge sharing. Thus, the results are significant for team leadership and social presence.

Table 4
Correlation of social factors on knowledge sharing

	Knowledge Sharing	**Social Presence**	**Mutual Trust**	**Team Conflict**	**Team Cohesion**	**Mutual Influence**
Social Presence	.488*					
Mutual Trust	0.389	.553**				
Team Conflict	-0.018	-0.148	-.432*			
Team Cohesion	0.257	0.351	.727**	-0.225		
Mutual Influence	0.27	0.313	0.338	-0.122	0.275	
Team Leadership	.475*	0.294	.422*	-0.1 74	.538**	.603**

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The Pearson correlation method was used to determine whether associations exist among social factors and Knowledge Sharing. The result in Table 4 shows there is a positive and significant relationship between Social Presence and Knowledge Sharing ($r = 0.488$, $p<0.05$) and also between Team leadership and Knowledge Sharing ($r = 0.475$, $p<0.05$). According to Sheskin (2003), correlation coefficient (r) between 0.3 – 0.7 is a moderate relationship. For this study, a five percent (0.05) level was determined as the accepted level of significance for statistical analysis.

The study demonstrates that social presence and team leadership significantly affect knowledge sharing through online collaborative learning. Thus, students' participation in online interaction is influenced by social presence and team leadership. This implies that the type of CMC tools used among students can also affect their online interaction in the process of task completion, and that a team leader plays an important role in supporting team members in their group work. In general, the positive results of the study suggest that using CMC tools for interactions can enhance and engage students' collaborative learning and sharing of knowledge in completing their project-based writing tasks based on the effectiveness/impact of two factors – social presence and effective team leadership.

On the other hand, trust is one of the important factors in developing a sense of collaborative learning. The means on mutual trust among team members in this study was high and above average. Thus, if students do not feel their team members are sincere and trustworthy, it can devastate their sense of collaboration. Although group members can encourage each other to communicate and interact in a polite manner, it has no guarantee that team members will communicate honestly and sincerely with each other. Indeed, students also expect their team members to be responsible and contribute to the group. They understand that a team cannot easily achieve its objectives without the effort and contribution of all its members. Individual responsibility is vital for successful teamwork (Johnson & Johnson, 1996); however, this study revealed that students sometimes have personal business or emergencies to take care of. Therefore, it would be helpful if norms or rules for group collaboration are put in place to encourage students to inform their team members ahead of time or as soon as possible whenever they find they cannot complete their assigned tasks or participate in the discussion at a specific time.

Furthermore, CMC is a promising technology to enhance teaching and learning English language among ESL students in two ways; first, the medium of communication through the Internet is English, thus students are required to use the language for tasks discussion. Second, two language skills, reading and writing can be acquired in text-conversations, and if video conference is adapted, speaking and listening skills can be enhanced too. Discussion forums such as Wikis are beneficial for collaborative writing tasks as they enable students to write, review and revise on the platform anytime and anywhere at their own pace and place. Language teachers may select suitable CMC tools, depending on the type of task, to use for group discussion. Some students may be familiar with the CMC tools and experienced in online learning, however, teachers need to set out guidelines for students to comply with in their online collaborative learning. Since good team leadership enables the team to share knowledge and progress, it is vital to instruct the group to elect a team leader agreed upon by all members. In addition, it is necessary to include text-conversations as part of the assessment as this may encourage ESL students to participate in the discussion, and use English excessively, thus improving their writing skills.

Qualitative Data Analysis and Discussion

All of the 25 participants answered the open-ended question. The responses were extracted from the questionnaire and categorised according to the students' comments on benefits and limitations of using Wiki and Skype. The summary in Table 5 shows the benefits and limitations of Wiki, while Table 6 presents the same for Skype. To highlight some of the benefits of Wiki, students commented that they were able to share information and write properly in the discussion,

thus improve academic writing skills. This may be due to the fact that students had flexible time to think before they posted the messages. They also viewed Wiki as helpful in completing collaborative tasks. However, some of the limitations of Wiki were that the students were unable to get immediate feedback from their group members, some group members rarely log in to check messages, and some technical problems were encountered. Thus, the delay in students' response in a discussion forum may de-motivate the students.

On the other hand, Skype is perceived as beneficial where it allows students to discuss and solve problems immediately and the relationships among group members were closer. The students also felt more casual when writing on Skype and they interacted more actively in the discussion. Nevertheless, some of the limitations of Skype were that students found it hard to take turns to talk when there were more members in the discussion. This was due to some members dominating the discussion, thus coordination of actual writing task became more difficult.

When CMC is utilised in English language teaching and learning, it is necessary for the teacher to teach and ensure that the students are familiar with the technology before they start using it. This may include the function of the webpage and where to seek help when they face technical problems. The teacher may select the most suitable system based on the type of tasks. For example, if the task concerns collaborative writing, then the asynchronous system may be more suitable where group members can write on the webpage and edit their work easily. For more social type of discussion where instant feedback is needed, then the synchronous system would be more appropriate.

Table 5
Benefits and limitations of Wiki for collaboration

Benefits
• Flexible time in posting messages
• Formal
• Edit work online
• Share information
• Discussion easier, post anytime and respond anytime
• Good experience discuss in a forum
• Can look at other groups' work
• Improve academic writing skills

- Be able to write properly in the discussion
- Improve critical thinking skills
- Good for completing tasks

Limitations
• Restrictive/rigid • Team leader deviates instructions • Unreliability of members • Technical problems/poor internet connection/slow • Not user friendly • Not enough privacy • Not getting replies from members • Immediate feedback not available • Webpage has limited browsers to use as not all browsers support Wikis • Not convenient for discussion as cannot be done at the same with all members • Need to refresh the page to see the feedback from member • Not interactive enough/not real time • Work may be delayed • Some group members seldom login to check Messages • Not used to using Wiki in group work

Table 6
Benefits and limitations of Skype for collaboration

Benefits
• All group members can be present in the discussion • Discussion is smooth and fast • Members able to give opinions and express ideas • Discuss and solve issues/problems immediately • No need to login everyday to discuss • Not stressful • Become more discipline to involve in the discussion • Easy to use • Simple and clear instructions • Group discussions become well and organized • Gain lots of useful information at a time

- Responses received immediately/ instantly
- Task can be done sooner
- Know more about the group members
- Relationships among group members were closer
- More convenient as all members are in and no need to wait for respond
- Interact more actively in discussion
- Lots of information can be shared and retrieved
- Informal and can use emoticons
- Easy to transfer files
- Easier to do work
- Excellent way of communication
- More comfortable
- Casual feeling when writing
- Can express more thoughts and emotions

Limitations

- Not easy finding the right time for every member to login
- Depending on internet connection, hard to download/upload files
- Not flexible as need to login at the same time for discussion
- Hard to talk in turns when there are more members
- Slow internet connection
- Coordination of actual writing task is difficult
- Technical problems
- Hard to do assignment online

Conclusion

Collaborative learning involves knowledge sharing among ESL students, and there are factors such as social presence, trust, influence, coherence, conflict, and team leadership that could affect how students are willing to share their knowledge with other members to enhance their collaborative writing task. The present study posited that social presence and team leadership were significantly associated with knowledge sharing among the group members in their collaborative writing using CMC tools.

The use of CMC in collaborative learning can be a good strategy for English teaching and learning to complement classroom learning. English courses at the

university are meant to facilitate ESL students to improve their language skills, particularly academic writing. Thus, language teachers may implement online collaborative learning for project-based tasks and encourage students to complete their group work entirely online. This study reveals that the students perceived Skype as having more strengths than Wiki in terms of convenience and ease of use of the system and function. This may be due to the instant messages that students received in the interaction and therefore decisions and tasks could be done sooner. Future research in CMC may test on different types of tasks in English language learning to determine the selection of online tools. In addition, further research is needed to facilitate ESL students to learn the four language skills, speaking, listening, reading and writing by way of video conferences and text-conversations.

Although Wiki and Skype were used in the present study as CMC tools, instructors may implement other available tools such as the Learning Management System (LMS), Google Docs and Facebook for group projects. The present study also proposes to include a team leader in group work in the instruction. It is suggested that the instructor should be aware that some students may feel they do most of the work, and some may feel they have nothing to contribute, thus plan the course properly. Unlike face-to-face group discussion, completing tasks through CMC provides the opportunity for the instructor to check on the students' learning process by moderating the conversations in the discussion forum and chat room.

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