Effects of Individualism-Collectivism in Computer Supported Collaborative Learning

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ABSTRACT

There are few explorations of the effects of cultural orientation (collectivism vs. individualism) on users' perceptions in computer supported collaborative learning in spite of the increasing research attention received. This study investigates the differences in perceptions between collectivists and individualists regarding collaborative learning systems in facilitating collaborative learning, group wellbeing and member support. The effects of these user perceptions on the intention to use are also explored. An experiment involving seventy-three subjects from Asian as well as European countries was conducted to test the hypotheses. The study provides important guidelines in both theoretical and practical forms for future collaborative learning system design and usage.

1. INTRODUCTION

Collaborative learning is regarded as an important information processing activity in e-collaboration. Members learn from one another by actively engaging in exchanging knowledge and information based on their understanding as well as individual experiences (Leidner & Jarvenpaa, 1995). Growing interest in supporting the needs of active learning, along with concurrent improvements in computer networking technology, have prompted research on Computer Supported Collaborative Learning (CSCL). These systems enable effective learning to be achieved related to interactive communication and teamwork.

Individual members' cultural backgrounds influence how members collaborate and communicate (Feldman, 1984). Oetzel (2001) has identified the importance of a member's cultural orientation in influencing his/her participation in the groups that is undergoing adverse conditions. National cultures have been distinguished along a variety of dimensions (Hofstede, 1991). Arguably, the dimension of individualism- collectivism has received the most attention by psychologists specializing in cross-cultural research, particular in the context of group collaboration (Goncale & Staw, 2006). Most of the research on the individual-collectivism dimension has found that growing up in a particular country shapes the person's perceptions, and this element can be used to predict behaviors across a wide variety of situations (Brockner, 2003).

Relatively speaking, people from collectivistic cultures are presumed to care for the development of other members, whereas individualists care more for their self-development (Hofstede, 1991). Members with collectivistic culture background value greater the group needs and goals, social norms, and group cooperation (Cox et al., 1991). In contrast, members with individualistic culture background emphasize on self-interest and belief. They tend to value more personal time and freedom (Massey et al., 2001). Comparing the two types, collectivists are motivated to find a way to fit into the group, and in general become part of various interpersonal relationships (Goncale & Staw, 2006).

The cultural orientation impacts participants' perceptions, which in turn determine the intention to use a technology; this chain of relationships highlights the potential and importance of designing culturally appropriate systems in CSCL. This study concentrates on four common system features which are, according to literature and previous studies, very likely to trigger different perceptions between collectivists and individualists (Marcus & Gould, 2000; Massey et al., 2001); these features include template in posting, post statistics, personal contribution history, and synchronicity of communication.

Table 1. The constructs of PCL, PGW and PMS

| Constructs defined in this study	Corresponding constructs in Dennis and Reinicke's (2004) work
Perceived facilitation of collaborative learning (PCL): This construct measures learners' perception of the effectiveness and efficiency of a CSCL feature in facilitating collaborative learning.	**Perceived task performance:** This factor inherited the common presumption of the construct perceived usefulness in literature; it refers to users' perception regarding the effectiveness and efficiency of the system in terms of performance.
Perceived facilitation of group wellbeing (PGW): This construct measures learners' perception of the effectiveness and efficiency of a CSCL feature in facilitating the socialization and relationship building in groups.	**Group wellbeing:** This factor measures users' perception of the ease of socializing and building relationships among members.
Perceived facilitation of member support (PMS): This construct refers to how learners perceive how a CSCL feature can facilitate them to be understood and known by other group members.	**Member support:** This factor refers to how the users perceive themselves are being understood by other group members and hence able to build network with others.

In line with Dennis and Reinicke's (2004) extended Technology Acceptance Model (TAM) in investigating the adoption behaviors of collaborative technologies, This study proposes an adoption model in CSCL by incorporating perceived facilitation of collaborative learning (PCL), perceived facilitation of group wellbeing (PGW) and perceived facilitation of member support (PMS) as antecedents of *perceived usefulness* (Davis, 1989), which in turn affects the intention to use (IU). We adopt these constructs in Dennis and Reinicks' (2004) work (see Table 1); the salient difference is that the current study focuses on the (perceived) effectiveness of the collaboration learning technologies.

This paper highlights the importance of culture sensitivity in CSCL design, which would cater to the cultural orientation, i.e., collectivism or individualism. Section 2 proposes an adoption model for CSCL. The next sections describe an experimental study and the data analysis. Findings are next discussed and implications are drawn.

2. PROPOSED MODEL AND RESEARCH HYPOTHESES

The diagram (Figure 1) depicts the theoretical model to be examined in this paper. The hypotheses are derived in the remaining of the section.

Figure 1. Research model
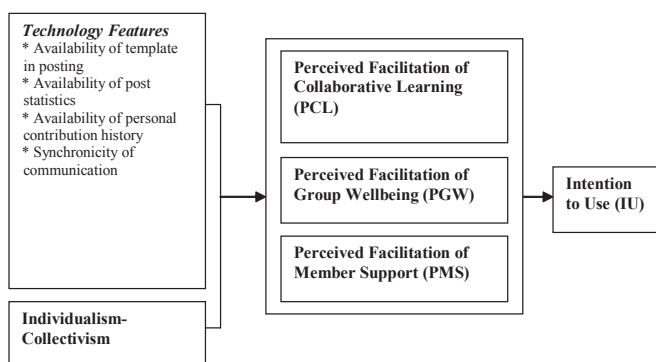
2.1 Availability of Templates in Posting
Previous instructional research has shown that providing students with templates in answering questions can guide the cognitive process and in turn enhance the learning (Cinneide, 1998). In CSCL, the templates can make the idea exchange among users easier because the flows of the posts are similar. However, individualists may tend to see a template is hindering uniqueness and creativity. Individualistic cultures encourage uniqueness; in contrast, uniqueness can be viewed as a threat to harmony in collectivist cultures (Goncale & Staw, 2006). The underlying psychological reason is that individualists are in favor of being unique and distinguished from other people; however, collectivists value their group as a whole and they generally tend to avoid being unique (Markus & Kitayama, 1994). In this connection, collectivists tend to appreciate the templates provided in the system more than individualists, because they tend to perceive the template as an easier way to achieve the group goal, and communicate with group members.

H1a.   *Collectivists will report higher perceived facilitation of collaborative learning to the availability of templates in posting than individualists.*

H1b.   *Collectivists will report higher perceived facilitation of group wellbeing to the availability of templates in posting than individualists.*

H1c.   *Collectivists will report higher perceived facilitation of member support to the availability of templates in posting than individualists.*

2.2 Availability of Post Statistics
Some bulletin boards and discussion forums inform publicly the statistics regarding the responses to each post. Through this feature, users could gain a better sense of the degree of the consensus concerning a particular topic. Also the statistics reflect the social support among group members (Marcus & Gould, 2000). Collectivists are more incline to follow the consensus so as to promote feelings of harmony and cooperation (Kanter, 1988). This tendency is motivated by their concern for the well being of the larger social group.

However, because individualists tend to resist following the majority if majority's opinion is different from their preferences (Fiske et al., 1998); they are likely to be consistent in their views and maintain them in the face of opposition. As a result, the number shown in the statistics about the responses would not have as much effect on individualists as that on collectivists.

H2a.   *Collectivists will report higher perceived facilitation of collaborative learning to the availability of post statistics than individualists.*

H2b.   *Collectivists will report higher perceived facilitation of group wellbeing to the availability of post statistics than individualists.*

H2c.   *Collectivists will report higher perceived facilitation of member support to the availability of post statistics than individualists.*

2.3 Availability of Personal Contribution History
Some systems allow users to search others' posts using the user login names, i.e. the personal contribution history of every individual is accessible to all users. The purpose of having this feature is to enable users a better understanding of others' arguments or ideas. However, the effects of this features triggers differently on users' emotion. Collectivists' self-esteem is not derived from calling attention to their own abilities or contributions; instead, their prime interest is to promote group interests (Wink, 1997). Thus, they tend to perceive the personal contribution history to be more useful in understand others' contributions rather than making themselves understood. Contrarily, in general, individualists tend to perceive that their contributions could arouse attention (Goncale & Staw, 2006); consequently, they are expected to perceive this function as a mechanism to promote themselves and consequently perceive greater member support from the other members.

H3a.   *Collectivists will report higher perceived facilitation of collaborative learning to the availability of personal contribution history than individualists.*

H3b.   *Collectivists will report higher perceived facilitation of group wellbeing to the availability of personal contribution history than individualists.*

H3c.   *Individualists will report higher perceived facilitation of member support to the availability of personal contribution history than collectivists.*

2.4 Synchronicity of Communication
According to Dennis and Valacich (1999), communication media in CSCL may be differentiated in terms of their synchronicity (or lack of). For example, real-time text communication (e.g. chat) is a highly synchronous communication medium, while message board (e.g., bulletin board and discussion forum) are asynchronous media in which a discussion is carried over time (Bafoutsou & Mentzas, 2002). Generally, collectivists prefer the asynchronous media which allow them more time to compose messages and explain themselves; therefore, they tend to perceived asynchronous communication more helpful in facilitating learning than the synchronous communication (Massey et al., 2001). Collectivists also tend to prefer to reach decisions through indirect communication with a calculated degree of vagueness to avoid conflicts (Goncalo & Staw, 2006).

However, individualists generally prefer to reach decisions through synchronous communication that may invite debates - a practice not easily enacted to asynchronous groupware. The explanation here is that individualists value frankness and perceive conformity negatively, as compared to collectivists (Markus & Kitayama, 1994). Studies have shown that learners of individualistic cultures are generally more assertive than others (Goncalo & Staw, 2006).

H4a.   *Collectivists will report higher perceived facilitation of collaborative learning to asynchronous medium than synchronous medium; individualists will report higher perceive facilitation of collaborative learning to synchronous medium than asynchronous medium.*

H4b.   *Collectivists will report higher perceived facilitation of group wellbeing to asynchronous medium than synchronous medium; individualists will report higher perceived facilitation of group wellbeing to synchronous medium than asynchronous medium.*

H4c.   *Collectivists will report higher perceived facilitation of member support to asynchronous medium than synchronous medium; individualists will report higher perceived facilitation of member support to synchronous medium than asynchronous medium.*

2.5 Relationships Between Perceived Facilitation and Intention to Use
Perceived usefulness has been studied widely in Information Systems literature as an important factor having a positive relation with users' intention to use (Lim & Bebhasat, 2000). Aligning with Dennis and Reinicke's (2004) work, perceived facilitation of collaborative learning, perceived facilitation of group wellbeing, and

perceived facilitation of member support are considered to be important aspects of perceived usefulness. Therefore, we expect they are positively related user's intention to use the technology features.

H5a.   *Perceived facilitation of collaborative learning is positively related to intention to use.*

H5b.   *Perceived facilitation of group wellbeing is positively related to intention to use.*

H5c.   *Perceived facilitation of member support is positively related to intention to use.*

3 RESEARCH METHODOLOGY

3.1 Subjects and Manipulation Check

An experiment was conducted which involves seventy-three undergraduates participated in this study. For the collectivistic condition, forty subjects were recruited from Asian countries including China, Malaysia and Vietnam. For the individualistic condition, subjects were from European countries, mainly Sweden and Germany. Participation to this study was on a voluntary basis. Comparative research on Asian and European cultures suggests that the two cultures represent well the collectivistic and individualistic cultures respectively (Hofstede, 1991). Manipulation check was conducted by using Hofstede's scales to test subjects' cultural orientation in terms of individualism-collectivism, and it was found successful ($p < 0.01$).

3.2 Experimental Procedure

Prior to the experiment, all participants completed a questionnaire to assess their experience in exploring sites and links, participating in online chat, posting in forum, and visiting the websites relating to their courses. Also subjects were assessed for their experience in collaborative learning. No significant differences were reported between the individualists and collectivists. Further, all subjects reported that they had previously participated in all the activities mentioned. Variables PCL, PGW, PMS and IU were measured through questionnaire items adapted from Dennis and Reinicke's (2004) work (see Appendix).

Table 2. Descriptive statistics: mean and standard deviation

Cultural Orientation	Functions	PHCL	PGW	PMS	IU
Collectivists	Templates in posting	3.53 (0.81)	3.23 (0.79)	3.28 (0.79)	3.30 (0.95)
	Post statistics	3.02 (0.75)	3.13 (0.81)	3.02 (0.73)	3.29 (0.82)
	Personal contribution history	3.51 (0.77)	3.54 (0.69)	3.54 (0.72)	3.66 (0.85)
	Asynchronous comm. (Forum)	3.72 (0.56)	3.73 (0.79)	3.71 (0.67)	3.75 (0.82)
	Synchronous comm. (Chat-room)	3.43 (0.78)	3.53 (0.89)	3.50 (0.90)	3.65 (0.82)
Individualists	Templates in posting	3.33 (0.88)	3.07 (0.91)	3.02 (1.02)	2.95 (1.03)
	Post statistics	2.59 (0.81)	2.73 (0.86)	2.89 (0.91)	3.05 (0.98)
	Personal contribution history	3.03 (0.87)	3.02 (1.00)	3.18 (1.03)	3.45 (0.92)
	Asynchronous comm. (Forum)	3.78 (0.64)	3.78 (0.67)	3.75 (0.81)	3.77 (0.81)
	Synchronous comm. (Chat-room)	3.41 (0.82)	4.05 (0.75)	4.03 (0.89)	3.76 (0.90)
Total	Templates in posting	3.44 (0.84)	3.16 (0.84)	3.16 (0.90)	3.15 (0.99)
	Post statistics	2.83 (0.89)	2.96 (0.85)	2.97 (0.81)	3.18 (0.89)
	Personal contribution history	3.30 (0.85)	3.32 (0.87)	3.39 (0.88)	3.57 (0.88)
	Asynchronous comm. (Forum)	3.74 (0.59)	3.75 (0.73)	3.73 (0.73)	3.76 (0.81)
	Synchronous comm. (Chat-room)	3.42 (0.79)	3.75 (0.87)	3.73 (0.93)	3.70 (0.85)

Table 3. Summary of hypotheses test results

H1, H2, H3 and H4				
Functions	Constructs	Hypothesis	ANOVA / T-test	Hypothesis supported?
Templates in posting	PHCL	Collectivists > Individualists	F = 0.91 , p = 0.35	H1a: No
	PGW		F = 0.42, p = 0.52	H1b: No
	PSS		F = 1.01 , p = 0.31	H1c: No
Statistics about the responses to posts	PHCL	Collectivists > Individualists	F = 0.03, p =0.86	H2a: No
	PGW		F = 3.15, p = 0.08	H2b: No
	PSS		F = 0.37, p = 0.55	H2c: No
Personal contribution history	PHCL	Collectivists > Individualists	F = 5.12 , p =0.03	H3a: Yes
	PGW		F =5.81 , p = 0.02	H3b: Yes
	PSS	Individualists > Collectivists	F =2.22 , p =0.14	H3c: No
Degree of synchronicity in communication	PHCL	Collectivists: Asynchronous>Synchronous	t = 1.25 , p = 0.22 t = 1.43 , p = 0.16	H4a: No
	PGW	Individualists: Synchronous>Asynchronous	t = 2.08, p = 0.04 t = 4.67, p = 0.00	H4b: Yes
	PSS		t = 2.23 , p =0.03 t = 4.01, p = 0.00	H4c: Yes

H5					
	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Hypothesis supported?
	B	Std. Error	Beta			
PHCL	0.18	0.03	0.28	7.03	0.00	H5a: Yes
PMS	0.20	0.07	0.18	2.92	0.00	H5b: Yes
PGW	0.30	0.07	0.27	4.34	0.00	H5c: Yes

We used a web-based learning environment, Future Learning Environment (FLE), to support collaborative learning among participants in this experiment (Leinonen et al., 2003). In the FLE, a course about the solar system was constructed. The subjects were informed that there were a total of 15 users (including the experimenter). These phantom users were played by the experimenter, who also served as the facilitator. Posts (by virtual participants) were pre-created and made identical for all experimental conditions.

Detailed instructions were provided to guide subjects to use the corresponding system features in performing a series of activities. Subjects were first asked to read through the materials as well as the posts in the system. Next, they were requested to compose in a forum two posts in two separate threads regarding two topics covered in the materials. In one thread, all posts were supposed to adopt a specific template. In the other thread, posts were composed without any templates. To combat any order effects in the experiment, the sequence of the two posting activities was randomly assigned to subjects. When the two posts were completed, subjects were asked to try out the chat-room feature, while the experiment administrators took the time to post replies to subjects' posts using the names of virtual participants. The subjects were next asked to check the response statistics about their posts, and access their own personal contribution history and also histories of other percipients in the forum. The relevant instrument was administrated at the appropriate point in time after the corresponding function was attended to.

4. DATA ANALYSIS

Factor analysis and reliability tests show that the instruments are suitable (see Appendix). The ANOVA model was used to detect significant effects; a 5% level of significance was used in all tests. Due to the different number of subject involved in the experimental conditions, steps have been taken prior to the analysis to ensure the satisfying of the three assumptions underlying the ANOVA model, namely homogeneity of variance, independent sample, and normality of error terms. Further, subjects have reported no significant differences in terms of computer experience and collaborative learning experience between the two experimental conditions; these factors are not included as covariates in the analysis. Next, linear regression model is used to test the relationships between the perception variables (PCL, PGW and PMS) and the intention to use (IU). Table 2 reports the descriptive statistics. Table 3 summarizes the results of the hypotheses testing.

5. DISCUSSION AND IMPLICATION

This study has the following limitations. First, the users have used the system for a relative short time. The time limitations could have affected the behaviors of members. This calls for longitudinal studies in future. Next, the relatively small number of subjects should be noted when interpreting the results. Lastly, the use of voluntary subjects in an optional course which may be quite different from the setting in a compulsory course; this may account for most of the unsupported hypotheses regarding the perceived facilitation of collaborative learning.

In terms of theoretical contributions, this exploratory study has examined the effects of culture orientation on perceptions pertinent to the collaborative learning, and how these perceptions affect the intention to use. In this research, the individualism-collectivism culture dimension was of focus. Future research could look into other dimensions such as power distance and uncertainty avoidance. The joint effects of culture and other factors are of interest; these factors include communication style, task nature and gender (Simon, 2000). For example, Chang and Lim (2003) also stated that gender effects may become salient only in individualists in online setting.

This study also highlights the importance of designing culturally sensitive system to facilitate CSCL. For users from collectivistic culture background, systems could include functions which facilitate social support to increase users' incentive and intention to use of the system.

6. CONCLUSION

This study investigates the differences in perceptions between collectivists and individualists regarding collaborative learning systems in facilitating collaborative learning, group wellbeing and member support. The effects of these user perceptions on the intention to use are also explored. An experiment involving seventy-three subjects from Asian as well as European countries was conducted to test the hypotheses. The study provides important guidelines in both theoretical and practical forms for future collaborative learning system design and usage.

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APPENDIX MEASUREMENT ITEMS (5 POINT SCALES)
Perceived Facilitation of Collaborative Learning (PCL) (Alpha = 0.96)
PCLE1: Using <This function> enhances the quality of the message I composed. (loading = 0.92)

PCLE2: Using <This function> make the message easier to compose. (loading = 0.91)

PCLE3: Using <This function> is a good way to share my information with other users. (loading = 0.94)

PCLE4: If other users use <this function>, I can understand better their idea in the message. (loading = 0.92)

PCLE5: If other users use <this function>, I can improve my learning in CLS. (loading = 0.91)

Perceived Facilitation of Group Wellbeing (PGW) (Alpha = 0.87)

PGW1: <This function> is a good way to help all users to socialize and develop relationships. (loading = 0.84)

PGW2: <This function> is a good way to build and maintain all users as intact and continuing social group. (loading = 0.88)

PGW3: <This function> contributes to the cohesiveness among all users. (loading = 0.78)

Perceived Facilitation of Member Support (PMS) (Alpha = 0.76)

PMS1: <This function> is a good way to let other users in the system understands me more. (loading = 0.79)

PMS3: <This function> is a good way to create and maintain my role among all users. (loading = 0.75)

Intention to Use (IU) (Alpha = 0.93)

IU1: I intend to use <this function> for learning in CLS. (loading = 0.82)

IU2: Assuming I have access to <this function>; I predict that I would use it for learning in CLS. (loading = 0.82)

IU3: I plan to use <this function> to learning in CLS in future. (loading = 0.85)

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