

The Effect of Sense of Community on Learner Satisfaction in Online Learning : A Meditating Model

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Abstract

This study examines the effect of sense of community on the relationship between learner satisfaction and influencing factors related to the online learning environment. Influencing factors related to the online learning environment are derived from previous literature and classified into two groups : social dimension (leader's enthusiasm, offline activities) and system dimension (usefulness, ease of use, enjoyability). Learner satisfaction is defined as the learners' perceived learning gains from taking an online class. Study participants included 250 university students from two different institutions. The participants were divided into 43 groups and asked to complete an online TOEIC preparation module using a commercial cooperative learning system over 4 weeks. Data were collected at three points for each participant, at the beginning, 3 weeks after, and at the end of the online module. Two system factors related to the online learning environment (ease of use, usefulness) directly influenced learner satisfaction, while social factors indirectly influenced learner satisfaction through the mediating role of sense of community.

Keywords : Online Learning, Sense of Community, Learner Satisfaction

Received : 2008. 08. 22. Revision : 2008. 09. 13. Final Acceptance : 2008. 09. 20.

※ This work was supported by the Korea Research Foundation Grant funded by the Korean Government (MOEHRD), (KRF-332-B00112).

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1. Introduction

Online collaborative learning, the notion that we should provide a learning environment where students can actively exchange ideas and learn from one another using new computing and communication technologies, is hardly a new idea, and its benefits are widely praised by many researchers and practitioners [Roberts, 2004; Bonk, Wisner, and Lee, 2004; Bernard and Ludgren-Cayrol, 2001; Kitchen and McDougall, 1998].

Despite these general positive claims, however, the use of group work does not always deliver quality learning and satisfied learners. Nowadays, students are more likely to come from diverse backgrounds, have different levels of technical and academic abilities and have the desire to study at times and in places to fit their lifestyles. It is said that individual differences among learners, size and formation of groups, type of learning tasks, as well as the design and functionality of learning environments, can influence the quality of learning and learner satisfaction [Carr-Chellman and Duchastel, 2000; Fay, Garrod, and Carletta, 2000]. These research findings indicate that simply placing students in groups does not guarantee that collaborative learning will occur and that we have to carefully design and implement online learning environments to increase learners' active participation and the feelings of engagement.

Recently, researchers are paying close attention to online communities and trying to utilize their social networks to benefit learning. Previous research studies indicate that

students with strong sense of community are more likely to persist in online learning environments [Tinto, 1993; Rovai, 2002]. Research also provides evidence that strong sense of community has positive influence on increased enthusiasm to group goals, cooperation among students, satisfaction with collaborative efforts, and motivation to learn [Bruffee, 1993; Dede, 1996; Frymier, 1993; Wellman, 1999; Rovai, 2002]. Thus, many researchers and practitioners proposed strategies to increase online learners' retention by providing increased informal, affective support through sense of community.

In this study, we focused on the mediating role of sense of community to increase learner satisfaction and examined the interactions of sense of community and factors associated with the system and social aspect of online learning environment. To achieve this goal, the following research questions were addressed :

First, what factors influence individual learners' learner satisfaction in online learning environments?

Second, what factors influence individual learners' sense of community in online learning environments?

Third, what is the role of sense of community in online learning environments?

2. Theoretical Backgrounds

2.1 Online environments as information and learning systems

Online environments have rapidly changed

the way people work and learn. Thanks to the widely accessible and flexible Internet, we are witnessing more information sharing and knowledge building activities in the virtual space that were previously perceived impossible. With its format and delivery mode so diverse and constantly evolving, it is difficult to define online learning in a few words. Still, many researchers agree that online learning refers to a wide range of learning experiences mediated by web-based, telecommunication technologies as opposed to traditional classroom-based, offline learning [Dempsey and Van Eck, 2007; Dabbagh and Bannan-Ritland, 2005].

Prior research proposes two distinctive approaches to design online learning environments—the system approach and the social approach. In the former, the emphasis is on the

technology-mediated aspect of online learning and developing a reliable, user-friendly platform of learning becomes important. Here, perceived usefulness, ease of use, and enjoyability are major determinants of system usage as suggested by Technology Acceptance Model (TAM) [Davis, 1989] or many IT researchers [see Teo, Lim, and Lai, 1999; Moon and Kim, 2001]. In the latter, on the other hand, the focus is on the learners' relationships with one another and designing online environments where learners can engage in frequent and flexible interactions becomes critical [Karahanan, Straub, and Chervany, 1999; Venkatesh and Davis, 2000]. Group leader's enthusiasm and availability of diverse offline activities to provide further opportunities for contact are relatively well-accepted and clear-

<Table 1> Measures of Research Variables

Variables	Operational definitions	No. of Items	Related studies
Usefulness	The degree to which a person believes that using an online learning environment would enhance his or her job performance	6	Davis et al. [1989] Venkatesh et al. [2003]
Ease of Use	The degree to which a person believes that using an online learning would be free of effort	6	Davis et al. [1989] Venkatesh et al. [2003]
Enjoyability	Level of enjoyment from using online learning with other members	4	Moon and Kim [2001] Koh and Kim [2003]
Leader's enthusiasm	Willingness and effort of team leaders to lead members or to contribute to them	5	Koh and Kim [2003]
Offline activities	Agility of regular offline meetings, contacts via telephone, and communications between members	4	Koh and Kim [2003]
Sense of Community	A feeling that members have of belonging, a feeling that members matter to one another and to the team, that they have duties and obligations to each other and to team, and they possess shared expectations that members' educational needs will be met through their enthusiasm to shared learning goals	10	Rovai [2002] Rovai et al. [2004]
Learner satisfaction	Participants' perceived learning gain from taking an online learning	10	Wang [2003] Feller and Moon [1994]

ly defined factors in this approach [Venkatesh and Brown, 2001].

For more complete and balanced understanding of online collaborative learning, we focused on both system and social dimensions of online learning environments and identified three system factors (*usefulness*, *ease of use*, and *enjoyability*) as well as two social factors (*leader's enthusiasm* and *offline activities*). Operational definitions of major factors explored in this study are summarized in <Table 1>.

2.2 Learner satisfaction as a measure of online learning

A significant portion of research on online learning can be categorized as media comparison study in which researchers examined the effect of different media on student learning [Simonson, Smaldino, Albright, and Zvacek, 2003], although Clark [1983] concluded that the type of medium is not a major factor to explain difference in learning outcomes based on a review of hundreds of media comparison studies. In response to Clark's criticism, a growing number of recent research studies are shifting the focus to the experiences of online learners. In these studies, learner satisfaction is an important dimension to understand student experiences and perceptions of online learning [Dabbagh and Bannan-Ritland, 2005].

Earlier studies with interactive televised courses [Biner, Dean, and Mellinger, 1994] identified seven factors related to learner satisfaction in online environments : satisfaction with a) instructor/instruction; b) technology; c) co-

urse management; d) at-site personnel; e) promptness of material delivery; f) support services; and g) out-of-class communication with the instructor. These factors are often considered to be organizational and involve the environment, management, and support services.

In a more recent attempt to identify domains of learner satisfaction, learner satisfaction in online environments is defined as "a summary affective response of varying intensity that follows online learning activities, stimulated by several focal aspects such as content, user interface, learning community, customization, and learning performance" [Giese and Gote, 2000]. According to Wang [2003], satisfaction appraisal is generally considered the central mediator of post-learning behavior, which links pre-learning beliefs about online learning systems to post-learning cognitive structure, learner communications, and persistence (reuse or continuing use of online learning systems). He further proposed a model consisting of four constructs (learner interface, learning community, content, and personalization) to assess learner satisfaction with online learning systems.

This study adopts Wang's model [2003] and looks at the relationships between learner satisfaction and influencing factors (system and social) as well as the role of sense of community in online learning environments.

2.3 Sense of Community

Defined as "a feeling that members have of belonging, a feeling that members matter to

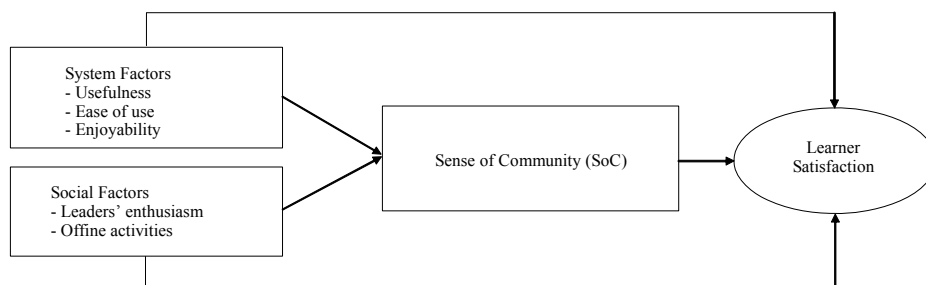
one another and to the group, and a shared faith that members' needs will be met through their commitment to be together [McMillan and Chavis, 1986]", the concept was first introduced by social psychologists and shifted the focus of community research from the structure, formation, and setting of community to people's experiences of community [Sarason, 1974]. With advances in information technologies, the notion of sense of community has expanded to online environments, generating interest among researchers and practitioners as a powerful solution to address problems with online learning (i.e., high dropout rates, learners' feeling of isolation).

In an attempt to further understand the nature of interactions in online learning environments, Rovai [2001] distinguished between task-driven and socio-emotional interaction in building a sense of community. In his follow-up study with Wighting and Lucking, Rovai [2004] further identified two underlying dimensions of sense of community : a) social dimension representing the feelings of community members regarding their spirit, cohesion, trust, interdependence, and sense of belonging; and b) learning dimension regarding

the degree to which the members share group norms and values and the extent to which their educational goals and expectations are satisfied. This extended notion of sense of community supports Haythornthwaite, Kazmer, Robins, and Shoemaker's earlier finding [2004] that online learners' sense of community is multi-dimensional. Thus, the study adopts Rovai and others' [2004] two sub-dimensions of sense of community to explore the role of sense of community in online learning environments.

2.4 Conceptual Framework

Based on the research propositions presented above, a conceptual framework is proposed to examine the mediating effect of sense of community on learner satisfaction in an online learning environment. As illustrated in <Figure 1>, the dependent variable in our framework is learner satisfaction. The independent variables include a number of system and social factors related to the online learning environment and sense of community mediate relationships between these independent variables and learner satisfaction.



<Figure 2> Factors influencing learner satisfaction in online learning

The framework suggests that a) learner satisfaction in online environments will be directly influenced by system and social factors related to the online learning environment, and sense of community; and b) the system and social factors related to the online learning environment will also indirectly influence learner satisfaction through sense of community.

According to prior research, major factors that influence learner satisfaction in online learning environments include learners, the instructor, learning tasks, technical and system aspects of learning environment, and offline activities [Phipps and Merisotis, 1999; Yoo, 2003; Choi and No, 2002]. In this study, however, all participating groups were given the same lesson modules (with VOD lectures from a single instructor) to control the effect of instructor and task variables, and we focused on the system and social variables as major factors as well as their interaction with learners' sense of community.

3. Methods

3.1 Participants

Study participants included 250 university students from two different institutions. The participants were divided into 43 groups and asked to complete an online TOEIC preparation module using an online collaborative learning system over a 4-week period. The participation was voluntary and no class-related credit was given to the participants.

Each group was composed of 4-6 students

and one of them was assigned to be a group leader who took charge of facilitating various online and offline learning activities. As groups, students were asked to make decisions as to how often they would meet for study, how they would divide work within the group, and etc.

3.2 The Survey Instrument

The survey instrument was developed based on the measures from the literature and modified through preliminary interviews with selected online learners, and the survey data were collected at Three points (at the beginning (T1 = 250), 3 weeks after (T2 = 171) and at the completion of the online module (T3 = 78) for each participant.

Participants were asked to indicate their agreement or disagreement with the survey instruments using a seven-point Likert scale. The dependent variable, learner satisfaction, was measured on the second round of survey while all the other variables were measured on the first round (see <Table 1> for the operational definitions of major factors explored in this study).

A series of factor analyses was conducted to test the validity of research variables and the results indicate that each of the constructs is unidimensional and all the items used to operationalize a construct are loaded onto a single factor. The result of reliability analysis is shown in <Table 2>. Internal consistency, as measured by Chronbach's alpha for all the variables, ranges from 0.85 to 0.97. Given the

<Table 2> The Research Variables

Variables	Reliability	No. of Items	Mean	S.D
Usefulness ^a	0.93	6	4.09	1.89
Ease of use ^a	0.90	6	4.80	1.14
Enjoyability ^a	0.89	4	4.10	1.30
Leaders' enthusiasm ^a	0.97	5	4.51	1.63
Offline activities ^a	0.95	4	3.96	1.83
Sense of community (SoC) ^b	0.93	10	4.17	1.29
Learners' satisfaction ^b	0.94	10	4.66	1.11

Note) ^a: n = 171, measured on the 2nd round survey (T2).

^b: n = 78, measured on the 3rd round survey (T1).

exploratory nature of this study, the reliability of the instrument was also deemed adequate.

3.3 The Online Learning Environment and Learning Tasks

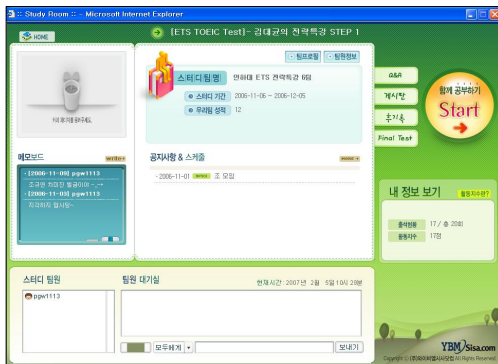
The online learning system utilized by students participated in this study was developed by Company Y, one of the largest for-profit English language institutions in Korea. The system is designed to facilitate cooperative language learning over the Internet. The lesson unit selected for the study was a popular TOEIC preparation module and it was provided free-of-charge.

Within each group, students had access to a group homepage (see <Figure 2>) and they were able to share class-related materials and make postings to discussion boards. the on-line learning system also supported synchronous communications including simultaneous viewing of video lectures by the group members (see <Figure 3>).

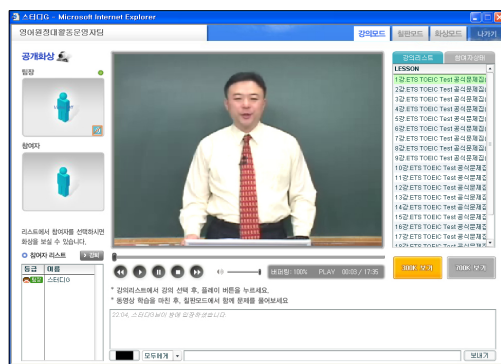
4. Results

4.1 The Relationship between Influencing Factors and Learner Satisfaction

To examine the relationships between in-



<Figure 2> the online learning environment Interface (1)



<Figure 3> the online learning environment Interface (II)

fluencing factors and learner satisfaction, six regressions were run, and as reported in <Table 3>, the results indicate that all six regression models are significant. The result of regression model 1 indicates that two system factors related to the online learning environment (*usefulness* and *ease of use*) are positively related to learner satisfaction, and for model 2, only one of the social factors, leaders' enthusiasm, is positively related to learner satisfaction. On observation of model 3, only correlation between sense of community and

learner satisfaction are significant. For model 4, the results of multiple regression shows that two factors related to the online learning environment (*usefulness* and *ease of use*) and sense of community are positively related to learner satisfaction.

4.2 The Relationships between Influencing Factors and Sense of Community

<Table 3> describes the analysis results of three regression models to examine the rela-

<Table 2> Regression Models on learner satisfaction

Regression Models	Independent Variables	Model 1 ^a β coeff.	Model 2 ^b β coeff.	Model 3 ^c β coeff.	Model 4 ^e β coeff.
Factors related to the online learning environment	Usefulness	0.62***			0.59***
	Ease of use	0.28***			0.28***
	Enjoyability	0.54			-0.05
Social factors	Leaders' enthusiasm		0.26***		-0.04
	Offline activities		0.18		0.07
Sense of community				0.56***	0.25*
Adj-R ²		0.60***	0.13*	0.31***	0.64***

Note) * : P < 0.05, *** : P < 0.01, **** : P < 0.001.

^a Model 1 : learner satisfaction = Factors related to the online learning environment.

^b Model 2 : learner satisfaction = Social factors.

^c Model 3 : learner satisfaction = Sense of Community (composite).

^d Model 4 : learner satisfaction = System factor, Social factors, Sense of Community.

<Table 3> Regression Models on Sense of Community (composite)

Regression Models	Independent Variables	Model 1 ^a β coeff.	Model 2 ^b β coeff.	Model 3 ^c β coeff.
Factors related to the online learning environment	Usefulness	0.24***		0.18**
	Ease of use	-0.00		-0.01
	Enjoyability	0.39***		0.12
Social factors	Leaders' enthusiasm		0.38***	0.30***
	Offline activities		0.56***	0.50***
Adj-R ²		0.33**	0.68***	0.73***

Note) * : P < 0.05, *** : P < 0.01, **** : P < 0.001.

^a Model 1 : Sense of Community = Factors related to the online learning environment.

^b Model 2 : Sense of Community = Social factors.

^c Model 3 : Sense of Community = factors related to the online learning environment, Social factors.

tionships between influencing factors and sense of community (composite). The result of regression model 1 indicates that only two factors related to the online learning environment (*usefulness* and *enjoyability*) are positively related to sense of community, and for model 2, all social factors, leaders' enthusiasm and offline activities, are positively related to learner satisfaction. Model 3 includes all factors and its results from a multiple regression shows that only three (*usefulness*, *leader's enthusiasm*, and *offline activities*) are positively related to sense of community.

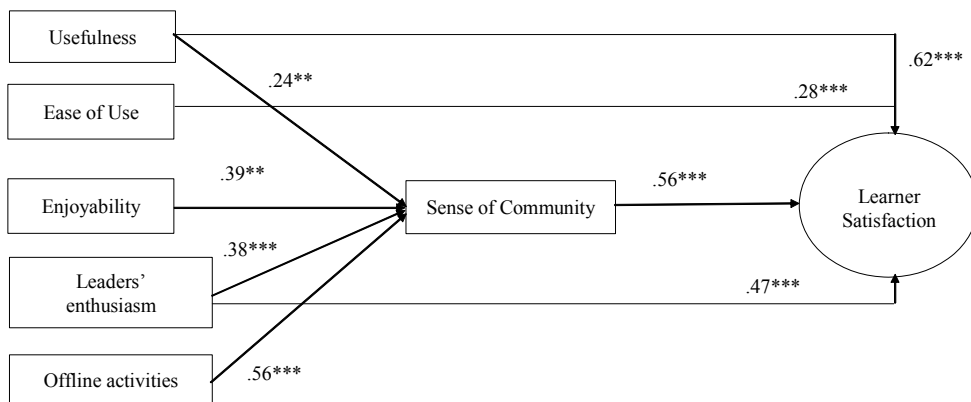
Based on statistically significant relationships, the overall paths of sense of community dynamics are graphically shown in <Figure 2> and <Figure 3>. In <Figure 2>, usefulness and leaders' enthusiasm influence learner satisfaction both directly and indirectly through sense of community while ease of use directly influence learner satisfaction. In the cases of enjoyability and offline activities, both factors' influences on learner satisfaction seem to be mediated by sense of community.

4.3 The Mediating Role of Sense of Community

As reported earlier, it was estimated that sense of community mediates the relationship between system/social factors and learner satisfaction as well as directly affects learner satisfaction. This section discusses the analysis results to validate the mediating role of sense of community.

According to Baron and Kenny [1986], a mediational model should meet the following requirements to be valid : a) the independent variable must be significantly correlated to the mediator variable; b) the independent variable must affect the dependent variable in a regression of the independent variables on the dependent variable; c) the mediator variable must affect the dependent variable, in a regression of both independent variable and the mediator on the dependent variable; and d) the effect of the independent variable on the dependent variable in e) must be less than in b).

To examine the mediating role of sense of



<Figure 4> Overall paths of sense of community

community between influencing factors and learner satisfaction, three regressions were run, and as reported in <Table 4>, the results indicate that all three regression models are significant.

On observation of <Table 4>, the results meet all four requirements by Baran and Kenny [1986], except for the case of ease of use, confirming the mediating role of sense of community between influencing factors and learner satisfaction. The mediating effects were especially significant for social factors such as leaders' enthusiasm and offline activities.

5. Discussion and Conclusions

As with existing research, the findings from this study indicate that two system factors related to the online learning environment (*usefulness* and *ease of use*) are important to increase learner satisfaction. Again, this confirms the need to approach designing online learning environments from the perspective of information system as well as learning system.

The findings related to the social factors of online learning environments are also consistent with previous studies—*leader's enthu-*

<Table 4> Regression Models on Learner Satisfaction with and without SoC

Regression Models Independent Variables		Without SoC	With SoC	Difference in R ² & β
Usefulness	R ²	0.53	0.60	0.069
	F value	79.13***	51.77***	
	Usefulness(β coeff.)	0.61***	0.50***	-0.11
	SoC(β coeff.)		0.26**	
Ease of use	R ²	0.21	0.43	0.22
	F value	18.56***	26.03***	
	Ease of use(β coeff.)	0.45***	0.34***	-0.11
	SoC(β coeff.)		0.42***	
Enjoyability	R ²	0.38	0.46	0.08
	F value	42.06***	28.78***	
	Enjoyability(β coeff.)	0.48***	0.34***	-0.14
	SoC(β coeff.)		0.29**	
Leaders' enthusiasm	R ²	0.13	0.32	0.19
	F value	10.71**	16.39***	
	Leaders' enthusiasm(β coeff.)	0.27**	-0.07	-0.34
	Soc(β coeff.)		0.56***	
offline activities	R ²	0.11	0.33	0.22
	F value	8.32**	16.94***	
	offline activity(β coeff.)	0.19**	-0.09	-0.20
	Soc(β coeff.)		0.59***	

Note) * : P < 0.05, *** : P < 0.01, **** : P < 0.001.

siasm is critical to increase learner satisfaction.

In the cases of *enjoyability* and *offline activities*, no significant results are reported. This is probably due to the fact that the online learning environment examined in this study is primarily a utilitarian information system, designed to provide instrumental values to its users. As opposed to a hedonic information system, its counterpart designed to provide self-fulfilling values such as games, extrinsic motivation becomes more critical in using a utilitarian information system [Heijden, 2004]. Previous studies do not show significant effects of *enjoyability* and *offline activities* on learner satisfaction, yet our findings indicate that their effects are mediated through sense of community.

Sense of community seems to be critical to assure learner satisfaction in online learning for its mediating roles between factors related to the online learning environment (system and social) and learner satisfaction. Sense of community plays the role of mediator between all variables, except ease of use, and learner satisfaction. Its mediating effects were especially significant for social factors such as leaders' enthusiasm and offline activities.

The study has several implications for researchers and practitioners in the field of information system : a) we need to consider both system and social factors to examine the role of sense of community in online learning; b) the findings provide empirical evidence for the mediating role of sense of community; c) by differentiating the data collection point for dependent and independent variables, we can

expect to reduce problems related to common method bias among research variables; and d) to increase learner satisfaction, an online learning environment's perceived usefulness and ease of use become important as well as the leader's role and sense of community. To cultivate system users' sense of community, the online learning environment should be able to provide enjoyable system experiences and support various offline activities.

It should be recognized that this study is exploratory in nature. It does not attempt to analyze the relationships between the mediating role of sense of community and other factors in a more comprehensive manner, necessitating additional research for further analysis utilizing structural equation analysis. Also, the study focused primarily on factors related to the online learning environment and did not examine the effect of individual differences of learners, such as their prior knowledge, technical ability, and self-efficacy. Future research should take these learner-related factors into consideration. Lastly, the participants in this study were given access to online learning module free of charge. Thus, some of our findings might not be generalizable to a broader audience of online learning (for example, people who pay for online classes).

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