

Differences in Student-Instructor and Student-Peers Social Interactions in Explaining Satisfaction in Online Learning

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Abstract

This research examines differences in students' perceived social ability (i.e. social presence, social navigation, and social connectedness) with the instructor and with their peers in online learning environments. In addition, this research explores the relationships between social ability and satisfaction in online learning by examining a student-instructor and a student-peers social interaction model respectively. The similarities and dissimilarities of the two structural equation modeling (SEM) models will be discussed in the presentation.

INTRODUCTION

Previous studies of social ability and satisfaction in online learning environments have shown positive results but have considered social ability a unitary construct (Author et al., 2007; Lin et al., 2006). However, Moore (1989) made the distinction among three types of interaction: learner-instructor, learner-learner, and learner-content. Learner-instructor and learner-learner are identified as two types of interactions due to the different roles of the instructor and students.

Since online learning is a student-centered learning environment, the instructor plays as a mediator and facilitator for supporting students' learning and responding to students' application of new knowledge while social interaction among peers promotes meaningful collaboration and discussion with in class. Due to the different role of the instructor and peers, it is common that students view the information and knowledge distributed by the instructor and peers as well as the interaction between student-instructor and peer-peer differently. Vonderwell (2003) found that students expected to have personal one-on-one relationship with the instructor in the online learning because they believed that the instructor could be a resource for their future learning while students did not identify an expectation of personal relationships with peers. Certainly, students perceived roles of instructor and peers differently. Thus, distinguishing perceived instructor social ability from perceived peers social ability may help build new knowledge about how students perceive the social interactions with the instructor and their fellow students in different ways, and how the differences would result in various impact on learning in online environments.

THEORETICAL PERSPECTIVES

Author et al. (2006) defined social ability as a relationship among people, tools, and activities that determine the person's capacity to associate with fellows and to use the members, resources and tools of the social context to achieve something of value. In their initial study, Author, et al. (2006) and Lin et al., (2006) explicated the construct of social ability and found that social navigation, social presence, and social connectedness are three primary factors describing social ability in online learning environments.

According to Dourish (1999), social navigation refers to “a particular phenomenon, in which a user’s navigation through an information space was primarily guided and structured by the activities of others within that space” (p.18). Author et al. (2006) stated that “social navigation is a construct representing being aware of what others are doing as a primary guide for one’s own actions” (p. 166). For example, social navigation is found in how students’ actions and participation in online learning environments may be influenced by other individuals’ work or actions, such as content and number of postings and information shared in class.

Based upon insights of Short, Williams, and Christie (1976), Author et al., (2006) stated that social presence “in networked virtual environments includes the sense of “being there” and the sense of “being there with others” (p. 166). Students’ perceived social presence and their actual written assignment scores, and students’ perceived social presence and their perceived learning experience in an online course were found to be positively related and (Picciano, 2002).

Social connectedness represents social ties among people and the value they perceive in being connected (Author et al., 2006; Resnick, 2002). It represents a sense of membership and being part of a community (Lin et al, 2006). The meaning of social connectedness is close to the definition of sense of community which is “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and shared faith that members’ needs will be met through their commitment to be together” (McMillan and Chavis, 1986, p.9). Previous studies found that students’ feeling of connectedness influence their participation and learning satisfaction in online learning environment (Rovai, 2002; Tinto, 1993).

METHODOLOGY

Research Purpose & Questions

The purposes of this study are twofold: 1) to extend Authors’ research (2006) to further explicate the difference of student perceived social ability (i.e. social presence (SP), social navigation (SN), and social connectedness(SC)) with the instructor and with their peers in online learning environments; 2) to explore the relationships between perceived instructor social ability and satisfaction as well as between perceived peers social ability and satisfaction in online learning respectively; and 3) to examine the similarities and dissimilarities between the student-instructor model (SIM) and student-peers model (SPM). More specifically, the research questions are as follows:

- 1) Are there differences between student perceived social ability (i.e. social presence, social navigation, and social connectedness) with the instructor and with their peers?
- 2) To what extent and in what ways does student perceived instructor social ability relate to their satisfaction in online learning environments?
- 3) To what extent and in what ways does student perceived peers social ability relate to their satisfaction in online learning environments?
- 4) Comparing the SIM and SPM, how do student perceived social ability with the instructor and peers explain their satisfaction in online learning similarly and differently?

Participants

Data were collected from 33 online courses offered in a college of education in a mid-west university during 5 semesters from 2005 to 2007. These courses are taught by different instructors. A recruiting email with consent forms and the URL of the Online Learning Experience Study Questionnaire (OLESQ) were sent to students at the end of the semester. A sample of 334 who enrolled in the surveyed courses volunteered and completed the OLESQ over

the Internet. After initial data screening, 8 cases were excluded due to missing data. The final sample was 326 cases including 2 cases without providing demographic information. Table 1 reports the demographic information for 324 cases.

Table 1. *Demographic information for 324 cases*

Demographic Information		Number of Participants	Percentage (%)	Total
Gender	Male	116	35.8	324
	Female	208	64.2	
Language	Native Speaker	291	89.8	324
	Non-native Speaker	33	10.2	
Academic Status	Undergraduate	72	22.2	324
	Graduate	252	77.8	
Previous Online Courses	0-1 courses	93	28.7	324
	2-5 courses	127	39.2	
	> 6 courses	104	32.1	
Hours Login(weekly)	< 5 hr.	128	39.5	324
	6-10 hr.	119	36.7	
	> 10 hr.	77	23.8	

Context

All the surveyed courses were delivered entirely over the Internet using course management systems, such as Sakai, Blackboard, and WebCT. The courses were structured with similar format that a set of tasks were given to students and they worked interactively to create artifacts to complete assignments. Online discussion boards were the primary channel for students to discussion their questions regarding to learning.

Instruments

Social Ability. The original Social Ability Instrument (SAI) consisted of 20 items assessing students' experience and perception of social interaction in online learning environments (Author et al., 2006). Three factors, social navigation (6 items, $\alpha = .92$), co-presence (4 items, $\alpha = .84$), and social connectedness (2 items, $\alpha = .95$) accounted for 65.69% of the variance in the measure. In the current study, 22 items were added to expand the instrument to 42 items so as to explore the distinction between instructor presence and presence of other students, the new issues of privacy (Tu, 2002) and written communication skills (Lapadat, 2002; Tu, 2001) which were suggested by the extant literature and observation by researchers, who are experienced online instructors. Only the items regarding social presence, social navigation, and social connectedness were included in this study, yielding a total of 14 items as the perceived peers social interaction while 10 items as the perceived instructor interaction.

Satisfaction. Four learning satisfaction (LS) items and 5 course evaluation (CE) items (Alavi, 1994) were used to measure student learning satisfaction as well as satisfaction with course materials and teaching in online learning environments. The Cronbach α reliability estimates from our data were found to be high (Table 2).

Data analysis

Research questions were answered through one-way MANOVA, correlation, and structural equation modeling (SEM) analyses. MANOVA was conducted through SPSS to examine if student perceives social ability with their instructor and peers differently. The results of one-way MANOVA determine the value of conducting further SEM analysis. Next, correlation analysis among social ability factors and learning satisfaction factors was conducted to better understand the relationships among the constructs. The findings of correlation analysis serve as a guide for establishing the initial SEM model. The causal relationships of the social ability factors and learning satisfaction factors were investigated through SEM analyses via Mplus@.

FINDINGS

Prior to Analysis, univariate and multivariate outliers were examined. For one-way MANOVA analysis of social presence, social navigation, and social connectedness between Student-Peers and Student-Instructor interaction, 3 univariate and 5 multivariate outliers were found. For path analysis, 6 univariate outliers and 7 multivariate outliers were found for Student-Instructor interaction model, while only 6 multivariate outliers were identified for the analysis of Student-Peers interaction model. After removing outliers, a total of 318 cases retained for one-way MANOVA analysis, 313 cases remained for the analyses of SIM, and 320 cases for SPM. Table 2 shows the descriptive statistics of cases applied in SEM analyses.

Table 2. *Descriptive Statistics and Reliability*

Constructs	Overall		Reliability (# of items)
	M	SD	
Student-Instructor Interaction Model (N=313)			
Perceived Instructor Social Presence (SPi)	5.52	1.10	.89 (6)
Social Navigation with Instructor (SNi)	5.34	1.44	.89 (2)
Social Connectedness with Instructor (SCi)	5.52	1.25	.74 (2)
Learning Satisfaction	5.75	1.18	.90 (4)
Course Evaluation	5.72	1.21	.90 (5)
Student-Peers Interaction Model (N=320)			
Perceived Peers Social Presence (SPp)	5.06	1.20	.91 (6)
Social Navigation with Peers (SNp)	5.07	1.40	.88 (4)
Social Connectedness with Peers (SCp)	4.96	1.20	.86 (4)
Learning Satisfaction	5.71	1.24	.91 (4)
Course Evaluation	5.68	1.27	.91 (5)

Note. N=312 for Student-Instructor Interaction; N=320 for Student-Peers Interaction

One-Way MANOVA of Perceived Social Ability with Instructor & Peers

A one-way between-groups multivariate analysis of variance was performed to investigate the differences between students' perceived social ability with the instructor and their peers. Three constructs of social ability, including social presence, social navigation, and social connectedness were used as dependent variables in the examination. Preliminary assumption testing was

conducted and found no serious violations noted. The results of MANOVA showed 1) a statistically significant multivariate effect of student perceptions to instructor and peers on the SP, SN, and SC, and 2) significant univariate effects of student perceptions to instruction and peers on SP and SC but not on SN (Table 3). There is a statistically significant multivariate effect of students' perceptions to instructor and peers on the social presence, social navigation, and social connectedness, $F_{Wilks' \text{ Lambda}}(3, 632) = 11.621, p = .000$; Wilks' Lambda = .948, which is a moderate effect ($\eta^2 = .052$). When the results for the dependent variables were considered separately, Bonferroni adjusted alpha level of 0.017 was used to examine the statistical significance. Significant univariate effects of students' perceptions to instructor and peers on social presence ($F_{Wilks' \text{ Lambda}}(1, 634) = 22.662, p = .000$; $\eta^2 = .035$) and social connectedness ($F_{Wilks' \text{ Lambda}}(1, 634) = 30.419, p = .000$; $\eta^2 = .046$) were found to have moderate effect; however, the effects of students' perception to instructor and peers on social navigation ($F_{Wilks' \text{ Lambda}}(1, 634) = 4.720, p = .030$; $\eta^2 = .007$) was found to not significant and small effect. An inspection of the mean scores indicated that students perceived higher social presence with instructor ($M=5.810, SD=.103$) than with peers ($M=5.303, SD=.103$) and higher social connected with instructor ($M=5.832, SD=.110$) than with peers ($M=4.976, SD=.110$).

Table 3. *MANAOV Results of Perceived Social Ability with Instructor & Peers*

Multivariate Analysis of Variance for Students' Perception to Instructor and Peers						
	Wilks' Lambda	F	Hypothesis df	Error df	Sig.	Partial η^2
Perception to Instruction and Peers	.948	11.621	3	632	.000*	.052
Univariate Analysis of Variance for Students' Perception to Instructor and Peers						
		F	df1	df2	Sig.	Partial η^2
Social Presence		22.662	1	634	.001**	.035
Social Navigation		4.720	1	634	.030	.007
Social Connectedness		30.419	1	634	.000**	.046
Mean Scores on Dependent Variables for Students' Perception to Instructor and Peers						
		Mean (M)	Std. Error (SD)	95% Confidence Interval		
				Lower Bound	Upper Bound	
Social Presence	Instructor	5.514	.064	5.389	5.639	
	Peers	5.085	.064	4.961	5.210	
Social Navigation	Instructor	5.335	.079	5.180	5.490	
	Peers	5.093	.079	4.398	5.248	
Social Connectedness	Instructor	5.506	.067	5.374	5.639	
	Peers	4.980	.067	4.848	5.113	

Note. * computed using alpha = .05; ** computed using alpha = .017

Inter-correlation between Social Ability Constructs & Satisfaction

Two correlation matrices of critical constructs applied in Student-Instructor and Student-Peers interaction models are presented in Table 4.

Table 4. *Inter-correlations among Critical Constructs*

Student-Instructor Interaction Model (N=313)					
Variables	SPi	SNi	SCi	LS	CE
Perceived Instructor Social Presence (SPi)	-				
Social Navigation with Instructor (SNi)	.661**	-			
Social Connectedness with Instructor (SCi)	.804**	.654**	-		
Learning Satisfaction (LS)	.654**	.577**	.626**	-	
Course Evaluation (CE)	.630**	.599**	.608**	.812**	-
Student-Peers Interaction Model (N=320)					
Variables	SPp	SNp	SCp	LS	CE
Perceived Peers Social Presence (SPp)	-				
Social Navigation with Peers (SNp)	.675**	-			
Social Connectedness with Peers (SCp)	.874**	.714**	-		
Learning Satisfaction (LS)	.565**	.537**	.584**	-	
Course Evaluation (CE)	.554**	.539**	.572**	.814**	-

Note. ** P<.01, *P<.05

Structural Equation Models: SIM v.s. SPM

After examining the measurement and structural steps, the final models with statistically significant causal directions and path coefficients were developed (Figure 1 and 2). In the Student-Instructor interaction model (Figure 1), the chi-square value (χ^2) for the model is 2.67 ($p>.05$) suggesting that the data fit the model well. Other model fit indices, including the comparative fit index (CFI), the Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), are presented in Table 4. In the Student-Peers interaction model, the chi-square value (χ^2) for the model was 4.22 ($p>.05$) suggesting that the data fit the model well and relevant model fit indices are presented in Table 5. Overall, the data have a good model fit in these two final models.

Table 5. *Goodness of Fit Indicators*

Model	χ^2	P	CFI	TLI	RMSEA	RMSEA	
Criteria	N/A	>.05	$\geq .90$	$\geq .90$	$\leq .10$	90% C. I.	R^2_s
Student-Instructor Interaction Model	2.67	.26	1.00	1.00	.03	.00 ~ .12	.58
Student-Peers Interaction Model	4.22	.24	1.00	1.00	.04	.00 ~ .11	.45

Note. Criteria is based upon criteria provided by Hu and Bentler (1998); R^2_s means total variance of satisfaction explained by the model.

Student-Instructor Interaction Model (SIM)

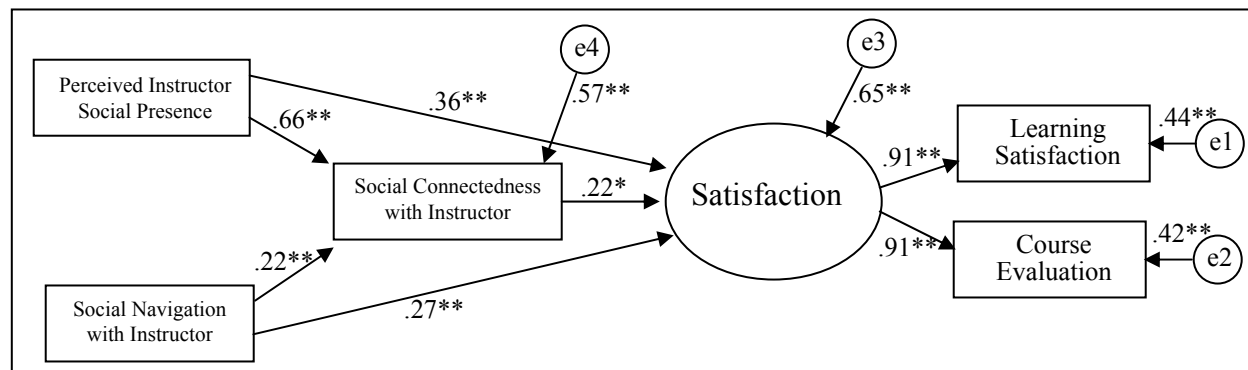


Figure 1. Student-Instructor Interaction Model (* $z \geq 1.96$, $p < 0.05$; ** $z \geq 3.29$, $p < 0.001$)

In the student-instructor interaction model (Figure 1), students' satisfaction of learning in online courses was significantly measured by their learning satisfaction and course evaluation. According to steps for testing moderators described in Baron and Kenny (1986), social connectedness with the instructor was identified as a moderator for perceived instructor social presence and social navigation toward students' satisfaction of online learning from the examination presented in Figure 2. The strength of a significant direct relationship between the perceived instructor social presence and satisfaction ($SP_i \leftrightarrow S$, from $b = .71^{**}$ to $.46^{**}$) decreased when adding social connectedness with instructor into the model. Similarly, the path value of social navigation with the instructor to satisfaction ($SN_i \leftrightarrow S$, from $b = .65^{**}$ to $.36^{**}$) decreased after the social connected with the instructor was added. The results indicate that the perceived instructor social presence and social navigation influenced by the instructor were the predictors for students' perception of their social connectedness with the instructor. Further, students' perceptions of social connectedness with the instructor impacts their satisfaction of online learning directly as well as students' perceived instructor's social presence and social navigation. Overall, this model accounted for approximately 58% of the variance in satisfaction, and 67% in social connectedness with the instructor.

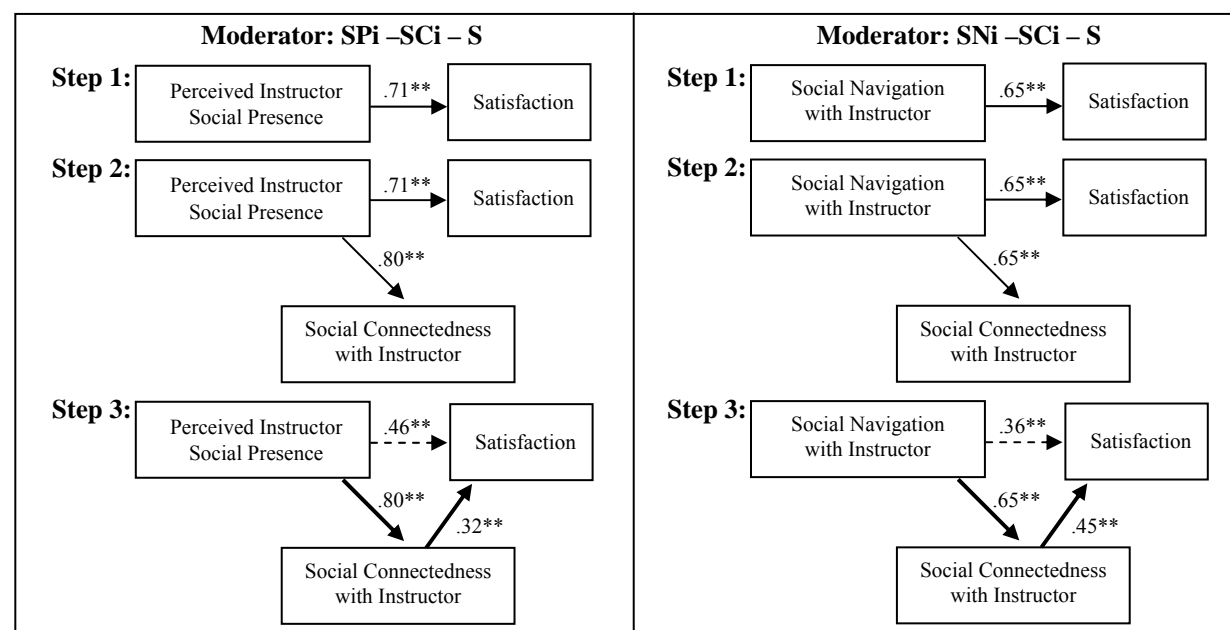


Figure 2. Moderator Identification (* $z \geq 1.96$, $p < 0.05$; ** $z \geq 3.29$, $p < 0.001$ statistically significant; ----→ represents weaken path, —→ represents significant path without decreasing strength)

Student-Peers Interaction Model (SPM)

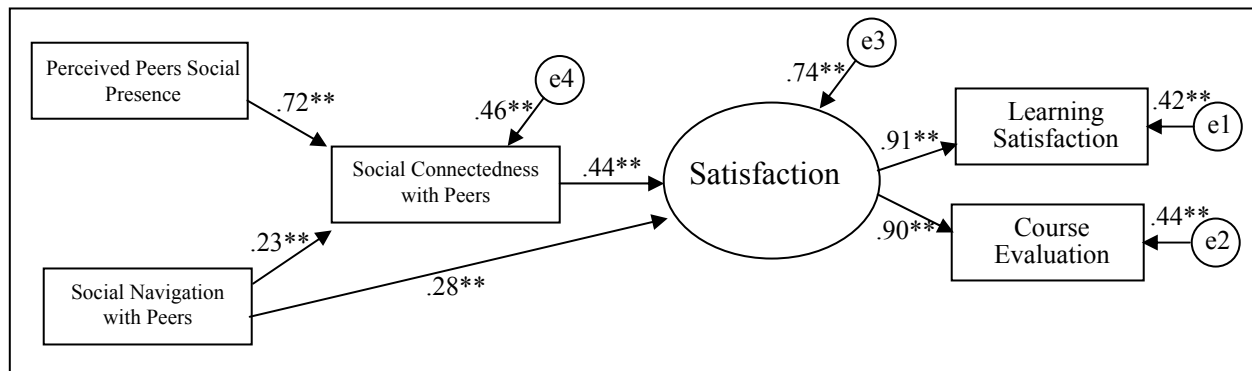


Figure 3. Student-Peers Interaction Model (* $z \geq 1.96$, $p < 0.05$; ** $z \geq 3.29$, $p < 0.001$)

In the student-peers interaction model (Figure 2), students' satisfaction of learning in online courses was significantly measured by their learning satisfaction and course evaluation. Differ from the Student-Instructor Interaction Model, the direct relationship between perceived peers social presence and satisfaction was dropped because of the insignificant path value ($b = 0.18$, $z = 1.89 < 1.96$, $p < 0.05$). Thus, only social navigation with peers and social connectedness with peers have direct impact on satisfaction of online learning. According to steps for testing moderators described in Baron and Kenny (1986), the strength of the direct relationships between a) the perceived peers social presence and satisfaction ($SPp \leftrightarrow S$, from $b = 0.62^{**}$ to $.24^{*}$), and b) social navigation with peers and satisfaction ($SNp \leftrightarrow S$, from $b = .60^{**}$ to $.28^{**}$) decreased when social connectedness with peers was added into the model (Figure 4). Social connectedness with peers serves as a moderator for both the relationships between perceived peers social presence to satisfaction and social navigation with peers to satisfaction. The results show that the perceived peers social presence and social navigation influenced by the peers were the predictors for students' perceptions of their social connectedness with the peers. This model accounted for approximately 45% of the variance in satisfaction and 79% in social connectedness with the peers.

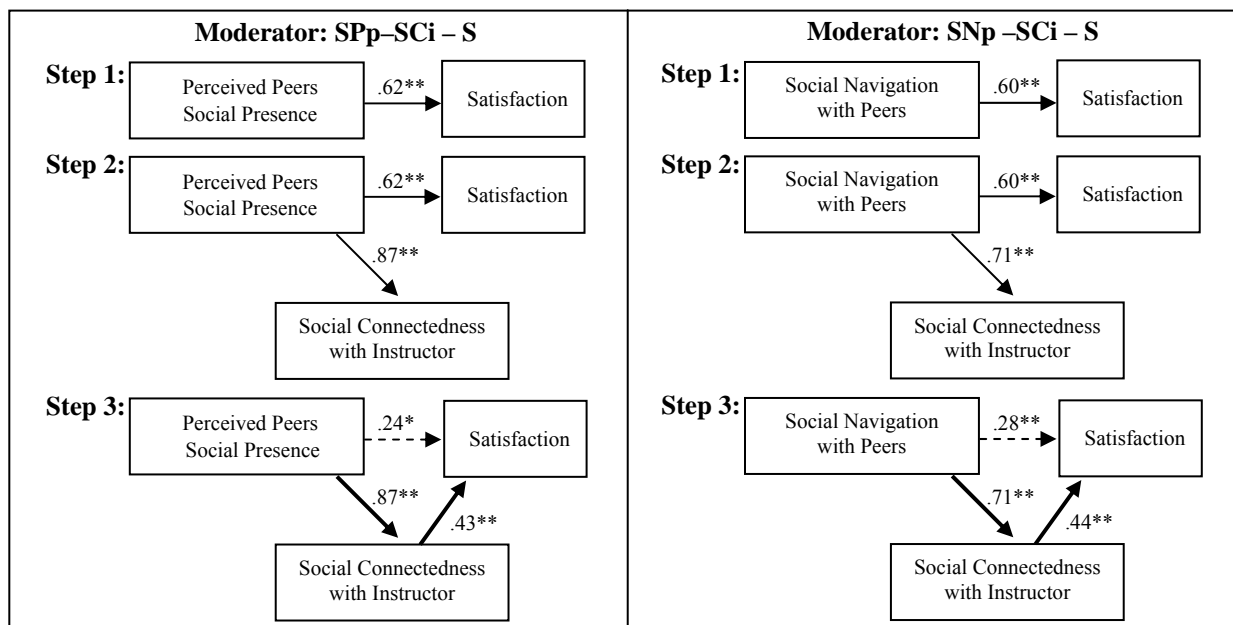


Figure 4. Moderator Identification (* $z \geq 1.96$, $p < 0.05$; ** $z \geq 3.29$, $p < 0.001$ statistically significant; ----→ represents weakened path, —→ represents significant path without decreasing strength)

DISCUSSION

According to MANOVA results, students' perceptions of social ability toward the instructor and toward their peers in terms of social presence, social navigation, and social connectedness were found to be significant on social presence and social connectedness. Students tend to perceive higher instructor social presence than peer social presence in online learning environment and feel higher social connectedness with instructor, whereas students perceived insignificant difference of the influence of instructors' and peers' actions and interaction. Previous studies (Author, et. al., 2007; Lin, et. al., 2006) examined the relationships among social ability and learning satisfaction found social ability positively impact on students' learning satisfaction. However, researchers did not take students' different perceptions of student-instructor and peer-peer interaction into account although students might view the interaction with the instructor and peers differently. The MANOVA results showing evidences of students' different perceptions of interaction with the instructor and peers brought interesting insights of examining the relationships between social ability and learning satisfaction separately in terms of exploring the relationships in student-instructor and student-peers interaction models.

The results found in this study are consistent with previous studies (Author, et. al., 2007; Lin, et. al., 2006) that students' social ability positively influences their learning satisfaction in online learning. However, the influential relationships of sub-constructs of social ability and learning satisfaction were found differently when comparing student-instructor interaction model and peer-peer interaction model. By comparing these two SEM final models, students' perceptions of their interaction with the instructor and peers impact their satisfaction of online learning differently in the following aspects. First, in both models, the perceived social navigation with the instructor and peers (SNi & SNp) are significant predictors in satisfaction. Having information about the activities of both the instructor and peers contributes to student satisfaction which suggests that having tools for social awareness available and visible to students may be an important attribute of online learning.

Second, the perceived instructor social presence (SPi) directly impacted student satisfaction in online learning in student-instructor interaction model whereas perceived peers social presence (SPp) showed no direct influence in student-peers interaction model. Compare to students' perception of peers' social presence (SPp), students' perception of instructors' social presence (SPi) seems to have better impact of their online learning satisfaction. In addition to the substantial differences between students' perception of peers' social presence (SPp) and students' perception of instructors' social presence (SPi) identified by Author et al. (2006), we found students tended to perceived instructors' social presence more important to their satisfaction.

Third, aligning with results of sense of community (i.e. belonging/feelings of connecting to people who they interact with) found in Author et al. (2007), in the current study social connectedness with the instructor (SCi) moderates the relationships for students' perception of instructors' social presence (SPi) and perceived social navigation with the instructor (SNi) to satisfaction. The moderating effect is also observed in the student-peers interaction model in which student satisfaction is only predicted by their perception of social navigation with peers (SNp) and social connectedness with peers (SCp). This result shows that students' feeling of belonging and connecting to the instructor or peers is identified as an important factor for their satisfaction in online learning.

In conclusion, the study identifies that students perceived their online social interactions in relate to the instructor and their peers differently. Moreover, how students are satisfied at their

online learning experience and how they value the online course can be explained by their perceived social ability. Examining the perceived social ability with the instructor and peers respectively reveals what cannot be understood if the differences between student-instructor and student-peers social interaction are not considered. Furthermore, more research on investigating the mediating effect of social connectedness or similar construct, such as sense of community, in online learning environments is needed.

EDUCATIONAL IMPORTANCE

Our findings contribute to online education research in several ways. First, our findings support literature that shows student social ability is highly and positively related to student satisfaction of online learning. Additionally, we have built new knowledge to advance theories of the social nature of online learning by showing differential models of how students relate to the instructor and their peers in determining student online learning satisfaction. These findings provide online instructors and instructional designers with new information about how to best support students, and provide educational researchers with further articulation of the social nature of online learning.

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