The relationship between learning satisfaction and social ability in completely online learning courses

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Abstract: The relationship between learning satisfaction and social ability factors were explored using multivariate analysis of variance among 83 students in completely online learning courses. Results indicate that those with higher learning satisfaction levels are related to higher social ability factors, in particular social presence with peers, social presence with instructor, and social navigation. Implications for instructional design and tools for online learning are discussed.

Introduction

Over 3.5 million individuals took at least one online course in Fall of 2006 and approximately 19.8% of total enrollment was online enrollment (Allen & Seaman, 2007). While online education is continuing to grow and is expected to continue, further exploration into the facets that make a *quality* online learning experience is essential. Retention rates are the third highest concern inhibiting further adoption of online education according to the Sloan Consortium (Allen & Seaman, 2007), and the reasons behind these attrition rates are difficult to measure and understand (Allen & Seaman, 2007; Tyler-Smith, 2006). As such, interest in understanding the relationships that exist with student satisfaction in online learning is of great interest.

Many studies have identified relationships that exist between student satisfaction and various social measurements such as social presence (Garrison, 2007; Gunawardena & Zittle, 1997; Richardson & Swan, 2003; Sun, Tsai, Finger, Chen & Yeh, 2008) and interaction with peers and sociability (Fredericksen, Pickett, Pelz, Swan & Shea, 2000; Kreijns, Kirschner, Jochems & van Buuren, 2004). While many of these studies differ in a variety of dimensions, many of them point out social presence as predictors and large contributors to student satisfaction. However, there still needs to be further investigation into other social aspects which are related to learning satisfaction, which in turn can serve to inform both instructional design and learning systems design. The purpose of this particular study is to further investigate the relationship between students' learning satisfaction and the social nature of online learning, and in particular, social ability.

Social Ability

We draw upon the social learning frameworks of Vygotsky (1978) and Wenger (1998) with the idea that learning is a social process. It is interactional in nature, and it is through the very nature of these interactions that learning takes place and knowledge is constructed. In an online environment, a person's interactions, unlike face-to-face interactions, are *mediated* through tools such as a web page, a chat tool, a computer, or a discussion board, just to name a few (Kaptelinin, Nardi & others, 2006). Rather than the person interacting *with* or *on* the technology, the person is interacting *through* the technology in order to interact with another (Dourish, 2001). People have sometimes felt that learning in an online environment as "being blind". It is only by seeking out, observing the actions of others *through* these mediating tools which display the actions of others that people can begin to understand the actions of others around them in the environment.

Social ability presents members' ability to use the resources of the social context (i.e. learning tools, relationship with others, and etc.) to achieve their learning goals. It is a construct which was explicated by Laffey, Lin & Lin (2006) and further expanded by Yang et al. (Yang, Tsai, Kim, Cho & Laffey, 2006). Social ability represents an individual's experience and perception of social interaction as mediated through the technological tools in the learning system. It is a combination of the fit between the individuals in the community, context, tools, and task(s) (Tsai et al., 2008). Yang et al. (2006) identified five factors of social ability: social presence with peers, social presence with instructor, communication skills, comfort with sharing personal information, and social navigation.

Social presence is the extent to which a person on the other end of a mediated communication is felt as real and "physically" present, and the extent to which a person represents themselves as real to others within an environment (Kreijns et al., 2004; Short, Williams & Christie, 1976). Communication skills represents the perceived comfort with their own ability to express and write to communicate their intended meaning to others. Comfort sharing personal information identifies their self-rating of level of comfort sharing details about one's self in an online environment. Social navigation refers to how a user utilizes information about the activity of others to inform their own navigation through that social space (Dourish, 1999).

All of these elements come together as the construct of social ability.

Learning Satisfaction

Previous studies have looked at the relationship of learning satisfaction in online learning. Frequently learning satisfaction is found to be highly associated with peer and instructor interaction (Bolliger & Martindale, 2004; Marks, Sibley & Arbaugh, 2005; Swan, 2001) and social presence (Richardson & Swan, 2003). Additional findings have found relationships between satisfaction and course structure (Swan, 2001), courses which match with their own learning styles (Eom, 2006), and perceived ease of use and perceived usefulness of the learning system (Sun et al., 2008). According to Tsai et al. (2008), social ability is a predictor to students' learning satisfaction. Also, several sub constructs of social ability were found to have significant direct influence of learning satisfaction (i.e. social presence with instructor) or indirect influence via sense of community to learning satisfaction (i.e. social presence with peers & comfort with sharing personal information) (Laffey, Tsai, Amelung, Young, Galyen, & Goggins, 2009),

By looking at learning satisfaction and its relationship with social ability factors, we seek to extend these previous findings by also looking at learning satisfaction's relationship with social navigation, communication skills, and comfort sharing information with others.

Purpose of the study

The purpose of this study is to explore the relationship between learning satisfaction levels and the five social ability factors: social presence with peers, social presence with instructor, communication skills, comfort sharing information, and social navigation. The research question is the following:

(1) Do students with different learning satisfaction levels differ in their social ability?

(2) To what extent does learning satisfaction relate to social ability and its sub constructs (i.e. social presence with peer, social presence with instructor, social navigation, communication skills, and comfort sharing information with others)?

Method

Research Context & Participants

Data were collected across 8 completely online learning courses at a large Midwestern university. Volunteers were solicited via email and 84 volunteers completed the electronic "Social Nature of Online Learning" survey via the Internet. No participants were removed from analysis due to missing data. Table 1 shows demographic data of the 84 volunteer participants.

All the courses were completely online with units containing a set of learning tasks which utilized to varying degrees discussion boards, resources, and chat.

Measures and variables

The survey administered included the 30-item social ability instrument (Yang, et al., 2006; Laffey, Lin & Lin, 2006) covering social presence with peers, social presence with instructor, communication skills, comfort sharing information with others, and social navigation. Five learning satisfaction questions were also used from the Zone Experience Study Questionnaire (ZESQ, 2005). Demographic data was also collected but was not used in the MANOVA analysis.

Items for each of the social ability factors were summed and an overall average was created for each participant, creating a social ability factor score for each of the five social ability factors. Learning satisfaction levels

were created using SPSS by creating cutoffs for equal groups, originally intended to be low, medium, and high learning satisfaction. Due to the nature of the data within those created cells and the negatively skewed nature of the data, the labels were changed to "moderate", "moderately high" and "high" learning satisfaction, which more accurately represents the data.

Table 1. Demographic Information for 84 cases

Demographic Information		Number of Participants	Percentage (%)
Gender	Male	29	34.5
	Female	55	65.5
Age	18-25	30	35.7
	26-35	29.8	29.8
	36-45	17	20.2
	46 and older	12	14.2
Academic Status	Undergraduate	23	27.4
	Graduate	57	67.9
	Other	4	4.8
Previous Online courses	1	23	27.4
	2-3	37	44.0
	4-5	26	28.6
Hours login (weekly)	< 5 hours	34	40.5
	6-15 hours	43	51.1
	16-25 hours	6	7.2
	> 25 hours	1	1.2

Note: N=84

Data Analysis

Multivariate analysis of variance with post-hoc tests Bonferroni multiple comparison tests were used to answer the research questions. All analyses were done with SPSS 17.0 for Windows. Results of the analysis follow.

Results

Prior to analysis, one case was deleted due to a within-cell univariate outlier in social navigation (S.D. >= 3.29) leaving 83 cases for analysis. There were no multivariate within-cell outliers at $p < .001$. All variables used in the analysis were slightly negatively skewed, ranging from -.056 to -1.371. However, no variables were skewed greater than +/-3. Tabachnick and Fidell (2006) also recommend that if all variables are moderately skewed in a similar manner and extent, then transformation does little to improve the analysis while it does sacrifice interpretation. Therefore, transformations were not used. Homogeneity of variance-covariance matrices, linearity, and multicollinearity were satisfactory, and MANOVA is a robust statistical method. Table 2 presents the descriptive statistics for the dataset.

MANOVA was performed on 5 social ability variables: social presence with peers, social presence with instructor, communication skills, comfort with sharing personal information, and social navigation. The independent variable was learning satisfaction with three levels: moderate satisfaction, moderately-high satisfaction, and high satisfaction.

Prior to MANOVA analyses, there were no missing cases found. According to Wilk's Λ, the combined social ability factor scores were significantly related to the learning satisfaction levels, approximate $F(10, 152) = 6.09$, $p < .001$. There was a moderate overall effect size with partial $\eta^2 = .286$. Tests of between-subjects effects are shown in Table 3.

Table 2. Descriptive Statistics

Social Ability Constructs	Learning Satisfaction Level	Mean	Std. Deviation	N
Social Presence with Peers (SPp)	Moderate	4.50	.98	23
	Moderately High	5.17	.67	29
	High	5.94	.73	31
	Total	5.27	.97	83
Social Presence with Instructor (SPi)	Moderate	4.54	1.21	23
	Moderately High	5.18	.89	29
	High	6.20	.74	31
	Total	5.39	1.15	83
Communication Skills (CS)	Moderate	5.43	1.99	23
	Moderately High	5.09	1.99	29
	High	5.38	2.07	31
	Total	5.29	2.00	83
Comfort with Sharing Personal Information (CSPI)	Moderate	4.81	1.65	23
	Moderately High	4.53	1.57	29
	High	6.04	1.41	31
	Total	5.17	1.67	83
Social Navigation (SN)	Moderate	4.74	1.07	23
	Moderately High	5.26	.83	29
	High	5.96	.92	31
	Total	5.38	1.05	83

Table 3. Tests of Between-Subjects Effects

Source	Dependent Variable	Sig.	Partial Eta Squared
Corrected Model	Social Presence with Peers	.000**	.385
	Social Presence with Instructor	.000**	.325
	Communication Skills	.761	.007
	Sharing Personal Information	.002**	.144
	Social Navigation	.000**	.213
Intercept	Social Presence with Peers	.000**	.980
	Social Presence with Instructor	.000**	.971
	Communication Skills	.000**	.876
	Sharing Personal Information	.000**	.920
	Social Navigation	.000**	.972
Learning Satisfaction Level	Social Presence with Peers	.000**	.385
	Social Presence with Instructor	.000**	.325
	Communication Skills	.761	.007
	Sharing Personal Information	.002**	.144
	Social Navigation	.000**	.213

Note: ** $p < 0.01$;* $p < 0.05$

For learning satisfaction level, only communication skills did not have a significant association with learning satisfaction level. For social presence with peers and instructors a partial $\eta 2 = .385$ and .325 respectively, which is a moderate to high proportion of the variance being explained by learning satisfaction level, especially considering the nature of the soft variables. For social navigation, 21.3% of the variance was explained by learning satisfaction level while sharing personal information was only 14.4%. One can also see these variables are relatively correlated and have overlapping variances explained. See Table 4 for within-cell correlations among the DVs.

Table 5. Within-Cell Correlations among DVs

		SPp	SPi	CS	CSPI	SN
Moderate Learning Satisfaction	SPp	1.000				
	SPi	-.104	1.000			
	CS	.269*	-.513**	1.000		
	CSPI	-.278*	.229*	-.109	1.000	
	SN	-.610**	-.132	.095	-.383**	1.000
Moderately High Learning Satisfaction	SPp	1.000				
	SPi	.160	1.000			
	CS	-.096	-.495**	1.000		
	CSPI	-.465**	-.160	.119	1.000	
	SN	-.567**	.033	.287**	-.008	1.000
High Learning Satisfaction	SPp	1.000				
	SPi	-.373**	1.000			
	CS	.406**	-.650**	1.000		
	CSPI	.112	-.495**	.211	1.000	
	SN	-.279*	-.331**	.243*	-.150	1.000

Note. ** p< 0.01; * p < 0.05

In order to break down the information further, multiple comparisons were performed using the Bonferroni method (see Table 6). The data in table 6 reveals that, with exception of communication skills, as students' social ability factors increase, so does their learning satisfaction.

Table 6. Multiple Comparisons

Dependent Variable	(I) Learning Satisfaction Rank	(J) Learning Satisfaction Rank	Mean Difference (I-J)	Sig.
Social Presence with Peers	Moderate	**Moderately High**	**-.7414***	**.001**
		High	**-1.4865***	**.000**
	Moderately High	**Moderate**	**.7414***	**.001**
		High	**-.7451***	**.002**
	High	**Moderate**	**1.4865***	**.000**
		Moderately High	**.7451***	**.002**
Social Presence with Instructor	Moderate	**Moderately High**	**-.8405***	**.004**
		High	**-1.6216***	**.000**
	Moderately High	**Moderate**	**.8405***	**.004**
		High	**-.7810***	**.011**
	High	**Moderate**	**1.6216***	**.000**
		Moderately High	**.7810***	**.011**
Communication Skills	Moderate	Moderately High	-.345	1.000
		High	.000	1.000
	Moderately High	Moderate	.345	1.000
		High	.344	1.000
	High	Moderate	.001	1.000
		Moderately High	-.344	1.000
Sharing Personal Information	Moderate	Moderately High	-.5402	.574
		High	**-1.5494***	**.001**
	Moderately High	Moderate	.5402	.574
		High	-1.0092	.061
	High	**Moderate**	**1.5494***	**.001**
		Moderately High	1.0092	.061
Social Navigation	Moderate	Moderately High	-.5345	.101
		High	**-1.1933***	**.000**
	Moderately High	Moderate	.5345	.101
		High	**-.6589***	**.037**
	High	Moderate	1.1933*	.000
		Moderately High	**.6589***	**.037**

Note. ***p<.001; ** p< 0.01, * p< 0.05

For the "social presence with peers" and "social presence with instructor" factors, the moderate, moderately high, and high learning satisfaction ranks are significantly different (or can be distinguished) from each other. This is in contrast to the "sharing personal information" factor, as only the high and moderate learning satisfaction groups are significantly different from each other. In regards to the "social navigation" factor, the moderate and moderately high groups could not be distinguished from each other; however, the high learning satisfaction ranks were significantly different from the moderately high and the moderate learning satisfaction ranks.

Taken altogether, the students who have higher social presence with peers, social presence with instructor, social navigation, and comfort with sharing personal information, will likely also have higher learning satisfaction than those with lower social ability (especially concerning those factors).

Discussion

The results demonstrate that there is a positive relationship between social ability factor scores and student learning satisfaction. It was found in prior research (Tsai et al., 2008) that social ability has an indirect relationship to learning satisfaction. This research builds upon this prior research and supports their findings. While this research confirms the relationship of social ability to learning satisfaction, it further explicates how the social ability factors themselves relate to the different ranks of learning satisfaction.

So how can we use this information to inform teaching and learning?

As discussed earlier, social ability is neither an aspect comprised solely of an individual nor is it comprised solely of the technology. It is the person-to-person interaction through the technology, not just with the technology, that facilitates these online learning interactions. Because of this, one can see that the technology mediates the interaction, and as such, can increase or decrease the social interactions (and therefore social ability) of the learners. As such, the results of this study have implications for both instructional design as well as learning systems design in relationship to learning satisfaction.

In regards to instructional design, tasks should be designed so that social presence with peers and social presence with the instructor are facilitated. This is not in contradiction with other models, such as Garrison, Anderson, & Archer's (1999) model of community of inquiry in which cognitive presence and social presence play a large role. However, in addition to social presence, our data also has implications for class climate. In order to facilitate students' comfort sharing information, the instructor can facilitate discussions and draw students out in order to facilitate greater comfort in sharing information.

Social ability is comprised of the individual along with the context, tools, and task(s). For example, if an instructor decides that discussions will not take place in their online course, individuals will not be aware of "the other" and therefore likely not have a strong sense of social presence with their peers as a result. These are a mixture of the context and tasks.

However, let's imagine the instructor decides to implement a tool which enables individuals to work together more collaboratively and seamlessly, being aware of others' actions and promoting social presence and social navigation through the use of the tool. This too has the potential to impact social ability and potentially learning satisfaction. If there are no tools in my online environment which allow students to see what others are doing in the online learning environment, then it's likely the students will have a lower social navigation score and likely have a lower learning satisfaction score as well.

While a causal relationship cannot be inferred with this data between social ability scores and learning satisfaction, it does represent a relationship for connecting the social nature of online learning between the individual, context, tools, and task and the learner's satisfaction with the learning experience.

The limitations of this study, as mentioned before, are that readers should not infer a causal relationship, but the relationship is acknowledged. Future areas of inquiry may investigate social ability factors in an experimental design in order to see impact on learning satisfaction and learner behavior, and how various tools and instructional design could increase a learner's social ability factor scores and learning satisfaction.

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