

Exploring How Students' Self-regulated Learning Influences the Social Nature of Online Learning

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Abstract

This paper examines how students' self-regulation influences the social nature of online learning. Relationships among personal and social constructs, including self-regulation, perceived ease of use, usefulness of online learning tools, social ability, and sense of community, were explored using path analysis. Added to previous a study (Author et al., 2007), the model indicates that sense of community and social ability mediate relationships of self-monitoring to students' online learning satisfaction and of self-reported participation and satisfaction. Overall, sense of community, goal setting, and perceived usefulness of social awareness tools are direct predictors of satisfaction, while sense of community is predicted by social ability explained by self-monitoring and self-reported participation.

INTRODUCTION

As online learning tools spread in higher education, there is concern for higher dropout rates in distance education (10-20%) over traditional programs (Carr, 2000), and recognition that lack of social interaction decreases student satisfaction with online learning (Arbaugh, 2000). Research shows that learners who regulate their learning are more successful in school and achieve better learning outcomes (Schunk, 2005, p.87). Author et al. (2007) have shown that social ability and sense of community are associated with learning satisfaction in online learning. This study extends that research by exploring how students' self-regulation relates to the social nature of online learning and contributes to learning satisfaction.

THEORETICAL PERSPECTIVES

Sense of Community

Sense of community is associated with learning satisfaction and is defined as "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 & Chavis, 1986, p.9). Previous studies show that students with a strong sense of community tend to commit to, support, and exchange information with others, to enjoy group work, and have higher cognitive learning, experience less isolation and greater satisfaction with their academic program (Wellman & Gulia, 1999; Dede, 1996; Bruffee, 1993; Rovai, 2002a; Rovai, 2001). Author et al. (2007) found that students with a high sense of their ability to use online tools for social interaction have a higher sense of community and learning satisfaction. Rovai (2001, 2002a) found students with higher levels of interaction and participation (i.e. number of messages posted) reported higher sense of community in class.

Social Ability

Author et al. (2006a) defined social ability as how well members can use the resources or tools of social contexts to achieve their goals. Author et al. (2006b) showed that students with higher social ability could use others' actions to guide their own actions, share personal information, and communicate with others in online courses. Lin et al. (2006) found social ability to be a significant predictor of students' online learning satisfaction and a critical construct for explaining students' change from peripheral to central roles in communities. How well students participate and interact in online learning is partially determined by the affordance of tools supporting their social needs and learning goals.

Self-regulated Learning

Self-regulated learning (SRL) is an active, constructive process whereby learners set learning goals which along with environmental features guide and constrain their attempts to monitor, regulate, and control their cognition, motivation, and behavior (Pintrich, 2000, p.453). SRL is a powerful theoretical construct allowing researchers to describe many important facets of successful learning and to relate learning outcomes to learners through their goals, motivations, and emotions (Borkowski, 1996). Nenniger (2005) found that SRL learners can plan, control and evaluate their cognitive, motivational/affective, behavioral and contextual learning as a function of learning strategies and to regulate their learning processes by adjusting them to context in order to optimize their performance and improve their skills and competencies. Much SRL and learning performance research has occurred in face-to-face classroom situations. Theoretically SRL is common across learners and tasks (Boekaerts et al. 2000), but learners may need certain features in learning environments to optimize self regulation. SRL research on online learning is needed to understand the nature of computer mediated student interactions.

Technology Acceptance

The technology acceptance model (TAM), including perceived ease of use and usefulness, has been highly influential in predicting and explaining the use and acceptance of new technology (Davis, 1989). Students' perceived ease of use and usefulness of social awareness tools for becoming aware of the actions of others in online spaces have an indirect impact on their online learning satisfaction (Author et al., 2007). Author et al. (2007) found that students' perceived ease of use influences their social ability and perceived usefulness of social awareness tools, while perceived usefulness of social awareness tools is associated with students' sense of community.

METHODOLOGY

Research Purpose & Questions

A "previous model" of how social attributes of learning explain satisfaction in online learning has been developed by Author et al (2007) (Figure 1).

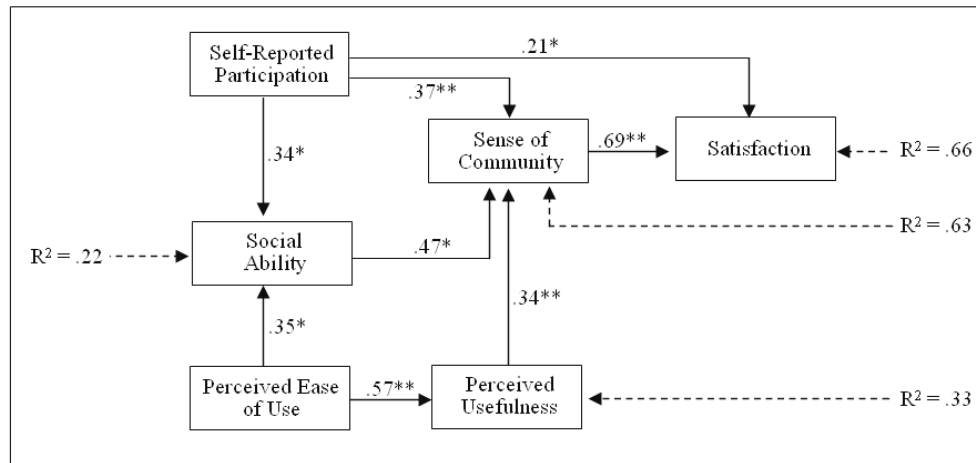


Figure 1. Model of Social Nature of Online Learning Experience. (Tsai et al., 2007)

This study explores and confirms relationships among social factors shown to explain online learning satisfaction and examines the impact of including the personal factor of self-regulation in the model. The research questions are:

- (1) How well do self-regulation factors, social ability, sense of community, and technology acceptance influence students' overall learning satisfaction in online learning?
- (2) How well does the final model for social ability, self-regulation, and technology acceptance explain sense of community?

Participants & Context

Data were collected from six online courses offered in a college of education in a mid-west university across Fall 2006 and Winter 2007. Recruiting emails linked to an electronic consent form and a survey were sent to students near the end of the semester. Courses were delivered fully online through the Sakai 2.0 course management system and had similar course structures with a typical unit comprising a set of learning tasks that directed students to work individually or interactively. The daily email digest providing detailed information of course activities was delivered to student automatically during the semester. In all 116 participants completed the Internet survey. After initial data screening for outliers, 23 cases were excluded leaving a total of 93 for analysis (Table 1).

Table 1. Demographic information for 93 cases

Demographic Information		Number of Participants	Percentage (%)
Gender	Male	33	35.5
	Female	60	64.5
Language	Native Speaker	84	90.3
	Non-native Speaker	9	9.7
Academic Status	Undergraduate	26	28.0
	Graduate	67	72.0
Previous Online Courses	0-1 courses	20	31.2
	2-5 courses	28	30.1
	> 6 courses	36	38.7
Hours Login(weekly)	< 5 hr.	40	43.0
	6-10 hr.	31	33.3
	> 10 hr.	22	23.7

Instruments

Sense of Community (SOC). A total of 20 items using a 7-point Likert scale from the Classroom Community Scale (Rovai, 2002b) were used to measure students' sense of community. The Cronbach α reliability estimate from our data was .93.

Social Ability (SA). A total of 30 items using a 7-point Likert scale from the Online Learning Experience Study Questionnaire (OLESQ; Author et al., 2006b) were used to measure students' perceived social ability in online learning environments. The Cronbach α reliability estimates from our data were .93.

Self-Regulated Learning. To measure students' self-regulation of online learning, a total of 14 items were developed based on the three constructs: goal setting, self-monitoring, and self-evaluation described in Hofer, Yu, and Pintrich (1998). Two factors, goal setting (GS) and self-monitoring (SM) were extracted in the exploratory factor analysis (EFA). The Cronbach α reliability estimates from our data were .85 (4 items) for goal setting and .76 (4 items) for self-monitoring.

Self-Reported Participation (SRP). A total of 4 self-report, 7-point Likert scale, items of the OLESQ (Author et al., 2006b) ask students to estimate their participation in the course via their use of the course management system. The Cronbach α reliability estimates from our data were .71.

Technology Acceptance Model. To measure students' acceptance of the tools for being aware of others' activities in the online system, two main constructs, perceived ease of use (PEU) and perceived usefulness (PU), were identified from the Technology Acceptance Model (TAM; Davis, 1989). 6 items for students' perceived ease of use and 6 items for students' perceived usefulness of online learning tools were adapted in this study. The Cronbach α reliability estimates from our data were .97 for PEU and .98 for PU.

Satisfaction (S). A total of 9 questions assessing students' learning satisfaction and satisfaction with course materials and teaching in the online learning environments were taken directly from the Zone Experience Study Questionnaire (ZESQ; Lin, 2005). The Cronbach α reliability estimates from our data were .94.

Data Analysis

Prior to path analysis, 14 self-regulation items were examined through EFA yielding 2 factors, GS and SM, for inclusion in further correlation and path analyses. The results from the previous model (Author et al., 2007) and the correlation analysis were employed to identify significant relationships and provided insights about possible causal relationships among social constructs. After examining path models via Mplus®, a final model with best model fit was found to demonstrate causal relationships among the personal and social constructs of online learning.

FINDINGS

In the interest of the brevity needed for the proposal the intermediate analyses leading to the path model will be included in the final paper but are excluded from this proposal.

Path Model of Social Constructs

The initial path model shown in Figure 2 was extended from Author et al. (2007) model by adding the factors of self-regulated learning and significant relationships found in the correlation analysis.

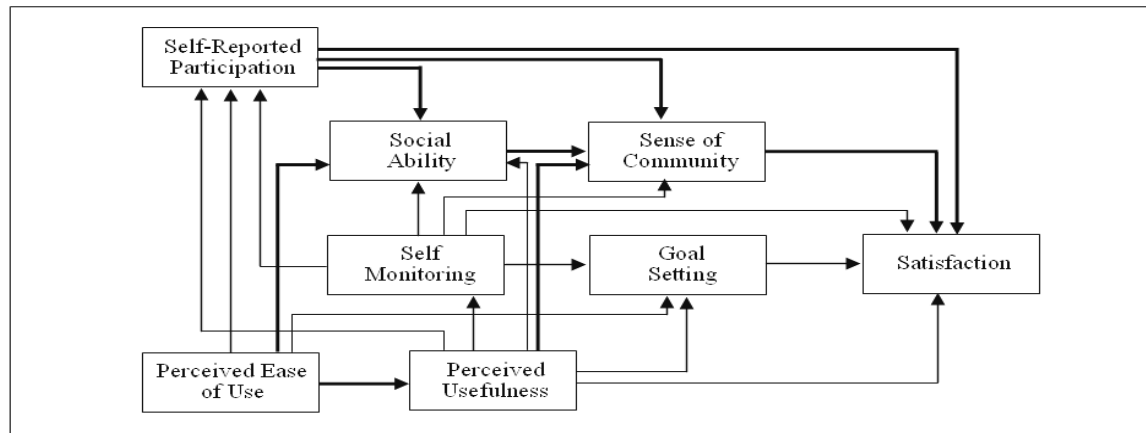


Figure 2. Initial Path Analysis Model (→ represents significant paths identified in Tsai's et al. (2007) model, - -> represents the significant relationships identified through the correlation analysis)

Four original paths (SRP to S, SRP to SOC, PEU to SA, & PU to SOC) in the previous model and 5 paths (PU to SRP, PU to SA, PEU to GS, SM to SOC, & SM to S) hypothesized based on the correlation analysis were discarded because of insignificant correlation coefficients ($P < .05$). When dropping these insignificant paths, chi-square changes were not greater than $\chi^2(0) = 3.84$. After discarding these paths, a final path model with best model-fit was found and presented in Figure 3. According to the criteria recommended by Hu and Bentler (1998), the chi-square value (χ^2) for the model (12.96, $p = 0.74 > .05$) and the relevant indices presented in Table 2 suggest a good model fit.

Table 2. Goodness of Fit Indicators

Model	χ^2	P	CFI	TLI	RMSEA	RMSEA 90% C. I.
Criteria	N/A	>.05	$\geq .90$	$\geq .90$	$\leq .10$	
Results of the Final Model	12.96	0.74	1.00	1.02	.00	.00 ~ .07

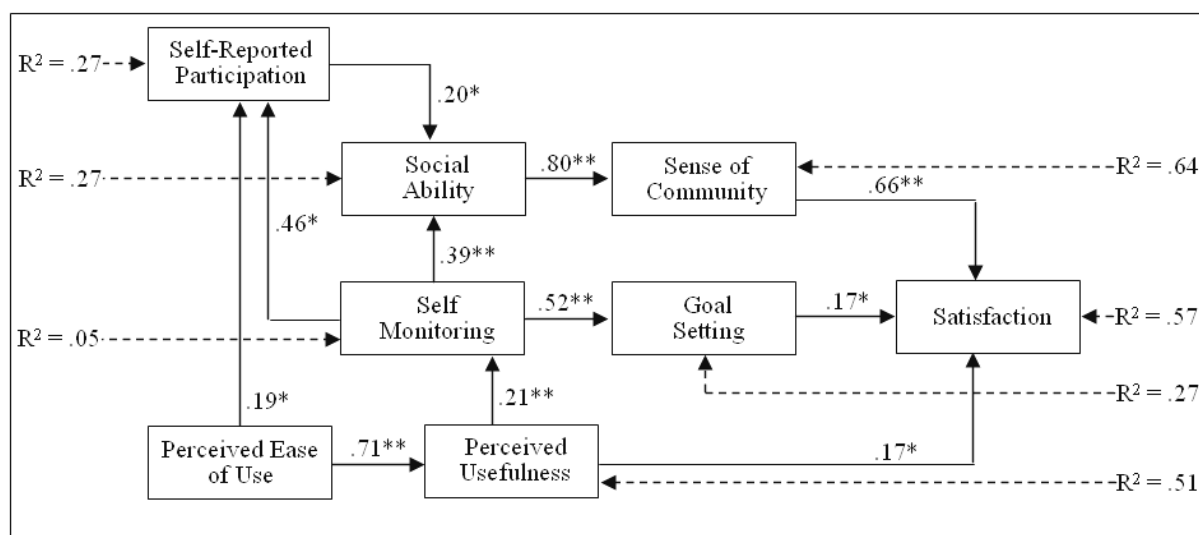


Figure 3. Final Path Analysis Model with R^2 Values (* $z \geq 1.96$, $p < 0.05$; ** $z \geq 3.29$, $p < 0.001$ statistically significant; → represents significant path, - -> represents variance explained)

In the final path model (Figure 3), students' overall satisfaction with learning in online courses was directly explained by SOC, GS, and PU. SA became the only predictor for SOC, SM influences students GS, and PEU had direct impact on their PU. Additionally, SRP, SM, and PU were predictors of SA. After adding GS and SM to extend the previous model, the original relationships of PEU to SA and PU to SOC changed. Direct relationships were found for PU to SM and PEU to SRP and indirect relationships of PU to SOC and PEU to SA. The direct relationships of PU to SOC & PEU to SA found in the previous model became indirect relationships in the final model. While GS had direct impact on S, SM only had an indirect relationship with students' satisfaction via GS, SA, and SOC.

All correlation coefficients of paths (range from .17 to .80) are statistically significant at $p < 0.001$. The R^2_s means indicated that approximately 57% of the variance in S is accounted for by SOC, SM, and PU, 64% of the variance in SOC is accounted for by SA, 27% of the variance in SA is accounted for by SRP and SM, 51% of the variance in PU is accounted for by PEU, 27% of the variance in SRP is accounted for by PEU and SM, and 27% of the variance in GS is explained by SM. Following procedures described by Baron and Kenny (1986), we identified several moderating and mediating relationships among social constructs (Figure 4 & 5), whose detail will be presented in the final paper.

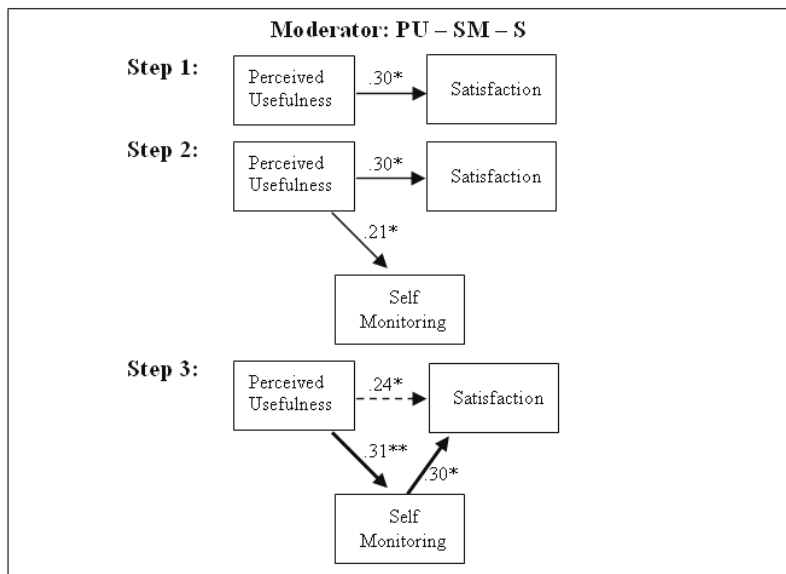


Figure 4. Moderator Identification (* $z \geq 1.96$, $p < 0.05$; ** $z \geq 3.29$, $p < 0.001$ statistically significant; ----→ represents weaken path, —→ represents significant path without decreasing strength)

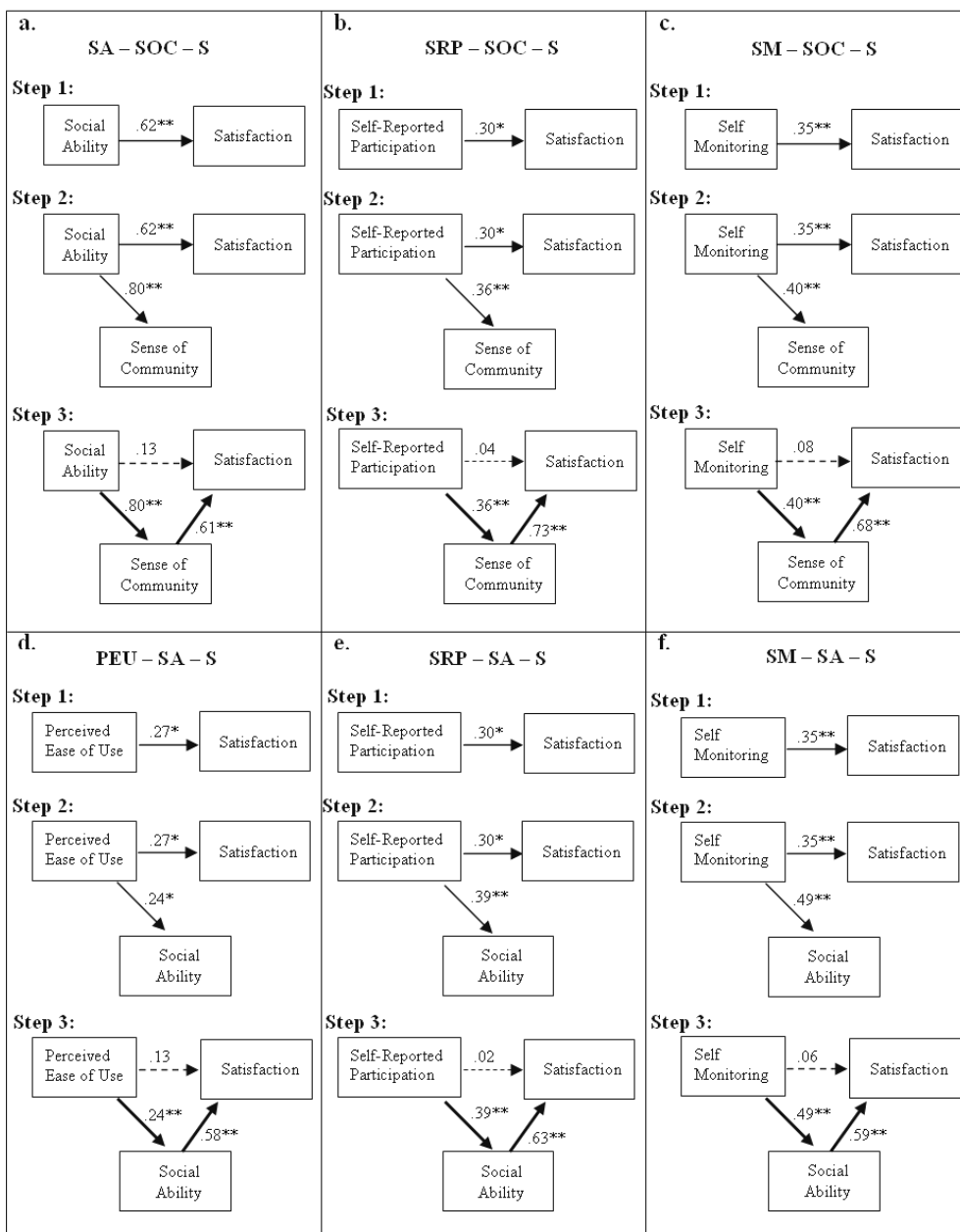


Figure 5. Mediator Identification (* $z \geq 1.96, p < 0.05$; ** $z \geq 3.29, p < 0.001$ statistically significant; ----> represents insignificant path, ———> represents significant path without decreasing strength)

DISCUSSION

Several differences and similarities with the previous model were found after adding GS and SM. The previous model identified SOC as a mediator for SA to S because SOC's strong relationship with S led to an insignificant relationship of SA to S. Also SOC was a moderator for SRP to S because the stronger relationship of SOC to S weakened the strength of SRP to S. SOC is confirmed to be a strong mediator for SRP, SA, and SM to S in the current findings.

The previous mediating function of SOC for the relationship between PU and S was replaced by the relationships of PU-SM-SA-SOC-S and PU-SM-GS-S, which indicates a critical role for the perceived usefulness of social awareness tools for having a sense of community,

self-monitoring their learning, and interacting with others. Although the direct relationship between PEU and SA in the previous model was replaced by the relationships of PEU-SRP-SA and PEU-PU-SM-SA, SA was found to mediate PEU to S. This finding implies that students need to have a sense of competence with the social awareness tools before they can interact with others via these tools. Additionally, SM bridged the indirect relationship of PEU-PU-SM-SA-SOC and PEU-PU-SM-GS, which demonstrates students' acceptance of social awareness tools play an essential role not only for SOC, SA, and S but also SM and GS. Other researchers have found positive contributions of scaffolding to learners' self-regulated learning and improved outcomes (Winne, 2005). The hypertext studies by Azevedo et al. (2005) and by Choi et al. (2005), however, indicated some theoretically useful scaffolds do not successfully support SRL. According to Boekaerts and Corno (2005) and the important role of technology acceptance to students' SM and GS, we believe self-regulated learning is context specific suggesting that instructional designers and developers should provide context specific scaffoldings.

Students self-monitoring their learning tend to be better able to perceive the social presence of others, use the actions of others to help determined their own actions, and provide more supportive and connected feedback to peers. These findings have implications for designing instructional activities and scaffolding to help develop students' sense of community. Goal setting contributes positively to students' online learning satisfaction and bridges the indirect contribution for self-monitoring to students online learning satisfaction. Students who adapt online learning tools to monitor their learning and adjust their goals tend to be more successful learners.

IMPORTANCE

Our results suggest benefits if online systems developers and instructors can implement mechanisms and strategies that activate self-regulated learning. If tools such as asynchronous online discussion (Berge, 1997, 2000) which allow students to better interact with peers and instructors to better implement various forms of computer supported learning are easy to use and perceived to be useful they may also engage self-regulation. Our findings show how students' self-regulated learning factors bridge relationships among PEU, PU, SA, and SOC. Further studies are warranted to replicate and further investigate the relationships found here and include other personal constructs such as self-efficacy for computer technologies. Further examination of self-regulated learning in online environments by adding more question items to the current instrument for self-regulated learning may uncover additional ways of relating SRL to online learning outcomes.

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