

# Interaction, Structure, Social Presence, and Satisfaction in Online Learning

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There have been various studies about interaction, structure, social presence and satisfaction in online learning; however, there is not any research which represents the relationships among these concepts. The purpose of this paper is to examine the relationship among these variables. The population of the study is involved 205 university students who enrolled bachelor degree completion program at the Ankara University. Structural equation modeling was used to test hypothesizes. The results of this study indicated that there is a negative correlation between the course structure and interaction dimensions defined by Moore in transactional distance theory. Secondly, online students' social presence was predicted positively by interaction and negatively by course structure. Furthermore, online learning satisfaction was predicted positively by social presence. Students are most satisfied when their social presences are high in the online learning.

*Keywords:* Transactional distance, course structure, interaction, social presence, satisfaction.

## INTRODUCTION

Internet is one of the most important technologies in today's information society. The use of distance education applications for online learning has been rising in parallel with the dramatic increase of internet usage. For instance, According to data released from Internet World Stats (July 2013), 45.7 % of Turkey's population actively use internet. Additionally in 1997, colleges, universities and the companies brought into the first online learning applications and within the two years, 10% of the college and universities and 25% of the companies practiced the online learning programs. By the year of 2001, these percentages increased to 80% for college and university and 60% for companies (Lynch, 2002). In 2009, total number of online learners

reached to 5.6 million, which means that the increase was 2.4 million users from 2004 to 2009. Most of the online learners consist of undergraduate students (Allen & Seaman, 2010). Online learning continues to be a major trend in education. This situation is similar in Turkey and in the other countries besides USA.

In the online learning, most of the content is delivered via internet (Allen & Seaman, 2010). Therefore, giving prominence to only the technology by ignoring the educational aspects will not produce effective instructions. c) found that 30% to 50% of the students failed to complete the distance learning programs in which educational aspects were not taken in to notice. These results revealed a necessity to original distance education theories to find solutions to drop out rate of distance learning students and similar problems. One of them is Transactional Distance (TD) theory.

## THEORETICAL FRAMEWORK

TD theory was developed originally by Moore (1991, 1993). TD is a "psychological and communication space, not a psychical space, to be crossed, a space of potential misunderstanding between

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### **State of the literature**

- Student satisfaction in online learning is an important variable. The increase of student satisfaction in online learning will reduce the rate of students drop out of online learning.
- If online learning students social presence increase, students will feel themselves as part of this learning environment and increase their satisfaction.
- If we present an environment with more interactive and less structured, social presence of online learning students will directly and satisfaction indirectly increase.

### **Contribution of this paper to the literature**

- This study is carried out with the goal of determining the influence of interaction, structure and social presence on online learning student satisfaction.
- Results of this study reveal that online learning environment includes less structure and more interaction directly affect to development of the social presence and indirectly satisfaction and also social presence directly affect satisfaction.
- This study suggests that design of online learning environment according to the recommendations of Moore's TD theory.

the inputs of instructor and those of the learner” (Moore & Kearsley, 2012).

TD is associated with interactive television by Bischoff, computer conference by Saba, Shearer and Force, computer by Gayol, audio conference and teleconference by Brenner, videoconference by Chen, Chen & Willits and Jung, internet by Chen, Chen, Huang, Jung, Choi, Lim & Leem, Zhang, Lowell and Sandoe, e-learning by Lemone, blended learning by Dron, Seidel & Litten, Dron and Horzum (Horzum, 2011). It is seen the most that the theory of TD is associated with distance learning applications in the internet.

Garrison (2000) defines that the theory of TD is the most known and the most applied theory. Cicciarelli (2008) also emphasizes that online media trainer's express the theory of TD is the most important theory that is always utilized. Structure and dialog are the components of this theory. Dialog refers to two-way interaction and communication possibility of program (Moore & Kearsley, 2012). Learner-teacher communication constitutes the dialogue or interaction (Moore, 1989), course structure refers to flexibility of the program in satisfying the students' needs (Moore & Kearsley, 2012) and flexibility in access to course components (i.e.; Content, learning outcomes and

activities, constitutes the structure). There is negative correlation between course structure and dialogue therefore; increased course structure decreases the dialogue; vice versa increase in the dialogue decrease the structure in distance education (Chen, 2001).

Although numerous studies represent the negative correlation between course structure and interaction (Demir Kaymak & Horzum, 2013, Jung, Seonghee, Lim & Leem, 2002; Hopper, 2000; Horzum, 2007, 2011), on the contrary, some other studies found that TD theory does not validate the structure component (Force, 2004; Gorsky & Caspi, 2005; Kanuka, Collet & Caswell, 2002; Lowell, 2004). As a result, these conflicting findings reveal out a necessity to examine the relationship between structure and dialogue in online learning.

### **Social Presence**

Social presence (SP) is one of the most crucial components of the quality of online learning experience from the student perspective (Cobb, 2009; Shin, 2003). SP is a learner ability to project them socially and emotionally as 'real' people into a community of learners (Garrison, Anderson & Archer, 1999: 94).

SP could be affected by the characteristics of the use of tools. Online interactive tool's usage increased SP positively (Chou & Min, 2009; Joyce & Brown, 2009; Mykota & Duncan, 2007; Weinel, Bannert, Zumbach, Hoppe & Malzahn, 2011; Wise, Chang, Duffy, & del Vale, 2004). From this aspect, interaction and SP are considered directly related two variables (Murphy & Rodríguez-Manzanares, 2008; Richardson & Swan, 2003). Related literature showed that SP has a positive effect on online learner's satisfaction and achievement (Olpak & Çakmak, 2009).

Although there has been some research which examined the relationship between the SP and interaction, few studies, however, have investigated the relationship between the structure and SP. Since the relationship between the interaction and SP is validated, this finding could postulate the relation between the structure and the SP.

### **Satisfaction**

Satisfaction is emphasized to be one of the most important factors that determined the quality of online instruction (Allen & Seaman, 2010; Garrison & Cleveland-Innes, 2005; Moore & Kearsley, 2012). Satisfaction can be defined as fulfillment and pleasure level of the students about different aspects of learning service which they received in an online learning program. From this aspect, satisfaction is a factor which could be directly affected by learning service components. Variety of the offered courses, quality of the instruction, academic support, library service,

usability of web site, communication services, quality of the course materials, internet speed and students affair are some of the factors that affect the satisfaction.

Related literature about the satisfaction shows that there are kinds of factors that affect the satisfaction in online learning environments. Online learner satisfaction primarily related their ability to learn from online content, interact and communicate from others, and understand to needs for success (Palmer & Holt, 2009). This finding features the structure component of the TD theory and reveals out the relation between the structure and the satisfaction (Lee, & Rha, 2009; Murphy & Rodríguez-Manzanares, 2008; Stein, Wanstreet, Calvin, Overtoom & Wheaton, 2005; Horzum, 2007).

Interaction is another factor influences the satisfaction in online learning and it is positively related with satisfaction (Ali, Ramay & Shahzad, 2011; Burgess, 2006; Jung, Seonghee, Lim & Leem, 2002; Lee & Rha, 2009; Murphy & Rodríguez-Manzanares, 2008; Stein, Wanstreet, Calvin, Overtoom & Wheaton, 2005). SP is another factor that affects the satisfaction in online learning environments. In the related literature, SP is one of the significant predictor of both satisfaction and perceived learning outcomes (Delfino & Manca, 2007; Murphy & Rodríguez-Manzanares, 2008; Swan & Shih, 2005; Wise, Chang, Duffy, & del Vale, 2004).

### Research Hypothesis

Although there have been various studies about interaction, structure, SP and satisfaction, any study has not yet investigated the relationships between all of them all in one. From this aspect, the purpose of the study is to examine the relationships among online learning students' interaction, structure, SP and satisfaction. Following research hypothesis provided the framework for the study:

In online learning environment, interaction would be associated negatively with structure.

- 1) Interaction will have a significant relationship with SP.
- 2) Structure will have a significant relationship with SP.
- 3) Interaction will have a significant relationship with satisfaction.
- 4) Structure will have a significant relationship with satisfaction.
- 5) SP will have a significant relationship with satisfaction.

### METHODOLOGY

Structural equation modeling (SEM) was used to develop an acceptable model based on relationship

among four basic research variables (online learning interaction, structure, SP, and satisfaction) in this study. SEM is one of the statistical methods that show us to relationships among more than one independent and dependent variables (Ullman & Bentler, 2003). Participants were consisted of 205 blended (most of the learning application through the online) learning university students. Ideal sample size for SEM is expressed as 150 or more people (Kline, 2011). Research data were collected by using an online questionnaire.

### Instrument

Perception of Online Courses Scale (POCS): Interaction and course structure in the online learning environment was measured by POCS. POCS was developed by Huang (2000) to assess the online course perceptions, and it has four sub-dimensions: interaction, structure, autonomy, and social comfort. In this study, 5-point Likert-type 15 items, and two sub-dimensions (Interaction and Structure) were used. POCS was adapted to Turkish language by the researcher. POCS Turkish form's internal consistency coefficient was .83 and the test-retest was .85. According to confirmatory factor analyzed results and Cronbach's alpha values POCS is a valid and reliably instrument. Detailed results are presented in the Appendix.

The Social Presence Scale (SPS): Participants' SP was measured by using SPS. SPS was developed by Gunawardena and Zittle (1997) to assess the SP in computer mediated conferences. Although SPS has 14 items in original form, in the study, 5-point Likert-type 11 items were translated and used. After translation, SPS was prepared as a structure including original item, translated item and proposed form and given to 3 educational technology experts for their opinion. After making all necessary adjustments, these 11 items were used in this study. SPS Turkish form's internal consistency coefficient was .95. Confirmatory factor analyze results reveal a good fit and they are presented in the Appendix.

The Satisfaction Scale (SS): The SS was developed by Gunawardena & Zittle (1997) and SS contains 5-point Likert-type nine items. SS was adapted to Turkish by the researcher and SS Turkish form's internal consistency coefficient was .95. Confirmatory factor analyzed results prove the construct validity of SS. These results are presented in the Appendix.

Participants and data collection: Participants were consisted of 205 university students who enrolled in İlahiyat Lisans Tamamlama (İLİTAM) (online learning + two weeks face to face learning in one year) bachelor degree completion program at the Ankara University, Turkey (for detailed information see in <http://www.ilitam.ankara.edu.tr>). In this study, the

scale applied on the internet and convenient sampling method was used for the selection of the working group. The survey's link was published on the forum of the students' learning management system. As a result, volunteer students filled the scale. 101 learners were on their first year and 104 were on their second year. 105 of the participants (51.2%) were males and 100 of them (48.8%) were females. While 12 (5.8%) students felt insufficient about internet use, 193 (94.2%) students felt sufficient. The age of the students ranged was from 20 to 47 years, the average ( $\pm$ SD) being  $30.74 \pm 6.39$  years for the entire sample.

**Procedure**

Students participation permission was obtained from Ankara University Distance Education Center where the students were officially enrolled the program. Data were collected by an online questionnaire so completion was anonymous. Pearson correlation, coefficient and structural equation modeling were utilized to determine the relationships among course structure, interaction, SP, and satisfaction. Maximum likelihood estimations were used in structural equation modeling. Analyses were performed by LISREL 8.54.

**DATA ANALYSIS AND RESULTS**

**Descriptive Data and Inter-correlation**

The results of means, standard deviations and correlations of this study represent a significant correlation between course structure, interaction, SP, and satisfaction. Interaction was found negatively correlated with the course structure ( $r=-.33$ ). Findings of this study support the Hypothesis 1. SP correlated positively with the interaction ( $r=.26$ ) and negatively with the course structure ( $r=-.27$ ). This finding supports the Hypothesis 2 and 3. On the other hand, while course structure has a negative correlation with the students' satisfaction ( $r=-.14$ ), interaction ( $r=.26$ ) and SP ( $r=.60$ ) have positive correlation with satisfaction. This finding supports the Hypothesis 4, 5 and 6.

**Structural Equation Modeling**

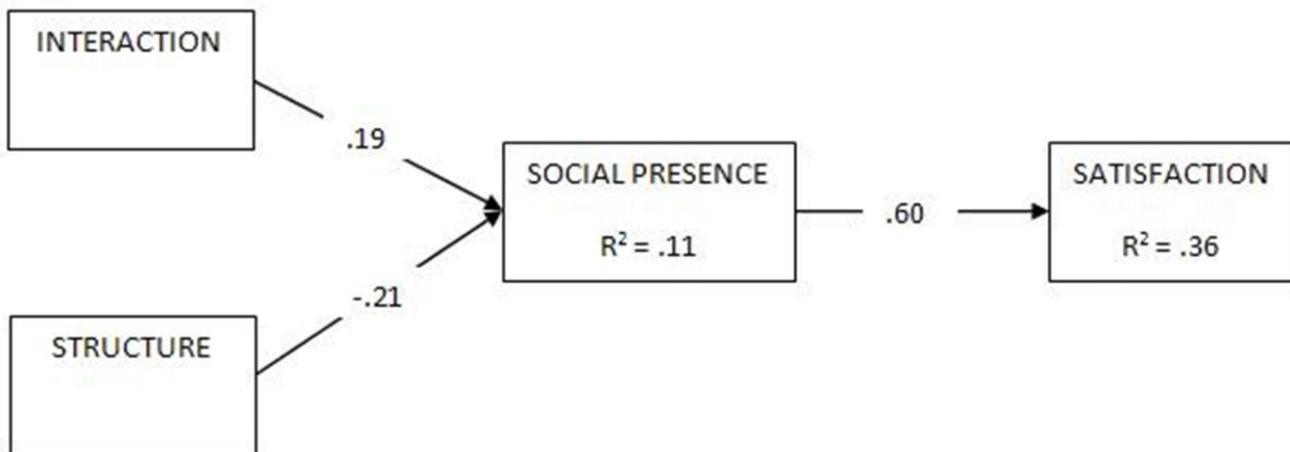
The research model was examined by structural equation modeling (SEM). Results of SEM analysis are presented in Figure 1. The model exhibited a good fit ( $\chi^2 / df = 1.20$ , GFI = .99, AGFI = .99, CFI = .98, NFI = .99, IFI = .99, and RMSEA = .020). Furthermore, interaction and structure accounted for 11% of the SP and 01% of the satisfaction variance, and SP accounted

**Table 1.** Mean, Standard Deviation and Correlations Among the Variables

Variables	1	2	3	4
1. Satisfaction	-			
2. SP	.60**	-		
3. Structure	-.14*	-.27**	-	
4. Interaction	.20**	.26**	-.33**	-
Mean	26.81	36.37	11.60	33.64
Standard deviation	9.66	10.68	6.01	8.22

\*\*p<.01

\*p<.05



**Figure 1.** Path analysis between interaction, structure, SP, and satisfaction

for 36% of the satisfaction variance.

The standardized coefficients in Figure 1 clearly showed that SP was predicted positively (.19) by interaction and negatively by course structure (-.21). In addition, satisfaction was explained positively by the SP (.60).

## DISCUSSION AND CONCLUSION

Online learning has become one of the major distance learning trends for the last two decades (Allen & Seaman, 2010). The need of research in the area of the online learning are emphasizes by many researchers (Lynch, 2002; Horzum & Çakır, 2009). The purpose of this research was to investigate the relationships among the online learning satisfaction, SP, interaction and structure. Correlation and SEM result showed significant relationships among study variables. Indexes related to model was found to be in a good fit (Schermelel-Engel, Moosbrugger & Müller, 2003).

The findings obtained in this research represent a negative correlation between interaction and the course structure. It can be said that if the interaction between the online students and their teachers or classmate increase, the course structure may decrease. The results of this study is consistent with one of the TD theory's assumption which is course structure negatively correlated with the students' interaction, teacher and other students (Moore, 1991; 1993; Moore & Kearsley, 2012; Sandoe, 2005). Similarly, this result is consistent with former studies results such as; Chen, 2001; Demir Kaymak & Horzum, 2013, Jung, Seonghee, Lim & Leem, 2002; Hopper, 2000; Horzum, 2007, 2011. The findings also showed that the course structure and interaction has a negative correlation.

However, some researches revealed that structure component of the theory do not validate (Force, 2004; Gorsky & Caspi, 2005; Kanuka, Collet & Caswell, 2002; Lowell, 2004). This can be the formation of different structures in different applications or sourced from different instructional design approaches.

Secondly, it was found that while the SP was predicted positively by interaction, it was predicted negatively by course structure. This means that the students' SP will be optimum in the online learning when course structure is low and interaction is high. This result is consistent with recent studies results (Chou & Min, 2009; Joyce & Brown, 2009; Murphy & Rodríguez-Manzanares, 2008; Mykota & Duncan, 2007; Richardson & Swan, 2003; Weinel, Bannert, Zumbach, Hoppe & Malzahn, 2011; Wise, Chang, Duffy, & del Vale, 2004).

Finally, satisfaction was found to be predicted positively by the SP. This means students are most satisfied when their SP is high in the online learning. If teachers and developers create the SP in the distance

learning systems, they should increase interaction between student teacher and classmate. This result is consistent with recent studies results (Delfino & Manca, 2007; Murphy & Rodríguez-Manzanares, 2008; Olpak & Çakmak, 2009; Swan & Shih, 2005; Wise, Chang, Duffy, & del Vale, 2004). Furthermore, the model of this study generates some indirect relationship between the variables. According to indirect results, satisfaction was correlated with interaction and course structure. These findings are also consistent with literature (Ali, Ramay & Shahzad, 2011; Burgess, 2006; Jung, Seonghee, Lim & Leem, 2002; Horzum, 2007; Lee, & Rha, 2009; Murphy & Rodríguez-Manzanares, 2008; Stein, Wanstreet, Calvin, Overtoom & Wheaton, 2005).

The magnitude of them was neither interpreted nor discussed. If students satisfied with online learning, they should also provide them with the SP. If teachers and designers give the opportunity of SP in the online learning system, they should increase interaction between student and teacher, and also students-and students. Furthermore, teachers and designers should decrease the course structure in the online learning environment.

As a result, increasing dialogue and decreasing of structure have a positive-acting factor to the SP and satisfaction. This is one of the basic assumptions used in the shaping of Moore's theory. Besides this, decrease of structure has emerged as a required variable in addition to the dialogue. This finding is observed the confirmation of the other assumption that is "if structure increase dialogue decrease, or vice versa" Moore structured and underlined his theory which is the well-known and the most applied distance education theory (Cicciarelli, 2008; Garrison, 2000).

SP and motivation are the important variable for quality of the online learning (Cobb, 2009; Garrison & Cleveland-Innes, 2005; Moore & Kearsley, 2012; Shin, 2003). Based on the research findings, it is emphasized the importance for online learning that instructional designer must establish a balance between course structure and dialogue. Therefore, when designing online learning materials and systems, it should be taken to design interactive and less structured environments.

This study has some limitations, it is obviously gave some clues to provide direction for future research. Because the participants are online learners and their participation was voluntary; some of the online students did not accept to participate. So the number of the study group was decreased. In addition, since the study group consisted of only university students, research results are limited to bachelor degree completion learner and ILITAM system. Therefore, definitive statements cannot be used because of these limitations.

In the online learning environment there are many services offered by internet such as www, searching engines, e-mail, chatting/instant messaging programs

and etc. Nowadays, services provided by the internet is based on the tools so-called Web 2.0. The effects of these Web 2.0 tool expressed as instruments of social interaction, with TD can be tested by using these tools in online learning environment. In the internet based education, designing the adaptive environments for students' individual differences has the character to affect the important variables such as students' achievement, self-efficacy, satisfaction, SP and TD. For this aspect, the effect of using adaptive environments by improving these for internet based learning is examined.

In conclusion, this study reports that online learner satisfaction with system affects SP directly, and interaction and course structure indirectly. Online student high SP, high interaction and low course structure increase the students' satisfaction in online learning environments. These findings shed light on the understanding of the online learner

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**Appendix.** Reliability coefficients and goodness of fit indexes of confirmatory factor analyze of scales.

Scale	Sub-Dimension	Reliability	Fit measure	Model value
Perception of Online Courses Scale	Interaction	0.95	$\chi^2/df$	2.52
			RMSEA	0.067
			SRMR	0.052
			CFI	0.98
			NFI	0.96
	Structure	0.94	NNFI	0.97
			GFI	0.90
			AGFI	0.89
			$\chi^2/df$	3.22
			RMSEA	0.10
SPS		0.95	SRMR	0.041
			CFI	0.97
			NFI	0.98
			NNFI	0.98
			GFI	0.90
			AGFI	0.85
			$\chi^2/df$	2.13
			RMSEA	0.075
			SRMR	0.027
			Satisfaction Scale	
NFI	0.99			
NNFI	0.99			
GFI	0.95			
AGFI	0.90			