THE EFFECTS OF PERIODIC INFORMATIVE INSTANT MESSAGES ON DISTANCE LEARNERS' PERCEPTION OF TRANSACTIONAL DISTANCE

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DECLARATION OF ORIGINALITY

I, Oğuz Onat, certify that

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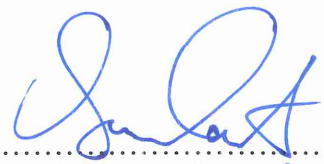

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ABSTRACT

The Effects of Periodic Informative Instant Messages on Distance Learners' Perception of Transactional Distance

This study examines the effects of periodic informative instant messages targeting to make distant learners feel less disconnected and more part of a group in addition to reducing course dropout rate and distance learners pereived transactional distance. These instant messages are suitable for automatization and they were sent to full time college students who takes several online courses periodically. All of these instant messages were designed either as a reminder, warning or advice. Probable impact of these instant messages was measured using the Perceived Transactional Distance Scale in Distance Education Environments (Horzum, 2011). This instrument measures five subscales which are; Dialog, Flexibility of Structure, Content Organization, Control and Learner Autonomy. An additional set of instant messages, targeting to make students have a sense that they are a part of a learning community, were also sent in order to influence distance learners' perception of sense of community, was measured by using the Sense of Community Scale in Online Distance Education Environments (Ilgaz & Aşgar, 2009). The participants were both college and college level vocational students who were randomly assigned to four treatment groups and a control group (N=99). These instant messages were designed minimal impact on online course content and course dynamics. All messages were delivered to students' smartphones by using a a popular messaging application. The general hypothesis, is that those students receive periodic informative instant messages will report a reduced perceived transactional distance and increased sense of community, was largely supported.

ÖZET

Periyodik Bilgilendirici Anlık İletilerin Uzaktan Eğitimde Öğrencilerin Transaksiyonel Uzaklık Algılarına Etkileri

Bu çalışmada uzaktan eğitim yoluyla ders alan öğrencilerin dersten kopma ve dersi bırakma gibi eğilimlerini azaltmak amacıyla, öğrencilere kendilerini bir topluluğun parçası hissettirecek ve algıladıkları transaksiyonel uzaklığı azaltacak periyodik bilgliendirici anlık ileti (instant message) sağlanmasının etkisi araştırılmıştır. Bu anlık iletiler otomatikleştirmeye uygun olup belli aralıklarla hatırlatıcı/uyarıcı/tavsiye niteliğinde verilmiştir. İletilerin etkisine uygulama başında ve sonunda Öğretim Ortamlarında Algılanan Uzaklık Ölçeği (Horzum, 2011) ile bakılmıştır. Bu ölçek Diyalog, Yapı Esnekliği, İçerik Organizasyonu, Kontrol ve Öğrenci Özerkliği unsurlarını incelemektedir. Ayrıca öğrencileri bir topluluğun parçası hissettirmek amacıyla çeşitli anlık iletiler hazırlanıp verilmiş ve etkisi ise Çevrimiçi Uzaktan Eğitim Ortamında Topluluk Hissi Ölçeği (Ilgaz & Aşgar, 2009) ile ölçülmüştür. Katılımcılar (N=99) rastgele dört deney grubu ve bir kontrol grubuna rastgele atanmış ve bu öğrencilerin cep telefonlarına popüler bir mesajlaşma uygulaması kullanarak, ders içeriğine ve dinamiklerine etkisi minimum olacak şekilde hazırlanan iletler gönderilmiştir. Genel bir hipotez olarak kontrol grubuna kıyasla diğer gruplarda incelenen unsur veya unsurlarda algılanan uzaklık hissinin azalacağı ve topluluğa aidiyet hissinin artacağı büyük ölçüde desteklenmiştir.

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TABLE OF CONTENTS

LIST OF TABLES

ABBREVIATIONS

DE	Distance education
D+LA+SoC	Dialogue, learner autonomy and sense of community
D+S+LA+SoC	Dialogue, structure, learner autonomy and sense of community
D+S+SoC	Dialogue, structure and sense of community
IM	Instant message
PTD	Perception of transactional distance
S+LA	Structure-and learner autonomy
TD	Transactional distance
LMS	Learning Management System
CMS	Content Management Systems

CHAPTER 1

INTRODUCTION

Distance education seems to be a viable option for those who cannot make to schools, which may have been in short supply for increasing population with wider education needs. DE improved significantly since its genesis with correspondence as the essential media delivery, with modern technology, such as the Internet, providing common and affordable ways to receive education.

However, nothing comes without a price and DE is not an exception. There are several issues about DE that needs to be tackled with. Perceived feeling of distance between instructors and students that is instigated by physical/geographical separation is a matter that DE has to struggle with. DE has higher dropout rates and reported feeling of distance than common education of face to face fashion. A hysterical problem with DE however feeling of isolation and the psychological gap that students have in distance education environments. Formulated by Moore (1973), as “Transactional Distance” has several causes and warrants deserted attention.

The purpose of this study is to examine the effects of periodic informative instant messages which aims to reduce this feeling of loneliness, dropout rate and perceived transactional distance of university students who takes classes via distance education.

1.1 Statement of the problem

This framework of DE may work for some but it will not work for many students. Due to above mentioned conditions, some students may find this psychological gap

cumbersome and lose their motivation. This in turn can lower their grades and some may even drop the course altogether. Unlike common education environments, DE has to take place with teachers engaging the class with different spaces and/or times. In DE one may have teachers and classes, as well as classmates, with whom she may be learning live and chat synchronously but, the atmosphere is remarkably different. The physical separation also prevents teachers from usually making moves for chiding on the students. Classmates are less likely to communicate about their learning, such as assignments and exams as well as casual talking to keep the social ties. Moore conceptualized this separation as creating a psychological and communicative gap termed “Transactional Distance”, which could be remedied to some extent. This so called transactional distance can be tolerated by some students however, it appears considerable number of students affected adversely as reflected in high dropout rates and lower academic achievement.

1.2 Significance of the study

Initially, the hypothesis was that dialogue would diminish TD and more structure would widen the TD. (Bischoff et. al., 1996; Saba & Shearer, 1994) studies supported this hypothesis. Other studies either added or related to new concepts to extend the theory of TD (Horzum, 2013) such as transactional presence (Shin, 2001; Shin & Chan, 2004), social presence (Lowell, 2004), cultural influences (Hopper, 2000) were the concepts found related to the theory.

Even though the theory of TD is well understood and quite clear about how to diminish the TD between teachers and students, very few studies have focused on practice of diminishing the psychological gap, especially none that examines the effects of periodic informative instant messages and TD.

CHAPTER 2

LITERATURE REVIEW

2.1 Distance education

Education can be thought as a process that people shapes themselves for life which is aided by various strategies, methods and tools (Senemoğlu, 2010). Education also has a crucial role in determining a country's economic, social and cultural policies (Demirkıran, 2008). Contemporary educational systems aim to show students ways of reaching knowledge and guiding them instead of transferring information (Mısırlı, 2007). One of the objectives of education is to raise individuals who are open to change and able to adopt contemporary methods and use them lifelong. It also aims to cultivate individuals who would able to research and question, and able to keep up with technology (Özüsağlam, 2007). Being able to follow the developing technologies and keeping up with the new knowledge requires constantly updating information and upgrading the technological tool on hand (Arıcı and Yekta, 2005).

Distance education brings the student, the teacher and course materials that are in physically different locations via communication technologies. Diversification and development in the communication technologies caused differentiations in the definition of distance education (Höçük, 2011). Distance education is a kind of education that occurs in such an environment that students are not physically in the same classroom (Güleçoğlu, 2012; Patriarcheas & Xenos, 2009; Perraton, 2010). Distance education is the combination of both teaching and planned learning where teaching occurs in a different place from student learning and communication between the teacher and the learner is provided by information technologies and institutional organizations (Moore and Kearsley, 2012). Distance education supports

the learning process of the pupils by providing various options and bridges the gap between the physical distance between learner and the teacher (Yousuf, 2007).

Common denominator stressed in definitions of distance education is the geographic distance between the learner and the source of knowledge (Başarıcı, 2012). There can also be a distance regarding time between the teacher and the student but it is not mandatory. According to Holmberg (1995) teaching is an attempt by the teacher and is not always successful. Furthermore, teaching can occur without learning and learning can occur without teaching. Since various learners can learn differently from the same teaching session, teachers should be mindful about learning styles of their students. Though what Holmberg stated is correct, what Moore and Kearsley referred as "planned" learning in their definition is also about the role of the student in this equation. DE students expected to be more responsible for their own learning an exert more control.

2.2 Conventional education versus distance education

Conventionally, education takes place in a face to face manner in classrooms with student and teachers being present simultaneously (Güleçoğlu, 2012). Distance education has various advantages in meeting the educational needs of large masses. However, distance education has some disadvantages such as obstructing socialization, lack of presence. Recently, these drawbacks can be partially overcome by video conferencing and web conferencing methods (Selvi, 2008). Distance education can assist formal education due to the developments in Content Management Systems (CMS) and Learning Management Systems (LMS) software but it can also be used by itself as an alternative to the formal education (Özüsağlam, 2007). Developments in the hardware and software helped in reducing disadvantages of distance education. Distance education also help formal education in many ways

by presenting alternative ways in handling certain problems virtually (Balaman, 2014).

The initial difficulty and high cost of creating a web-based DE environment tend to ease up over time mostly due to low cost of maintenance (Ersoy, 2008b). Unlike conventional education, in web-based DE cost is low because there is little need for infrastructure such as buildings and personnel and educational tools for teachers and students (Çimenli, 2013; Avşar, 2012). In distance education, with respect to conventional education, teachers can conduct lessons with much larger groups of students (Balaman, 2014). Nevertheless, this situation causes an increase in the amount of responsibilities of teachers since they have to be qualified in both technical and pedagogical aspects and they have to spend more time in taking care of large group of learner problems (Höçük, 2011). According to Yanpar (2015), distance education provides flexibility to the learners with special needs. Individuals who are not able to participate conventional education classes due to their handicaps can attend distance education lessons in their home, those who are visually challenged can benefit from audible materials and those who are hearing impaired can benefit from visual materials (Balaman, 2014).

2.3 Why distance education?

Learning should not limit itself to a certain period of time in people's lives. It's a lifelong process (Demirkol, 2012). Thanks to the facilities provided by the development of technology, learning is also possible outside of the conventional classroom environments. Lifelong learning adopts the philosophy of learning everywhere and any time. Learners who adopt the view of lifelong learning are the individuals who always research, question and learn (Turgut, 2011). Distance education supports lifelong learning and contributes in its proliferation (Tırnovalı,

2012). Distance education has its own rules and principles and it has a multidisciplinary structure (Koçdar, 2011). Distance education goes out of the boundaries of conventional education and presents us with an effective and comfortable way of learning (Ünlükahraman, 2011).

Increasing demand of education seems to strain the conventional ways of supplying it. Distance education uses technological facilities for educational purposes for large masses and it is also tempting for individuals who are interested in their personal development through learning. Such conditions gave birth to the necessity of distance education (Akdemir, 2011; Aydın, 2011). Furthermore, difficulties that arose due to the globalization, lack of qualified personnel, requirements of work life such as being practical and quick-witted and a view of learning being a process that continues throughout the life are among the reasons that distance education is essential (Dursun, 2011). Existing educational resources became inadequate due to the increase of population. New technologies surpassed the popular 20th century TV and radio broadcasting. For instance, web-based distance education can provide solutions to certain problems of education (Tüysüz and Aydın, 2007). Lack of facilities of education due to population increase and as a consequence of information age, standards of education level of individuals has changed. Therefore, education of individuals requires longer periods of time and information. Hence, present facilities such as buildings, tools for education and teachers fell short in meeting the demands of new standards of education. Under these circumstances, the importance and the necessity of distance education became more prominent (Lau and Yuen, 2014).

2.4 A short history of distance education

The first known organized form of the distance education attempt was correspondence via using postal services (Holmberg, 1995). According to Pittman (2013), correspondence courses started in early 18th century. Since that time, with the development of the technology, delivery method of the "teaching" in distance education took many forms. Taylor (1992) developed a conceptual framework about the so-called generations in distance education, focusing on the characteristics of those generations; delivery technologies within each generation.

2.4.1 First generation – correspondence model

In his conceptual framework, Taylor identifies four generations of distance education (see Table 1). In the first generation, the mode of delivery is print. This generation is called the correspondence education. Usually in this generation, printed materials delivered to the students via mail with a guidebook showing them how they should study given material. The pupils used the mailing system to reach the teachers if they had problems or questions regarding to lessons. Although, by today's standards this method seems painstakingly slow, such system enabled teachers to take care of students' problems individually by answering questions of learners or providing instant message via mail. Although the communication process was slow, teachers were able to give detailed instant message that helps students individually.

The first generation of the distance education was not without its' flaws. Apart from its leisurely nature, communication could easily fall victim to the postal establishment's mistakes such as late delivery or loss of mails.

Table 1. Models of Distance Education: A Conceptual Framework

Models of Distance Education and Associated Delivery Technologies	Characteristics of Delivery Technologies					
	Flexibility			Highly Refined Material	Advanced Interactive Delivery	Institutional Variable Costs Approaching Zero
	Time	Place	Pace			
First Generation - The Correspondance Model						
- Print	Yes	Yes	Yes	Yes	No	No
Second Generation - The Multi-media Model						
- Print	Yes	Yes	Yes	Yes	No	No
- Audiotape	Yes	Yes	Yes	Yes	No	No
- Videotape	Yes	Yes	Yes	Yes	Yes	No
- Computer-based learning (eg CML/CAL/IMM)	Yes	Yes	Yes	Yes	Yes	No
- Interactive video (disk and tape)	Yes	Yes	Yes	Yes	Yes	No
Third Generation - The Telelearning Model						
- Audioteleconferencing	No	No	No	No	Yes	No
- Videoconferencing	No	No	No	No	Yes	No
- Audiographic Communication	No	No	No	Yes	Yes	No
- Broadcast TV/Radio and Audioteleconferencing	No	No	No	Yes	Yes	No
Fourth Generation - The Flexible Learning Model						
- Interactive multimedia (IMM) online	Yes	Yes	Yes	Yes	Yes	Yes
- Internet-based access to WWW resources	Yes	Yes	Yes	Yes	Yes	Yes
- Computer mediated communication	Yes	Yes	Yes	Yes	Yes	No
Fifth Generation - The Intelligent Flexible Learning Model						
- Interactive multimedia (IMM) online	Yes	Yes	Yes	Yes	Yes	Yes
- Internet-based access to WWW resources	Yes	Yes	Yes	Yes	Yes	Yes
- Computer mediated communication, using automated response systems	Yes	Yes	Yes	Yes	Yes	Yes
- Campus portal access to institutional process and resources	Yes	Yes	Yes	Yes	Yes	Yes

Source: Taylor (2001).

2.4.2 Second generation – multimedia model

In the second generation, delivery mode became more versatile. As the name of this generation suggests, Multimedia Model, in addition to print materials and study guides, delivery mode included several multimedia materials such as audiotapes,

videotapes, and computer-based courseware including computer managed learning and computer assisted learning and interactive videos (Taylor, 1992).

2.4.3 Third generation – tele-learning model

In the third generation, the Tele-Learning Model, there was a paradigm change. This change was from asynchronous to synchronous. In the first two generations of Distance education, there was not only a geographic distance between the teacher and the student there was also a distance of time. But the third generation, students and teachers were able to overcome the "distance of time" by the use of information technologies such as audio teleconferencing, video conferencing. Although this changed the flexible structure of predecessor generations, third generation allow students and teachers to have live communication and fastened the process of delivery.

2.4.4 Fourth generation – flexible learning model

In the fourth generation, the Flexible Learning Model makes use of the delivery modes of Internet connection. Thanks to the myriad of choices that the Internet provides in terms of both synchronous and asynchronous communication, this generation combines the benefits of its predecessors.

2.4.5 Fifth generation - intelligent, flexible learning model

The fifth generation is based on the interactivity afforded by the Internet; it accommodates interactive multimedia elements that are presented online in Internet environment Taylor (2001). What's meant by distance education recently is the fifth generation of distance education that is web-based distance education since this

generation uses the benefits of web technology. In a sense, distance education and web-based distance education connotes each other. Distance education cannot be limited by only web or computer supported methods however with the development of the technology distance education is regarded as the same with the web-based distance education (Olcay, 2011).

In distance education materials such as video, sound, graphics and animation are developed by teachers or designers - usually with consultancy of teachers - and uploaded to the internet. In the design and development process of those materials, multimedia design principles should be taken into consideration (Selvi, 2008). The purpose of using information technologies in distance education is increasing the quality of education and decreasing the drawbacks of distance education. However, interaction between students and teachers and the interaction among students can be lower than the conventional education due to incapability of system or due to the user's inability on operation technological equipment (Balaman, 2014).

Countries all around the world makes use of information technologies in findings solutions to the problems regarding to education. Advancements in the information technologies forced governments to adopt their educational policies and systems. Modern societies integrated technological developments into their educational systems and gone through some radical changes. İşman (2011) listed the problems regarding to our conventional education system increased: physical infrastructure, tools, qualified teachers, standardization in education, students drop outs, rapid increase in population, neglecting parents, not using the contemporary methods.

2.5 Sense of community

McMillan and Chavis (1986) defined the sense of community under the four components. These are; membership, influence, reinforcement and shared emotional connection. Sense of community can be defined as a feeling of belonging which members feel towards each other and to the group and a belief such that thanks to that synergy in the group individuals needs would be met.

According to McMillan and Chavis (1986), membership refers to the sense of belonging which the individual feels towards the group. Influence is the ability to cause a change or transformation within the group. Reinforcement is the individual's integration to the group and meeting of needs in other words, meeting of needs of the members through the resources of group. Shared emotional connection is the belief a member holds which they are going to spend time together and share the similar experiences.

Diminishing sense of community as a consequence of the geographical distance in distance education, brings along a lack of feeling of belonging for students as well as a feeling of exclusion. This situation may lead to dropouts. (Ilgaz & Aşgar, 2009)

Rovai (2001) coined a new term “classroom community” based on the four components in McMillan and Chavis (1986) definition. The components of the classroom community are; spirit, trust, influence and learning. Spirit is the first component of accepting the group identity and feelings of belonging. Spirit indicates the acceptance of the membership within a group and develops the feelings of friendship, bonding and contentment between students (Rovai, 2001). Trust is the second component of classroom community. For an individual, it would be constructive and friendly to be able to trust a group and receive instant message from

them. When individuals are accepted by a growing and developing community, they feel more secure and begin to trust that community. As they feel secure, members volunteer to speak more openly among each other. Outspokenness is an important element in a learning community, because through trust, members will explain their deficiencies in their learning and expect appropriate and supporting answers from the other members of the community (Rovai, 2001). Influence is the feeling of closeness and mutual benefit among individuals. Influence can be task oriented as well as it can occur in a social-emotional manner. In task-oriented influence, members can interact to accomplish a certain goal or mission, whereas social-emotional influence solely depends on the relationship between members (Rovai, 2001a). Learning is the feeling of the increase in collective knowledge and understanding as well as the feeling of active process of constructing knowledge and understanding in which individuals' educational needs are met (Rovai, 2001a).

2.6 Perception of transactional distance

Transactional distance theory was coined in 1972 stating that the separation between the teacher and the student was not only a geographical but also a pedagogical (Moore, 1973). Moore made use of Dewey and Bentley's concept of transaction in his transactional distance theory (Moore, 1993). The concept of transaction means the interplay among the environment, the individuals and behavior patterns in an occurrence (Dewey & Bentley, 1949; Boyd & Apps, 1980; Moore & Kearsley, 2012). The geographic distance between the learner and the teacher in distance education has certain effects on the education process and by building upon the concept of transaction, Moore theorized that this physical distance was actually a psychological and communicational distance (Moore, 1993). This psychological and communicational space that causes potential misunderstandings between learner and

the teacher was defined as transactional distance (Moore, 1993). According to McIsaac and Gunawardena (1996), transactional distance is not limited by the distance education environments and valid for conventional education as well.

According to Moore (1993), transactional distance between the teacher and the learner is different for each student thus it is a more of a relative concept than absolute one. Moore theorized that geographical distance was not the determiner of the transactional distance; rather it was a transactional distance was a function of dialog, structure and learner autonomy (Moore, 1993; Moore & Kearsley, 2012).

2.6.1 Dialogue

Moore (1993) defined dialogue as the series of interaction having positive features that is purposeful, constructive and valued by each party. According to Moore (1993), communicational media, content, learner personality, teacher personality and the number of the students affect dialogue. However, later studies used various factors that affect dialogue in their operational definitions such as; number of communications and discourse analysis (Saba & Shearer, 1994), length and number of communications (Bunker, Gayol, Nti & Reidell., 1996), number of communications (Bischoff, Bisconer, Kooker & Woods, 1996; Chen & Willits, 1998).

2.6.2 Structure

Structure connotes the extent of rigidity and flexibility of the educational programs' objectives, teaching strategies, evaluation methods and accommodate learner's individual needs by course components (Moore, 1993; Moore & Kearsley, 2012). Structure of a program is influenced by, philosophy and emotional characteristics of

teachers, nature of communication media and other constraints that are introduced by the educational institutions (Moore, 1993). Later studies used different factors that affect structure in their operational definitions such as; organization of pace, sequence, instant message and content (Saba & Shearer, 1994), instructional design (Bunker et. al., 1996), activities and number of students (Bischoff et. al., 1996), learner support and extent of online asynchronous interaction (Chen, 2001a; Chen, 2001b).

2.6.3 Learner autonomy

Learner autonomy refers to the extent of learners' ability of determining the goals, learning experiences and the making the decisions regarding learning program (Moore, 1993). In following studies, independence or interdependence of the student was determined as the crucial factor that defines learner autonomy (Chen & Willits, 1998; Chen, 2001a; Chen, 2001b).

2.6.4 Relationship between dialogue, structure, autonomy and transactional distance

The size of the transactional distance is dependent on the dialog, structure and the learner autonomy; the relationship between dialogue and transactional distance is inverse whereas the relationship between structure and transactional distance is proportional (Moore, 1993). The autonomy that learner needs to exert in distance education environments is necessary for success and it is possible in high transactional distance situations (Moore, 1993). In other words, if a course program has high level of dialog and low level of structure then the transactional distance is minimum, if a course program has low level of dialogue and high level of structure then the transactional distance is maximum (Darrin, 2005). According to Horzum

(2013) there are four levels of transactional distance (see Table 2); if a course program has low dialogue and low structure there is full transactional distance, if a course program has low dialogue and high structure it has high transactional distance, if a course program has high dialogue and high structure it has medium transactional distance and if a course program has high dialogue and low structure it has low transactional distance.

Table 2. Levels of Transactional Distance in Distance Education Programs

Interaction Level	Program Style
Full Transactional Distance	Low Dialogue, Low Structure
High Transactional Distance	Low Dialogue, High Structure
Medium Transactional Distance	High Dialogue, High Structure
Low Transactional Distance	High Dialogue, Low Structure

Source: Horzum (2013).

2.6.5 Studies related to transactional distance theory

In literature, studies regarding to transactional distance mainly fall under two categories. The first category is about Testing the original hypothesis of transactional distance theory (Bischoff et. al., 1996; Saba & Shea-rer, 1994). Which involves the following hypothesis: As the dialogue increases, transactional distance would decrease and as the level of structure increases the transactional distance would increase.

The second category of research aimed to extend the transactional distance theory by adding or relating new concepts to the theory (Horzum, 2013). Transactional presence (Shin, 2001; Shin & Chan, 2004), social presence (Lowell,

2004) and cultural influences (Hopper, 2000) were the concepts found related to the theory.

2.6.6 Hypothesis testing of transactional distance theory

Bischoff et al. (1996), conducted a study that surveys 221 students' perceptions regarding dialogue, structure and transactional distance in a distance education course. The data was collected through a 5-point Likert scale questionnaire which was prepared by them and had 68 items. The scale was administered in 13 public health and nursing TV-based interactive courses in University of Hawaii. The problem is that only two of those items solely targeted the dialog component and those items only targeted the amount of dialogue between student and teacher. Disregarding the qualitative nature of the dialog is a deficiency of the study. Their study yielded that there is indeed an inverse relationship between dialogue and structure.

To verify the constructs of the transactional distance theory in their research, Saba and Shearer (1994) examined interactions between the students and teachers. Their study had 30 participants whom worked with their instructor individually. The communication between the teacher and the student were enabled by a telephone and a video link and their transactions were videotaped. Saba and Shearer's study yielded that transactional distance varied in accordance with dialogue and structure, in other words, as dialogue increased, transactional distance decreased and vice versa.

These two studies have two limitations in common. Firstly, neither of the studies accommodate the learner autonomy, the third construct of the transactional distance theory, into their research. Secondly, both of the studies did not explore how

dialogue, structure and transactional distance are related to the learning of the students.

2.6.7 Extending transactional distance theory

Chen and Willits (1998) investigated learners' experiences in a videoconferencing course (n=121). In their study, they used path analysis to estimate the effects of dialogue, structure, learner autonomy and transactional distance on students' learning outcomes. In their study, the determinants of learning outcomes and transactional distance were as follows; physical presence of the instructor, learners access to computer and computer mediated communication software, learners' technology skills and the size of the learning group, learners experience level with distance education environments, learners level of prerequisite knowledge on the subject matter and the level of courses. These determinants were used as exogenous subdimensions and dialogue, structure and learner autonomy were used as mediated subdimensions. They found partial relationship between the elements of transactional distance and determinants of learning outcomes.

Moore (1989), claimed that there are three types of interaction in distance education environments and these are learner-instructor, learner-learner and learner-content. Later fourth type of interaction, learner-interface interaction, was added to Moore's original three types (Hillman, Wills & Gunawardena, 1994). Chen (2001a, 2001b) in her studies, researched transactional distance in terms of these four types of interaction. Chen (2001a) argued that communication is the central concept in transactional distance and interaction is essential in all educational transactions, both teaching and learning, in distance education programs. In her study, Chen (2001a), conducted an exploratory factor analysis and found evidence supporting her

prediction that transactional distance was consisted of four dimensions. Zhang (2003) also used the same four dimensions in her study, using 100 college students as sample, she found that factors that affect students' perception of transactional distance were respectively student-student interaction, student-instructor interaction, student-content interaction and student-interface interaction.

Chen (2001b), attempted to extend transactional distance theory by adding four new elements that are internet usage skill level of the student, students' previous experience in distance education environments, learner support and online asynchronous interaction. In her study, she only found evidence that the internet usage skills of students' affect students' perception of transactional distance. However, study's sample size was small (n=71) and the results was not conclusive.

Lowell (2004) attempted to determine the factors influencing the transactional distance. These factors included Moore's original constructs; dialogue, structure and learner autonomy, as well as new subdimensions such as context, social presence and fluency. In his research, 147 graduate level students taking online course participated and the only significant predictors he found was dialogue, social presence and fluency.

Shin (2001) coined a new term "transactional presence" and that is defined as the degree to which a distance student perceives the availability of, and connectedness with, other parties involved in a given distance education setting. The study yielded that students' transactional presence has positive relationship with affective learning Shin concluded that transactional presence could be a significant predictor of students learning outcomes such as satisfaction, persistence and achievement.

Hopper (2000) in his qualitative research investigated how socio-cultural subdimensions such as learner characteristics and life circumstances relate to their perception of transactional distance. He found out that learner characteristics and life circumstances have effect on their participation in the distance education program however they do not directly affect the learners' perception of transactional distance. Furthermore, he found no evidence regarding that the size of the transactional distance hinders the academic achievement or the satisfaction of the students.

2.7 Instant messaging

Especially, in last decade, digital communication became widespread not only among students but also between teachers and students as well. This popular way of communication mainly has been used via the following channels: SMS, Email, Facebook, Twitter and WhatsApp (Calvo, Arbiol & Iglesias, 2014).

Instant Messaging (IM) services have been studied in literature. According to Hrastinski, Edman, Andersson, Kawnine, & Soames (2014), high school students who used IM service in terms of receiving math support versus anonymous forum, preferred IM service. This was due to the fact that they were able ask questions after school hours and establish a connection with the teacher. The teacher in turn was able to could help students individually and in a more relevant manner. Scornavacca, Huff, & Marshall (2009) found out that the university students that used internal SMS system, that which university developed, have more participation and their question asking rate have increased. Smit (2012) claims that using various IM between faculty and class results in potential increase in learning enhancement whereas Cifuentes & Lents (2011) study found out students that use IM services have more personal interaction between faculty as well as interaction related to the course content. Doering, Lewis, Veletsianos, & Nichols-Besel (2008) found in their study

that using IM increases students sense of community as well as overcomes the social barriers between teacher and students.

Facebook and Twitter have also been used as a learning tool. According to Fewkes & McCabe (2012) and Wang, Woo, & Quek (2012) Facebook potentially increases group collaboration and social interaction as well as interaction between students and teachers. Twitter on the other hand also has similar potentials however students reported that due to the character limit that one can use in a text dialogue remained shallow (Gao, Luo & Zhang, 2012; Leitch & Warren, 2011).

Recently, with the widespread use of smartphones, have caused an increase in use of WhatsApp, which is a popular messaging tool, in education. Students and teachers use this communication platform as a social network for class (Fischer, 2013). Church and de Oliveira (2013) listed the rationale for people's widespread use of WhatsApp as their main communication channel: App's low cost, unlimited number of message sending feature, immediacy, being a trend among acquaintances, conducting multiple communications in a simultaneous manner, forming a community of friends and with respect to other social network alternatives it provides a sense of privacy. That being said, those who use WhatsApp as a main communication tool reported that they are discontent with flooding of irrelevant or nonsensical messages and the feeling that the application is not a formal channel for communication. Popular social media platforms and IM tools were compared in Table 3.

Bere (2013) conducted a study in a South African university regarding the use of WhatsApp, in which students reported the ease of use in terms of communication with teachers and other students with respect to other alternatives. In another study that was

Table 3. Comparison of Common Social Media and Instant Messaging Tools in Education

	Email	SMS	Facebook groups	Twitter	WhatsApp
cost	free	payment	free	free	Up to 1$ per year
accessibility	ability to change text size	ability to change text size	Fixed text size	Fixed text size	ability to change text size
information about user availability	no information	no information	no information	no information	Full information
opening a group	possible	possible	easy	not natural	easy
adding and removing members to a group	Not possible the App	possible	Requires participant approval	Requires participant approval	easy
having a fluent conversation as a group	not natural	not natural	easy	not natural	easy
privacy	relatively high	relatively high	relatively low	relatively low	relatively high
teachers usage in private life	relatively high	relatively high	relatively low	relatively low	relatively high
student usage in private life	relatively low	relatively high	relatively high	relatively low	relatively high
collaborative learning	not natural	not natural	enables	enables	enables
sharing content	relatively easy	ungainly	relatively easy	relatively easy	relatively easy

Source: Bouhnik & Deshen (2014)

conducted in Spain, students reported that their motivation have increased for reading in a foreign language (Plana et al., 2013). However, in a study conducted in Kuwait, students' writing skills in English as a foreign language showed decrease when using WhatsApp (Salem, 2013).

2.8 Summary

The Theory of Transactional Distance was coined in 1970's however testing of the theory began in a systematic way in mid-1990s'. Some of the empirical studies attempted to test the original hypothesis of the theory, while some of them attempted to refine it. In empirical studies that were conducted on the subject, there is a diversification in the operational definitions of the constructs of the theory (Saba & Shearer, 1994; Bunker et. al., 1996; Chen, 2001a; Chen, 2001b; Bischoff et. al.,

1998; Chen & Willits, 1998). For operational definition of structure construct, Saba and Sharer (1994) took following factors into account; organization of pace, sequence, instant message, content instructional design, whereas Chen (2001a, 2001b) took following factors into account; learner support, extent of online asynchronous interaction. This can be considered as a limitation as a whole and it is essential for empirical studies to use consistent operational definitions when testing the same theory.

Although some criticize these empirical studies and claim that they only provide partial evidence and some of the studies lack construct validity (Gorsky & Caspi, 2005), several studies' results showed that dialog, structure and autonomy play a significant role as a predictor of learner's perception of transactional distance (Bischoff, et al, 1996; Saba & Shearer, 1994. Chen & Willits, 1998).

Literature review on IM in education have been studied in many aspects such as contribution in learning, collaboration, active participation. However, study indicates that IM is not widely implemented in DE and it had not been implemented with the context of TD.

CHAPTER 3

METHOD

3.1 Purpose of the study

This study examines the effects of periodic informative instant messages targeting to reduce the transactional distance and also seeks to increase their sense of community perceived by university students who takes classes via distance education. It also seeks to find out which combination of dialogue, structure, leaner autonomy and sense of community instant messages are more effective in reducing those undesired outcomes.

3.2 Research questions

These are the main questions of the study:

1. How does providing periodic informative instant messages to distance education students affect their perception of transactional distance?

    1a. Does giving periodic informative instant messages targeting autonomy and structure together increase students' perception of structure flexibility, content organization, control and learner autonomy?

    1b. Does giving periodic informative instant messages targeting structure, dialogue and sense of community together increase students' perception of structure flexibility, content organization and dialogue?

1c. Does giving periodic informative instant messages targeting dialogue, autonomy and sense of community together increase students' perception of dialogue, control and learner autonomy?

1d. Does giving periodic informative instant messages targeting structure, dialogue, autonomy and sense of community together increase students' perception of structure flexibility, content organization, dialogue, control and learner autonomy?

1e. Does increasing the types of instant messages targeting structure, dialogue, learner autonomy and sense of community is effective in reducing perceived transactional distance and in increasing sense of community?

2. How does providing periodic informative instant messages to distance education students affect their perception of sense of community?

3.3 Hypotheses

These are the hypotheses of the study:

1 Those who received periodic informative instant message will score significantly different in their posttest scores.

1a. Those who received periodic informative instant message targeting structure flexibility, content organization, control and learner autonomy will score significantly different in their posttest scores.

1b. Those who received periodic informative instant message targeting structure flexibility, content organization and dialogue will score significantly different in their posttest scores.

1c. Those who received periodic informative instant message targeting dialogue, control and learner autonomy will score significantly different in their posttest scores.

1d. Those who received periodic informative instant message targeting dialogue, structure flexibility, content organization, control and learner autonomy will score significantly different in their posttest scores on dialogue, structure, autonomy and sense of community as treatment.

1e. As the number of components that distance education students' take periodic informative instant message on increases, their perception of transactional distance will decrease.

2 Those who received periodic informative instant message targeting sense of community will score significantly different in their posttest scores than those who do not receive any instant message.

3.4 Essential terms and concepts

The terms and concepts that are essential for this study can be stated as follows:

3.4.1 Perceived transactional distance

Perceived transactional distance (PTD) refers to reported perception of transactional distance and by participating distance learners. The subscales may either indicate an increase or a decrease in their perception of transactional distance by their scores.

3.4.2 Structure

Structure refers to how strict or flexible a DE program is designed. That is to say, structure of the program is determined by the start dates and deadlines of exams and

home works as well as dates of classes and how they are going to be conducted. In addition, the accessibility of class materials through the semester is considered as part of structure.

3.4.3 Dialogue

Dialogue in this study is defined as the communication between students and teachers and students and students during the online class as well as the rest of the semester. This dialogue can be both synchronous and asynchronous that is to say students can have a dialogue in real time during the class or any other day using chat apps or they can have conversation asynchronously using the forum.

3.4.4 Autonomy

Autonomy refers to how much students feel that they can manipulate the program aspects by themselves to increase their achievement. They can either customize the course aspects as much as they can, such as scheduling or modify course materials and instruction as permitted by course design.

3.4.5 Sense of community

Sense of community in this study refers to the sense of belonging the students feel towards the group they are in. In addition, the belief the students hold; in their group, their words have value and thanks to the group they are in, their needs regarding the distance education class will be met.

3.4.6 Instant messaging

Instant messaging in this study refers to the periodic informative messages that has reminding/warning/advice characteristics which was sent to students in a periodic informative manner. Selective characteristics of these messages refers to the fact that for each treatment group, relevant set of IMs were sent. For example, for S+D+SoC group, message sets were structure, dialogue and sense of community. periodic characteristics refers to the fact that messages were sent to students in a periodic manner. These IMs were sent to the students for 14 weeks and for 3 times in a week. Informative characteristics of these IMs refer to the content of messages which are designed as reminders/warnings/advices.

3.5 Study design

In this study, effects of periodic informative instant messages on students' perception of transactional distance and sense of community were examined in an experimental pretest-posttest design. A survey was administered in the beginning and at the end of DE course to all groups.

Four types of periodic informative instant message, autonomy, structure, dialogue and sense of community with various orders are the independent subdimensions of this study. Dependent subdimensions of perceived transactional distance and sense of community. All students received course related standard instant message by e-mail, but experimental groups received additional instant message via a popular messaging application installed in their smartphones.

3.6 Setting

The study was conducted in a private university in Istanbul, Turkey. In this university, undergraduate students and the vocational school of higher education

students have to take several lessons per semester as online classes. For fall semester, these are; Foreign Language I, Turkish History and Information and Communication Technologies; for spring semester, these classes are Foreign Language II, Turkish Language. Information and Communication Technologies and Turkish Language lessons are taken in the first year, the rest of the lessons are taken in the second year.

These online classes are conducted via web conference at weeknights. Each lesson has one class per week that takes one full hour without a break except for Turkish language lesson which takes eighty minutes with a ten-minute break in the middle. Each semester has fourteen weeks thus fourteen online classes are conducted in semester. Rarely, due to technical failure or unavailability of the instructor, lessons are postponed but make-up classes are scheduled and students are informed.

In addition to online classes, students are registered in the distance education system of the university which is basically a web based LMS that has a few extra specialties. Course materials are usually uploaded in system at the beginning of the semester, though it is up to the instructor he or she may decide to upload the materials weekly. If students make requests about this issue the instructor can also change his/her decision. The instructor can also upload extra materials such as presentations that were used in the classes. In addition, for each lesson some interactive content is available.

Students take two midterms that are usually conducted fifth and tenth weeks of the semester. Each midterm has %4 contribution to their overall grade. These midterms are conducted. One could take a midterm once within a certain one-week period. These exams are usually consisted of twenty multiple choice questions to be answered in thirty minutes.

Students also has to submit a turn in assignment in the semester to the system. The instructor usually decides the topic and uploads it to the system and students usually have four-week window to submit their homework. This homework have %28 contribution to their grade.

Final exams for DE classes are administrated in person as regular exams at the end of the semester. Finals are usually consisted of twenty-five to forty multiple choice questions. Finals have %60 contribution to students' grade.

Students can contact the DE office personally or by email or phone. They can also contact their teachers by messaging in the LMS.

3.7 Participants and sampling

The population of this study included all of the vocational school of higher education students and undergraduate students. Convenience sampling was employed. Participants were selected from the first and second year students enrolled in a higher education vocational school students and undergrad students. These students belonged to different disciplines and different programs at the school. Participants were at the ages between 18 and 21.

Total number of distance learners that were contacted was 160 and 99 of them agreed to participate. 23. 20. 17 and 21 participants were in experimental groups respectively and control group had 18 participants. Groups were randomly formed with heterogeneous gender, undergraduate and vocational school of higher education student.

3.8 Data collection instruments

In this study, perception of transactional distance scale (Horzum, 2011) and sense of community scale in online distance education environments (Ilgaz & Aşgar, 2009)

was used. Perception of transactional distance scale was given as pretest to all participants, after the intervention, perception of transactional distance scale and sense of community scale in online distance education environments were given to all groups as posttest.

3.8.1 Perception of transactional distance scale

In this study, perception of transactional distance scale which was developed by Horzum (2011) was used to measure the students' perception of transactional distance. The scale (α = .92) was given to the participants before and after the intervention. It measures perception of transactional distance with 38 items. The scale is in Turkish. The scale has 5 subscales and they are autonomy, dialogue, content organization, structure flexibility and learner control. Autonomy subscale has 9 items (α = .82), dialogue subscale has 8 items (α = .91), content organization subscale has 8 items (α = .91), structure flexibility subscale has 7 items (α = .91) and learner control subscale has 6 items (α = .87). For responses, a 5-point Likert scale is used with the response choices being totally agree/ agree/ neutral/ disagree/ totally disagree (see Appendix A).

3.8.2 Sense of community scale in online distance education environments

In this study, Sense of community scale in online distance education environments which was developed by (Ilgaz & Aşgar, 2009) was used to measure the students' sense of community.

The scale (α = .80) was given to the participants after the intervention. It measures sense of community with 6 items. The scale is in Turkish. The scale has 2 subscales and they are actional and affective. Actional subscale has 2 items (α = .73)

and affective subscale has 4 items (α = .79). For responses, a 7-point Likert scale is used with the response choices range from (1) totally disagree to (7) totally agree (see Appendix B).

3.9 Materials

Custom informative instant messages were designed inspired by relevant literature were selectively sent to experimental groups. These messages were about four topics; three of which were based on TD subdimensions, and another one was based on sense of community. Chavis, Lee & Acosta (2008), Hanna, Glowacki-Dudka, & Conceição (2000), Horzum (2011), Henry (2015) and Ilgaz & Aşgar (2009) was the relevant literature which was made use of in preparation of messages.

"Structure" was one of the subdimensions and 13 instant messages was prepared regarding the structure (see Appendix C), "Learner Autonomy" was one of the subdimensions and 15 instant messages were prepared regarding learner autonomy (see Appendix D), "Sense of Community" was another one of the subdimension and 8 instant message items were prepared (see Appendix E) and finally "Dialogue" was the last of the subdimensions and 11 instant messages prepared regarding dialogue (see Appendix F). With these instant messages items four different combination of subdimensions were designed for each intervention group. For convenience, pretests were administered at the end of the fall semester and the treatment and posttest was administered during and at the end of following spring semester.

3.9.1 Experimental group 1: (S+LA)

Participant group 1 were only sent messages regarding subdimensions of structure (S) and learner autonomy (LA) thus S+LA. As in all groups, researcher introduced

himself and informed students about the rules and practice of the group. Participants were informed that they are allowed to ask any questions regarding the online course as well as the group and the study. Student's questions were answered in group chat if the topic was relevant to the group otherwise, researcher let the students know that he will answer the questions on personal chat. Students were also informed about the schedule of the messages that they are going to receive and how long this treatment would last.

Informative messages were scheduled to be sent to participants' smartphones at weeknights, mostly monday, wednesday and friday nights. One of 13 prepared messages of structure subdimension and one of 15 prepared messages of learner autonomy subdimension was mostly selected in a random fashion and sent to students. Especially dates around midterm and assignment deadlines, reminder type of messages about midterm and assignments were sent. These messages were scheduled to be sent in evenings and night times because it was expected that students would be in their spare time and engage in conversations. Messages were designed to be short, direct informative. One structure and one learner autonomy message were sent to students' smartphones three times a week for fourteen weeks. When all of the 13 messages of structure dimension or all 15 of learner autonomy messages was sent to students, researcher kept the iteration count and resend these messages until the end of fourteen weeks. Each subdimensions' message numbers and iteration counts are reported below (see Table 4).

Table 4. Message Frequencies for Experimental Group 1: S+LA

Sub	Msg No	Count	Sub	Msg No	Count
S	1	4	LA	1	4
S	2	4	LA	2	4
S	3	4	LA	3	3
S	4	3	LA	4	4
S	5	3	LA	5	3
S	6	4	LA	6	4
S	7	4	LA	7	4
S	8	4	LA	8	4
S	9	3	LA	9	3
S	10	3	LA	10	3
S	11	3	LA	11	3
S	12	3	LA	12	4
S	13	4	LA	13	4
-	-	-	LA	14	3
-	-	-	LA	15	4

According to Moore (1993), structure is directly proportional with TD. Meaning when structure is high, transactional distance students percieve in a DE program is also high and vice versa. Autonomy is inversely related with TD, meaning if a student has high autonomy, TD she perceives is low and vice versa. The rationale behind this intervention is that, to see which element of TD between structure and learner autonomy's perception can be affected.

3.9.2 Experimental group 2: (S+D+SoC)

Participant group 2 were only sent messages regarding subdimensions of structure (S), dialogue (D) and sense of community (SoC) thus S+D+SoC. As in all groups, researcher introduced himself and informed students about the rules and practice of the group. Participants were informed that they are allowed to ask any questions regarding the online course as well as the group and the study. Student's questions were answered in group chat if the topic was relevant to the group otherwise, researcher let the students know that he will answer the questions on personal chat.

Students were also informed about the schedule of the messages that they are going to receive and how long this treatment would last.

Informative messages were scheduled to be sent to participants' smartphones at weeknights, mostly monday, wednesday and friday nights. One of 13 prepared messages of structure subdimension, one of 11 prepared messages of dialogue subdimension or one of 8 prepared messages was mostly selected in a random fashion and sent to students. First night, a message from structure set and a message from dialogue set was sent to students. The following night, a message from dialogue set and a message from sense of community set was sent. At the third night of the week, a message from structure set and a message from sense of community set was sent to the students. This pattern of message sending was continued for fourteen weeks. Especially dates around midterm and assignment deadlines, reminder type of messages about midterm and assignments were sent. These messages were scheduled to be sent in evenings and night times because it was expected that students would be in their spare time and engage in conversations. Messages were designed to be short, direct informative. One structure and one learner autonomy message were sent to students' smartphones three times a week for fourteen weeks. When all of the 13 messages of structure dimension or all 15 of learner autonomy messages or all 8 of sense of community subdimension was sent to students, researcher kept the iteration count and resend these messages until the end of fourteen weeks. Each subdimensions' message numbers and iteration counts are reported below (see Table 5).

Table 5. Message Frequencies for Experimental Group 2: S+D+SoC

Sub	Msg No	Count	Sub	Msg No	Count	Sub	Msg No	Count
S	1.	2	D	1	2	SoC	1	3
S	2.	2	D	2	2	SoC	2	3
S	3	2	D	3	2	SoC	3	3
S	4	2	D	4	2	SoC	4	3
S	5	2	D	5	2	SoC	5	4
S	6	2	D	6	2	SoC	6	4
S	7	2	D	7	2	SoC	7	4
S	8	3	D	8	3	SoC	8	4
S	9	3	D	9	3	-	-	-
S	10	3	D	10	3	-	-	-
S	11	3	D	11	3	-	-	-
S	12	3	-	-	-	-	-	-
S	13	3	-	-	-	-	-	-

According to Moore (1993), structure is directly proportional with TD. Meaning when structure is high, transactional distance students percieve in a DE program is also high and vice versa. Dialogue is inversely related with TD (Saba & Shearer, 1994). Meaning if a student has high level of dialogue between teacher and other students, TD she perceives is low and vice versa. If a student has a sense of community about the learning group that she is in, she has lower tendency to drop out the program (Ilgaz & Aşgar, 2009). Having a sense of community may have an effect on lowering the perception of TD a student has. The rationale behind this intervention is that, to see which element of TD between structure and dialogue's perception can be affected and if having a sense of community has an effect on students' perception of TD.

3.9.3 Experimental group 3: (D+LA+SoC)

Participant group 3 were only sent messages regarding subdimensions of dialogue (D), learner autonomy (LA) and sense of community (SoC) thus D+LA+SoC. As in all groups, researcher introduced himself and informed students about the rules and practice of the group. Participants were informed that they are allowed to ask any

questions regarding the online course as well as the group and the study. Student's questions were answered in group chat if the topic was relevant to the group otherwise, researcher let the students know that he will answer the questions on personal chat. Students were also informed about the schedule of the messages that they are going to receive and how long this treatment would last.

Informative messages were scheduled to be sent to participants' smartphones at weeknights, mostly monday, wednesday and friday nights. One of 11 prepared messages of dialogue subdimension, one of 15 prepared messages of learner autonomy subdimension, and one of 8 prepared messages was mostly selected in a random fashion and sent to students. First night, a message from dialogue set and a message from learner autonomy set was sent to students. The following night, a message from dialogue set and a message from sense of community set was sent. At the third night of the week, a message from learner autonomy set and a message from sense of community set was sent to the students. This pattern of message sending was continued for fourteen weeks. Especially dates around midterm and assignment deadlines, reminder type of messages about midterm and assignments were sent. These messages were scheduled to be sent in evenings and night times because it was expected that students would be in their spare time and engage in conversations. Messages were designed to be short, direct informative. One structure and one learner autonomy message were sent to students' smartphones three times a week for fourteen weeks. When all of the 11 messages of dialogue dimension or all 15 of learner autonomy messages or all 8 of sense of community subdimension was sent to students, researcher kept the iteration count and resend these messages until the end of fourteen weeks. Each subdimensions' message numbers and iteration counts are reported below (see Table 6).

Table 6. Message Frequencies for Experimental Group 3: D+LA+SoC

Sub	Msg No	Count	Sub	Msg No	Count	Sub	Msg No	Count
D	1.	2	LA	1	2	SoC	1	3
D	2.	2	LA	2	2	SoC	2	3
D	3.	2	LA	3	2	SoC	3	3
D	4	2	LA	4	2	SoC	4	3
D	5	2	LA	5	2	SoC	5	4
D	6	2	LA	6	2	SoC	6	4
D	7	2	LA	7	2	SoC	7	4
D	8	3	LA	8	2	SoC	8	4
D	9	3	LA	9	2	-	-	-
D	10	3	LA	10	2	-	-	-
D	11	3	LA	11	2	-	-	-
-	-	-	LA	12	2	-	-	-
-	-	-	LA	13	1	-	-	-
-	-	-	LA	14	1	-	-	-
-	-	-	LA	15	1	-	-	-

According to Moore (1993), autonomy and dialogue is inversely related with TD, meaning if a student has high autonomy and high dialogue with her peers and teacher, TD she perceives is low and vice versa. If a student has a sense of community about the learning group that she is in, she has lower tendency to drop out the program (Ilgaz & Aşgar, 2009). Having a sense of community may have an effect on lowering the perception of TD a student has. The rationale behind this intervention is that, to see which element of TD between structure and dialogue's perception can be affected and if having a sense of community has an effect on students' perception of TD.

3.9.4 Experimental group 4: (S+D+LA+SoC)

Participant group 4 were sent messages regarding subdimensions of structure (S), dialogue (D), learner autonomy (LA) and sense of community (SoC) thus S+D+LA+SoC. As in all groups, researcher introduced himself and informed students about the rules and practice of the group. Participants were informed that they are allowed to ask any questions regarding the online course as well as the

group and the study. Student's questions were answered in group chat if the topic was relevant to the group otherwise, researcher let the students know that he will answer the questions on personal chat. Students were also informed about the schedule of the messages that they are going to receive and how long this treatment would last.

Informative messages were scheduled to be sent to participants' smartphones at weeknights, mostly monday, wednesday and friday nights. One of 13 prepared messages of structure subdimension, one of 11 prepared messages of dialogue subdimension, one of 15 prepared messages of learner autonomy subdimension, and one of 8 prepared messages was mostly selected in a random fashion and sent to students. First night, a message from structure set and a message from dialogue set was sent to students. The following night, a message from learner autonomy set and a message from sense of community set was sent. This pattern of message sending was continued for fourteen weeks. Especially dates around midterm and assignment deadlines, reminder type of messages about midterm and assignments were sent. These messages were scheduled to be sent in evenings and night times because it was expected that students would be in their spare time and engage in conversations. Messages were designed to be short, direct informative. One structure and one learner autonomy message were sent to students' smartphones three times a week for fourteen weeks. When all 13 messages of the structure subdimension or all of the 11 messages of dialogue dimension or all 15 of learner autonomy messages or all 8 of sense of community subdimension was sent to students, researcher kept the iteration count and resend these messages until the end of fourteen weeks. Each subdimensions' message numbers and iteration counts are reported below (see Table 7).

Table 7. Message Frequencies for Experimental Group 4: S+D+LA+SoC

Sub	Msg No	Itr	Sub	Msg No	Itr	Sub	Msg No	Itr	Sub	Msg No	Itr
S	1.	2	D	1.	2	LA	1	2	SoC	1	2
S	2.	2	D	2.	2	LA	2	2	SoC	2	2
S	3.	2	D	3.	2	LA	3	2	SoC	3	2
S	4.	2	D	4.	2	LA	4	2	SoC	4	2
S	5.	2	D	5.	2	LA	5	2	SoC	5	2
S	6.	2	D	6.	2	LA	6	2	SoC	6	2
S	7.	2	D	7.	2	LA	7	2	SoC	7	2
S	8.	2	D	8.	2	LA	8	2	SoC	8	2
S	9.	2	D	9.	1	LA	9	1	SoC	-	-
S	10.	1	D	10.	1	LA	10	1	SoC	-	-
S	11.	1	D	11.	1	LA	11	1	SoC	-	-
S	12.	1	-	-	-	LA	12	1	SoC	-	-
S	13.	1	-	-	-	LA	13	1	SoC	-	-
S	-	-	-	-	-	LA	14	1	SoC	-	-
S	-	-	-	-	-	LA	15	1	SoC	-	-

According to Moore (1993), structure is directly proportional with TD. Meaning when structure is high, transactional distance students percieve in a DE program is also high and vice versa. Autonomy and dialogue is inversely related with TD, meaning if a student has high autonomy and high dialogue with her peers and teacher, TD she perceives is low and vice versa. If a student has a sense of community about the learning group that she is in, she has lower tendency to drop out the program (Ilgaz & Aşgar, 2009). Having a sense of community may have an effect on lowering the perception of TD a student has. The rationale behind this intervention is that, to see which element of TD between structure and dialogue's perception can be affected and if having a sense of community has an effect on students' perception of TD.

3.10 Data collection procedures

Perception of transactional distance scale was administrated to the students before their final exam at the end of the fall semester. Most of the students took the survey in paper and pencil style and completed it within twenty minutes. Some of the

participants had to complete the survey in electronic form therefore the survey was transferred in Google Forms and link was sent to the participants' email adresses via using distance education departments LMS system. In the electronic form of the survey, the info about the survey was written at the beginning of the scale. Participants had two weeks to complete their survey.

At the end of the spring semester, perception of transactional distance scale and sense of community scale in online distance education environments surveys were sent to the students' email via using distance education departments LMS system. In the electronic form of the survey, the info about the survey was written at the beginning of the scale. Participants had two weeks to complete their survey.

3.11 Data analysis

3.11.1 Perception of transactional distance survey

Survey responses, a 5-point Likert scale was used with the following response: (5) strongly agree / (4) agree/ (3) undecided/ (2) disagree/ (1) strongly disagree. For each subscale, the scores were added up and reverse items were also added to calculation accordingly.

3.11.2 The sense of community survey in online distance education environments

For responses, a 7-point Likert scale was used with the responses ranged from (7) totally agree and (1) totally disagree. For calculation, each items' scores were added up.

3.11.3 Pretest and posttest

After calculating the scores for subscales in transactional distance scale, a normality test was conducted to check the distribution of pretest and posttest scores of each group. If the data is normally distributed, paired samples t-test was used to determine the effects of periodic informative instant messages. If the data is not normally distributed, then Wilcoxon signed ranks test was used.

For sense of community scale in online distance education environments, there was only posttest scores. After the calculation, a normality test was conducted to check the distribution of posttest scores of each group. The data was not normally distributed therefore Kruskal-Wallis H Test is used to determine whether there is a statistically significant difference between means of the groups scores. As a post-hoc test, Dunn's Test was conducted to determine which group pairs have statistically significant difference.

CHAPTER 4

RESULTS

This section reports on the descriptive statistics for each intervention type, the normality of the data and the results of pretests and posttests. It starts by laying out the descriptive analysis of the pretest and posttest results for dialogue, structure flexibility, content organization, learner autonomy and control subdimensions, and posttest scores of sense of community subdimension.

The effect of periodic informative instant messages on dialogue, structure flexibility, content organization, learner autonomy and control subdimensions were analyzed by using either paired samples t-test or Wilcoxon signed ranks test. This choice depended on whether the data had normal distribution or not. Therefore, firstly, each data set was checked for normality by performing a Shapiro-Wilk test, then depending on the result, appropriate analysis method is used.

The effect of periodic informative instant messages on sense of community subdimension was analyzed by using Kruskal-Wallis H Test and for post hoc Dunn's Test was used. This was because the data did not have a normal distribution. Normality of these data sets were checked by a Shapiro-Wilk test.

The values for asymmetry and kurtosis between -2 and +2 are acceptable to prove normal distribution (Trochim & Donnelly, 2006; Field, 2000 & 2009; Gravetter & Wallnau, 2014). The skewness and kurtosis values were measured and it fell between the desired range (see Table 8). For each treatment group, descriptive statistics, normality tests and appropriate analysis method was conducted.

Table 8. Descriptive Statistics of the Dataset

Subdimension	N	Skewness	Kurtosis	Mean	SD
Dialogue Pretest	99	-.150	-.310	26.343	8.446
Dialogue Posttest	99	-.678	-.451	29.121	8.713
Structure Flex. Pretest	99	-.314	-.746	18.758	6.059
Structure Flex. Posttest	99	-.314	-.746	18.758	6.059
Content Org. Pretest	99	-.097	-.396	20.646	7.067
Content Org. Posttest	99	-.391	-.481	21.111	6.606
Control Pretest	99	-.269	-.394	20.828	6.210
Control Posttest	99	-.536	-.510	22.000	6.585
Learner Autonomy Pretest	99	-.334	-.347	24.343	7.504
Learner Autonomy Posttest	99	-.039	-.770	23.778	7.173
Sense of Com. Posttest	99	-.967	.649	22.404	6.146

For descriptive statistics of S+LA Group check Table 9. As for the interpretation of the Shapiro-Wilk Test: if p value is greater than 0.05, the data is normally distributed and If it is below 0.05 it is not. Since it is a pretest and posttest design, posttest pretest difference need to have normal distribution to use Paired Samples t test. As seen on the table 10; all of subdimensions data sets have normal distribution. Therefore, for the analysis of all subdimensions Paired Samples t test is used.

Table 9. Descriptive Statistics of S+LA Group

	Pretest			Posttest		
Subdimension	n	Mean	SD	n	Mean	SD
Dialogue	23	30.435	8.596	23	31.435	8.627
Structure Flexibility	23	21.348	6.364	23	19.609	6.080
Content Organization	23	24.043	7.239	23	21.957	7.437
Control	23	22.739	6.461	23	23.565	7.907
Learner Autonomy	23	26.739	7.593	23	23.435	7.976

Table 10. Shapiro-Wilk Tests of Normality of S+LA Group

	Posttest – Pretest Difference		
Subdimension	W	n	p
Dialogue	.968	23	.638
Structure Flexibility	.949	23	.283
Content Organization	.970	23	.683
Control	.938	23	.167
Learner Autonomy	.966	23	.588

There was not a significant difference in the scores of students of Group S+LA for pretest perception of dialogue (M=30.435, SD=8.596) and posttest perception of dialogue (M=31.435, SD=8.628) conditions; t (22) =-0.608, p =.549 (see Table 11).

There was not a significant difference in the scores of students of Group S+LA for pretest perception of structure flexibility (M=21.348, SD=6.365) and posttest perception of structure flexibility (M=19.609, SD=6.081) conditions; t (22) =1.506, p =.146 (see Table 11).

There was not a significant difference in the scores of students of Group S+LA for pretest perception content organization (M=26.043, SD=7.239) and posttest perception of content organization (M=21.957, SD=7.437) conditions; t (22) =1.688, p =.106 (see Table 11).

There was not a significant difference in the scores of students of Group S+LA for pretest perception of control (M=22.739, SD=6.461) and posttest perception of control (M=23.565, SD=7.908) conditions; t (22) =-0.717, p =.481 (see Table 11).

There was a significant difference in the scores of students of Group S+LA for pretest perception of learner autonomy (M=26.74, SD=7.59) and posttest perception of learner autonomy (M=23.44, SD=7.98) conditions; t (22) =2.265, p =.034 (see Table 11).

Table 11. Paired Samples t test of S+LA Group

Subdimension	n	Mean Difference	SD	t	p
Dialogue	23	-1.000	7.885	-0.608	0.549
Structure Flexibility	23	1.739	5.537	1.506	0.146
Content Organization	23	2.087	5.930	1.688	0.106
Control	23	-0.826	5.524	-0.717	0.481
Learner Autonomy	23	3.304	6.993	2.265	0.034

For descriptive statistics of S+D+SoC Group check Table 12. As for the interpretation of the Shapiro-Wilk Test (see Table 13); if p value is greater than 0.05, the data is normally distributed and If it is below 0.05 it is not. Since it is a pretest and posttest design, posttest pretest difference need to have normal distribution to use Paired Samples t test. As seen on the table; all of subdimensions data sets have normal distribution. Therefore, for the analysis of all subdimensions Paired Samples t test is used.

Table 12. Descriptive Statistics of S+D+SoC Group

	Pretest			Posttest		
Subdimension	n	Mean	SD	n	Mean	SD
Dialogue	20	24.850	8.222	20	31.500	7.877
Structure Flexibility	20	17.200	5.287	20	19.700	5.037
Content Organization	20	18.650	6.458	20	22.850	5.797
Control	20	19.950	5.114	20	23.300	7.101
Learner Autonomy	20	23.050	5.880	20	24.800	8.237

Table 13. Shapiro-Wilk Tests of Normality of S+D+SoC Group

	Posttest – Pretest Difference		
Subdimension	W	n	p
Dialogue	.939	20	.229
Structure Flexibility	.924	20	.117
Content Organization	.925	20	.122
Control	.950	20	.363
Learner Autonomy	.946	20	.314

There was a significant difference in the scores of students of S+D+SoC group for pretest perception of dialogue (M=24.850, SD=8.222) and posttest perception of dialogue (M=31.500, SD=7.8777) conditions; t(19)=-3.570, p =0.002 (see Table 14).

There was a significant difference in the scores of students of S+D+SoC group for pretest perception of structure flexibility (M=17.200, SD=5.287) and posttest perception of structure flexibility (M=19.700, SD=5.037) conditions; t(19)=-2.084, p =0.05 (see Table 14).

There was a significant difference in the scores of students of S+D+SoC group for pretest perception of content organization (M=18.650, SD=6.458) and posttest perception of content organization (M=22.850, SD=5.797) conditions; t(19)=-2.497, p =0.02 (see Table 14).

There was a significant difference in the scores of students of S+D+SoC group for pretest perception of control (M=19.950, SD=5.114) and posttest perception of control (M=23.300, SD=7.101) conditions; t(19)=-2.040, p =0.05 (see Table 14).

There was not a significant difference in the scores of students of S+D+SoC group for pretest perception of learner autonomy (M=23.050, SD=5.880) and posttest perception of structure learner autonomy (M=24.800, SD=8.237) conditions; t(19)=-0.867, p =0.39 (see Table 14).

Table 14. Paired Samples t test of S+D+SoC Group

Subdimension	n	Mean Difference	SD	t	p
Dialogue	20	-6.650	8.330	-3.570	0.002
Structure Flexibility	20	-2.500	5.365	-2.084	0.050
Content Organization	20	-4.200	7.522	-2.497	0.022
Control	20	-3.350	7.343	-2.040	0.050
Learner Autonomy	20	-1.750	5.025	-0.867	0.391

For descriptive statistics of D+LA+SoC Group check Table 15. As for the interpretation of the Shapiro-Wilk Test (see Table 16); if p value is greater than 0.05, the data is normally distributed and if it is below 0.05 it is not. Since it is a pretest and posttest design, posttest pretest difference need to have normal distribution to use Paired Samples t test. As seen on the table; all of subdimensions data sets have normal distribution. Therefore, for the analysis of all subdimensions Paired Samples t test is used.

Table 15. Descriptive Statistics of D+LA+SoC Group

	Pretest			Posttest		
Subdimension	n	Mean	SD	n	Mean	SD
Dialogue	17	26.294	8.830	17	28.941	8.019
Structure Flexibility	17	20.824	4.759	17	17.824	5.939
Content Organization	17	22.235	6.290	17	20.353	6.800
Control	17	20.471	5.810	17	21.471	6.865
Learner Autonomy	17	24.294	9.081	17	23.824	8.217

Table 16. Shapiro-Wilk Tests of Normality of D+LA+SoC Group

	Posttest – Pretest Difference		
Subdimension	W	n	p
Dialogue	.912	17	.109
Structure Flexibility	.970	17	.819
Content Organization	.927	17	.193
Control	.929	17	.206
Learner Autonomy	.972	17	.857

There was not a significant difference in the scores of students of D+LA+SoC group for pretest perception of dialogue (M=26.294, SD=8.830) and posttest perception of dialogue (M=28.941, SD=8.019) conditions; t(16)= -1.073, p =0.299 (see Table 17).

There was not a significant difference in the scores of students of D+LA+SoC group for pretest perception of structure flexibility (M=20.824, SD=4.759) and posttest perception of structure flexibility (M=17.824, SD=5.939) conditions; t(16)=1.802, p =0.090 (see Table 17).

There was not a significant difference in the scores of students of D+LA+SoC group for pretest perception of content organization (M=22.235, SD=6.290) and posttest perception of content organization (M=20.353, SD=6.800) conditions; t(16)=-0.916, p =0.373 (see Table 17).

There was not a significant difference in the scores of students of D+LA+SoC group for pretest perception of control (M=20.471, SD=5.810) and posttest perception of control (M=21.471, SD=6.865) conditions; t(16)=-0.505, p =0.621 (see Table 17).

There was not a significant difference in the scores of students of D+LA+SoC group for pretest perception of learner autonomy (M=24.294, SD=9.081) and posttest perception of structure learner autonomy (M=24.800, SD=8.217) conditions; t(16)=-0.165, p =0.871 (see Table 17).

Table 17. Paired Samples t test of D+LA+SoC Group

Subdimension	n	Mean Difference	SD	t	p
Dialogue	17	-2.647	10.167	-1.073	0.299
Structure Flexibility	17	3.000	6.864	1.802	0.090
Content Organization	17	1.882	8.477	0.916	0.373
Control	17	-1.000	8.170	-0.505	0.621
Learner Autonomy	17	0.470	11.763	0.165	0.871

For descriptive statistics of S+D+LA+SoC Group check Table 18. As for the interpretation of the Shapiro-Wilk Test (see Table 19); if p value is greater than 0.05, the data is normally distributed and If it is below 0.05 it is not. Since it is a pretest and posttest design, posttest pretest difference needs to have normal distribution Paired Samples t test. As seen on the table; all of subdimensions data sets have normal distribution except for dialogue subdimension. Therefore, for the analysis of perception of structure flexibility, content organization, control and learner autonomy subdimensions Paired Samples t test is used. For the analysis of perception of dialogue subdimension (see Table 21), Wilcoxon Signed Ranks Test is used because that subdimension's data do not have normal distribution (see Table 20).

Table 18. Descriptive Statistics of S+D+LA+SoC Group

	Pretest			Posttest		
Subdimension	n	Mean	SD	n	Mean	SD
Dialogue	21	25.476	7.672	21	29.905	6.212
Structure Flexibility	21	17.143	6.287	21	17.905	5.328
Content Organization	21	18.762	7.182	21	20.476	4.905
Control	21	21.000	6.892	21	21.667	5.170
Learner Autonomy	21	24.762	7.300	21	22.952	5.200

Table 19. Shapiro-Wilk Tests of Normality of S+D+LA+SoC Group Posttest – Pretest Difference

Subdimension	W	n	p
Dialogue	.865	21	.008
Structure Flexibility	.948	21	.313
Content Organization	.942	21	.243
Control	.977	21	.884
Learner Autonomy	.961	21	.527

A Wilcoxon signed-rank test (see Table 20) showed that a 14 week, thrice weekly periodic informative instant message treatment course did indeed elicit a statistically significant change in dialogue perception in distance education students of Group S+D+LA+SoC ($Z = -2.684$, $p = 0.007$).

Table 20. Wilcoxon Signed Ranks Test of S+D+LA+SoC Group's Perception of Dialogue Subdimension

Subdimension	n	Z	p
Dialogue	21	-2.684	0.007

There was not a significant difference in the scores of students of S+D+LA+SoC group for pretest perception of structure flexibility ($M=17.143$, $SD=6.287$) and posttest perception of structure flexibility ($M=17.905$, $SD=5.328$) conditions; $t(20)=-0.607$, $p =0.551$ (see Table 21).

There was not a significant difference in the scores of students of S+D+LA+SoC group for pretest perception of content organization ($M=18.762$, $SD=7.182$) and posttest perception of content organization ($M=20.476$, $SD=4.905$) conditions; $t(20)=-1.039$, $p =0.311$ (see Table 21).

There was not a significant difference in the scores of students of S+D+LA+SoC group for pretest perception of control ($M=21.000$, $SD=6.892$) and posttest perception of control ($M=21.667$, $SD=5.170$) conditions; $t(20)=-0.423$, $p=0.677$ (see Table 21).

There was not a significant difference in the scores of students of S+D+LA+SoC group for pretest perception of learner autonomy (M=24.762, SD=7.300) and posttest perception of structure learner autonomy (M=22.952, SD=5.200) conditions; t(20)=1.074, p =0.295 (see Table 21).

Table 21. Paired Samples t test of S+D+LA+SoC Group's Structure Flexibility, Content Organization, Control, Learner Autonomy Subdimensions

Subdimension	n	Mean Difference	SD	t	p
Structure Flexibility	21	-0.761	5.752	-0.607	0.551
Content Organization	21	-1.714	7.557	-1.039	0.311
Control	21	-0.666	8.227	-0.423	0.677
Learner Autonomy	21	1.809	7.717	1.074	0.295

For descriptive statistics of Control Group check Table 22. As for the interpretation of the Shapiro-Wilk Test (see Table 23); if p value is greater than 0.05, the data is normally distributed and If it is below 0.05 it is not. Since it is a pretest and posttest design, posttest pretest difference need to have normal distribution to conduct Paired Samples T Test. As seen on the table; all of subdimensions data sets have normal distribution except for perception of content organization subdimension. Therefore, For the analysis of perception of content organization subdimension, since the data is not normally distributed, Wilcoxon Signed Ranks Test is used (see Table 24). For the analysis of rest of the subdimensions Paired Samples t test is used (see Table 25).

Table 22. Descriptive Statistics of Control Group

	Pretest			Posttest		
	n	Mean	SD	n	Mean	SD
Dialogue	18	23.833	8.038	18	22.778	10.429
Structure Flexibility	18	17.111	6.153	18	17.556	7.445
Content Organization	18	19.222	6.795	18	19.556	7.905
Control	18	19.500	6.599	18	19.444	4.925
Learner Autonomy	18	22.278	7.521	18	24.000	6.389

Table 23. Shapiro-Wilk Tests of Normality of Control Group

	Posttest – Pretest Difference		
	W	n	p
Dialogue	.906	21	.073
Structure Flexibility	.939	21	.275
Content Organization	.848	21	.008
Control	.955	21	.517
Learner Autonomy	.958	21	.570

A Wilcoxon signed-rank test showed that a 14 week, thrice weekly periodic informative instant message treatment course did not elicit a statistically significant change in content organization perception in distance education students of Control Group (Z = -0.398, p = 0.690) (see Table 24).

Table 24. Wilcoxon Signed Ranks Test of Control Group's Perception of Content Organization Subdimension

Subdimension	n	Z	p
Content Organization	18	-0.398	0.690

There was not a significant difference in the scores of students of control group for pretest perception of dialogue (M=23.833, SD=8.038) and posttest perception of dialogue (M=22.778, SD=10.429) conditions; t(17)= 0.454, p =0.655 (see Table 25).

There was not a significant difference in the scores of students of control group for pretest perception of structure flexibility (M=17.111, SD=6.153) and posttest perception of structure flexibility (M=17.556, SD=7.445) conditions; t(17)=-0.287, p =0.777 (see Table 25).

There was not a significant difference in the scores of students of control group for pretest perception of control (M=19.500, SD=6.599) and posttest perception of control (M=19.444, SD=4.925) conditions; t(17)=0.440, p =0.965 (see Table 25).

There was not a significant difference in the scores of students of control group for pretest perception of learner autonomy (M=22.278, SD=7.521) and posttest perception of structure learner autonomy (M=24.000, SD=6.389) conditions; t(17)=-1.241, p =0.232 (see Table 25).

Table 25. Paired Samples t test of Control Group's Perception of Dialogue, Structure Flexibility, Control and Learner Autonomy Subdimensions

Subdimension	n	Mean Difference	SD	t	p
Dialogue	18	1.055	9.854	0.454	0.655
Structure Flexibility	18	-0.444	6.563	-0.287	0.777
Control	18	0.055	5.307	0.440	0.965
Learner Autonomy	18	-1.722	5.889	-1.241	0.232

Table 26 summarizes the results for dialogue, structure and autonomy subdimensions pretest posttest results. If there is a statistically significant difference between pretest and posttest results of a subdimension for a treatment group, it is marked with "+" and if there is not a significant difference it is marked with "-". For analysis method; if Wilcoxon Signed Ranks test is conducted, relevant cell in the table is marked with "*" paired, and if paired samples t-test is conducted, the cell in the relevant table is not marked.

Table 26. Summary Table for Dialogue, Structure and Autonomy Subdimensions

Treatment	Dialgue	Structure		Autonomy	
		Structure Flexibility	Content Organization	Control	Learner Autonomy
S+LA	* -	* -	-	* -	+
S+D+SoC	+	+	+	+	-
D+LA+SoC	-	-	-	-	-
S+D+LA+SoC	* +	-	-	-	-
Control	-	-	-	-	-

*	Wilcoxon Signed Ranks Test	+	Significant Difference
	Paired Samples t Test	-	No Significant Difference

A Kruskal-Wallis H test (see Table 27) showed that there was a statistically significant difference in structure flexibility scores across all groups for 14 weeks, thrice weekly periodic informative instant message treatments, $\chi 2(4) = 9.651$, $p = 0.047$.

A Kruskal-Wallis H test (see Table 27) showed that there was a statistically significant difference in content organization scores across all groups for 14 weeks, thrice weekly periodic informative instant message treatments, $\chi 2(4) = 9.828$, $p = 0.043$, Kruskal-Wallis H test on other subdimensions did not yield a statistically significant difference.

Table 27. Kruskal-Wallis H Tests for TD Subdimensions Gains Across All Groups

Treatment	n	H	p
Dialogue	99	5.784	0.216
Structure Flexibility	99	9.651	0.047
Content Organization	99	9.828	0.043
Control	99	3.591	0.464
Learner Autonomy	99	3.009	0.566

Furthermore, a post hoc test is done for this Kruskal-Wallis H test, which is called Dunn's test (see Table 28). Dunn's test results yielded that there were only significant differences in structure flexibility perception between Group D+LA+SoC and Group S+D+SoC ($Z= 26.715$, $p=0.05$), Group D+LA+SoC and Group S+D+SoC ($Z= 23.857$, $p=0.012$), Other than that, there were no significant differences between the groups.

Table 28. Dunn's Tests for TD Subdimensions Gains Across All Groups Results

Group Pairs	Subdimension	Z	p
D+LA+SoC - S+D+SoC	Structure Flexibility	26.715	0.050
D+LA+SoC - S+D+SoC	Content Organization	23.857	0.012

For descriptive statistics of sense of community subdimensions results check Table 23. As for the interpretation of the Shapiro-Wilk Test (see Table 30); if p value is greater than 0.05, the data is normally distributed and If it is below 0.05 it is not. In this case, all data need to have normal distribution to perform a One-Way ANOVA test. As seen on the table; only Group S+D+SoC, Group D+LA+SOC and Control Group's subdimensions data sets have normal distribution. Therefore, for the analysis of all subdimensions, the nonparametric equivalent of One-Way ANOVA, the Kruskal-Wallis H test is used (see Table 31).

Table 29. Descriptive Statistics of Sense of Community Subdimensions Posttest Results

Treatment	n	Mean	SD
Group S+LA	23	23.913	5.177
Group S+D+SoC	20	24.750	4.216
Group D+LA+SoC	17	22.235	5.782
Group S+D+LA+SoC	21	23.190	5.144
Control Group	18	17.111	7.783

Table 30. Shapiro-Wilk Tests of Normality of Sense of Community Subdimensions Posttest Results

Treatment	W	n	p
Group S+LA	.842	23	.002
Group S+D+SoC	.871	20	.012
Group D+LA+SoC	.953	17	.502
Group S+D+LA+SoC	.838	21	.003
Control Group	.945	18	.358

A Kruskal-Wallis H test (see Table 31) showed that there was a statistically significant difference in sense of community scores between different 14 weeks, thrice weekly periodic informative instant message treatments, $\chi 2(4) = 12.935$, $p = 0.012$. with a mean rank sense of community score of 56.96 for Group S+LA, 59.23 for Group S+D+SoC, 47.38 for Group D+LA+SoC, 53.14 for Group S+D+LA+SoC and 29.67 for Control Group.

Table 31. Kruskal-Wallis H Tests for Sense of Community Subdimensions Posttest Results

Treatment	n	H
Group S+LA	23	56.96
Group S+D+SoC	20	59.23
Group D+LA+SoC	17	47.38
Group S+D+LA+SoC	21	53.14
Control Group	18	29.67

Furthermore, a post hoc test is done for this Kruskal-Wallis H test, which is called Dunn's test (see Table 32). Dunn's test results yielded that there were only significant differences in sense of community perception between Control Group and Group S+D+LA+SoC (Z= 23.476. p=0.011), Control group and Group S+LA (Z= 27.290, p=0.002), Control group and Group S+D+SoC (Z= 29.558, p=0.001). Other than that, there were no significant differences between the groups.

Table 32. Dunn's Tests for Sense of Community Subdimensions Posttest Results

Group Pairs	Z	p
Control Group - Group D+LA+SoC	17.716	.067
Control Group - Group S+D+LA+SoC	23.476	.011
Control Group - Group S+LA	27.290	.002
Control Group - Group S+D+SoC	29.558	.001
Group D+LA+SoC - Group S+D+LA+SoC	-5.761	.537
Group D+LA+SoC - Group S+LA	9.574	.295
Group D+LA+SoC - Group S+D+SoC	11.843	.209
Group S+D+LA+SoC - Group S+LA	3.814	.659
Group S+D+LA+SoC - Group S+D+SoC	6.082	.496
Group S+LA - Group S+D+SoC	-2.268	.795

CHAPTER 5

DISCUSSION

Moore (1993) and Moore & Kearsley (2012) states that the element of learner autonomy and distance learners' perception of transactional distance have an inverse relationship. Furthermore, the elements which are course structure and learner autonomy have an inverse relationship in terms of their effect on distance learners' perception of transactional distance (Moore, 1993; Horzum, 2013). This study examined the effects of instant messages on the students' perception of structure and learner autonomy subdimensions. The results indicate that when distance learners are sent instant messages related to structure and learner autonomy subdimensions, their scores of percieved learner autonomy have decreased. Even though students' percieved structure scores did not increase, instant messages about structure may have affected their perception scores of learners' autonomy indirectly by a decrease in that subdimension. Therefore, the results are in line with literature. However, it is recommended that instant messages regarding structure and learner autonomy subdimensions should be given separately to the two treatment groups in a new study. This could be helpful in analyzing effects of instant messagees separately and in that way, results be compared to other combinations of subdimensions. Consequently, relationship between subdimensions can be determined in a more precise manner.

Distant learners report an increase in their perception of dialogue when social media is used as a tool to facilitate conversations regarding their course (Bare, 2013; Smit, 2012; Scornavacca, Huff, & Marshall, 2009. Wang, Woo, & Quek, 2012). This study examined the effects of instant messages on the students' perception of

structure, dialogue and sense of community subdimensions. The results indicate that when distance learners are sent instant messages related to structure, dialogue and sense of community subdimensions instant messages together, their percieved scores of dialogue, structure, autonomy and sense of community are increased. Percieved dialogue scores increase corroborates with past research (Bare, 2013; Smit, 2012; Scornavacca, Huff, & Marshall, 2009. Wang, Woo, & Quek, 2012). Doering, Lewis, Veletsianos, & Nichols-Besel (2008) students report an increase in their sense of community when they use instant messages for communicating with their teachers and peers regarding their education. Increase in participants' perception of control scores, even though they did not receive any instant messages regarding this subdimension, is unexpected. Moore (1993) and Horzum (2013) states that there is an inverse relationship between autonomy has an inverse relationship with structure in terms of their effect on transactional distance. A reasonable expectation would be students' percieved autonomy scores should not have differed due to these instant messages. This could not be due to their percieved autonomy socres decrease because same conditions were valid for when students received instant messages of structure and learner autonomy dimension. However, increase in students' perception of dialogue and sense of community scores could have affected their perception of control scores indirectly. Increase in students' perception of sense of community scores also coheres with literature (Doering, Lewis, Veletsianos, & Nichols-Besel, 2008; Wang, Woo, & Quek, 2012). Increase in students' percieved dialogue, autonomy and sense of community scores together can indicate a relationsip between perception of transactional and sense of community.

The study examined the effects of instant messages on the students' perception of dialogue, autonomy and sense of community subdimensions instant

messages are studied. The results indicate that when distance learners are sent instant messages related to dialogue, autonomy and sense of community subdimensions together, there was no effect to be observed on distance students' perception scores. These results do not fall in line with the literature either on sense of community (Doering, Lewis, Veletsianos, & Nichols-Besel, 2008; Wang, Woo, & Quek, 2012) or dialogue subdimensions (Bare, 2013; Smit, 2012; Scornavacca, Huff, & Marshall, 2009. Wang, Woo, & Quek, 2012). It was expected that perceived dialogue and sense of community scores of students would increase due to a new communication medium was presented to distance learners (Calvo, Arbiol & Iglesias, 2014) and they participated in a group that share the same goals (McMillan and Chavis, 1986; Rovai, 2001). There may have been an effect of an exogenous variable for this treatment group. Dialogue, autonomy and sense of community subdimensions instant messages should be sent separately and subset combinations of these subdimensions also need to be examined for more detailed analysis in further studies.

Bare (2013), Smit (2012), Scornavacca, Huff and Marshall (2009) and Wang, Woo and Quek (2012) concludes that when students use social media and instant messages for communication in educational purposes, their perception of dialogue is affected in a positive manner. Additionally, Doering, Lewis, Veletsianos, & Nichols-Besel, (2008), Wang, Woo and Quek (2012) states it also helps students form a sense of community. The study examined the effects of instant messages on the students' perception of structure, dialogue, autonomy and sense of community subdimensions. The results indicate that when distance learners are sent instant messages related to structure, dialogue, autonomy and sense of community subdimensions together, their scores of percieved dialogue and sense of community has increased. These results also corroborate with relevant literature. Due to the effects of these instant messages,

an increase in distance learners' percieved dialogue, autonomy and sense of community scores have been observed. This increase in the scores provides another rationale for a relationship between distance learners' perception of transactional distance and their sense of community.

Since the structure of the program remain unchanged during the two semesters in the study, increase in participants' perception of structure means that their information regarding the structure that has increased due to treatments in this study. Therefore, having a low percieved structure score in this study is different from having a perception about an inflexible structure. This study's conditions resemble more of what Horzum (2013) classifies as "no structure" case, which is not being able to percieve the structure of the course. This situation is classified as a worse case than having a perception of a programs rigid structure in terms of transactional distance (Horzum, 2013). Thus, having a high perception score of structure subdimension does not necessarily mean that it causes more perceived transactional distance than having a low perception score of structure. This subdimension of transactional distance requires deeper analysis in terms of student foreknowledge regarding the structure of the course they are enrolled in. Another consequence of having a high perception score of structure is that it can help in recognizing distance learners' limit of control over their learning in a distance education program. From this perspective, having a high perception regarding structure can increase one's perception score of autonomy. These conditions can be beneficial in terms of students' recognition of their transactional distance perception in the course.

Percieved dialogue scores of participants were expected to increase after the treatments, especially for those who received instan messages regarding the dialogue

subdimension as the relevant literature propounds it (Bare, 2013; Smit, 2012; Scornavacca, Huff, & Marshall, 2009. Wang, Woo, & Quek, 2012). Even for the participants that did not receive instant messages regarding dialogue subdimension, since treatment itself opened distance learners a new channel for communication, their perceived dialogue scores were expected to increase due to relevant literature (Calvo, Arbiol & Iglesias, 2014). However, results that yielded in this study were different from the literature and this may stem from distance learners' perception of dialogue subdimension itself. Students perception of dialogue subdimension may only include instant messages about the course itself and did not include the rest of the communications. This could be a reason why participant percieved dialog scores did not always increase. Future studies could take this into account in designing their research and determine and focus on type of messages and content distance learners classify as dialogue.

Instant messages regarding autonomy subdimension did not yield clear cut results. However; instant messages regarding other subdimensions could have indirect effects on participants' scores of perceptions of autonomy. Instant messages regarding each subdimension of transactional distance should be isolated and treatment groups should be formed accordingly. The variations of the subdimensions of transactional distance that was left out in this study can and should be researched. Perception of autonomy subdimension may also require a different approach in designing a treatment.

Except for one, all treatment groups results yielded an increase in percieved sense of community scores. These results corroborate with past studies (Doering, Lewis, Veletsianos, & Nichols-Besel, 2008; Wang, Woo, & Quek, 2012). The possible reason for this is; for each treatment group an instant messaging group was

formed. Thanks to these chat groups each participant had group members that shared common educational goals (McMillan and Chavis, 1986; Rovai, 2001). These conditions could be the indirect factor that increased the scores of perceptions of sense of community subdimension, even though not every treatment group received instant messages regarding that subdimension.

Finally, gain scores, which are the difference between posttest and pretest scores, of each treatment groups were compared. The results indicate that when distance learners are sent instant messages related to structure, dialogue and sense of community subdimensions, they acquired higher perceived gain scores in these subdimensions. Among the variations of treatment in scope of the study this combination of instant messages appears to be most effective in changing perceptions scores of distance learners.

CHAPTER 6

CONCLUSION

The effects of periodic informative instant message regarding autonomy, structure, dialogue and sense of community subdimensions on distance learners' transactional distance perception have been examined. Distance learners (N=99) which were undergraduate and vocational school of higher education participated in the study in fall and spring semesters of 2017. Informative instant messages had been sent to four treatment groups of learnes smartphones periodically for fourteen weeks. The results revealed partial evidence about the effects of that periodic informative instant message perception of transactional distance of distance learners. The nature of this effect was as follows: Providing distance education students periodic informative instant messages regarding structure, dialogue and sense of community subdimensions plausibly led to an increase in participants' perception of structure and dialogue scores which in turn decreased their perception of transactional distance and increased their perception of sense of community scores. Relevant literature also concurs with these results (Bare, 2013; Doering, Lewis, Veletsianos, & Nichols-Besel, 2008; Smit, 2012; Scornavacca, Huff, & Marshall, 2009; Wang, Woo, & Quek, 2012). Instant messages regarding different combination of subdimensions have not yielded conclusive evidence.

The subdimensions used were structure, dialogue, autonomy and sense of community. Structure as its nature was an external factor to the distance learners whereas dialogue and sense of community were interpersonal factors. Lastly autonomy was an internal factor. Affecting students' perception scores of autonomies through instant messages could be more difficult than affecting their perception

scores of structure, dialogue and sense of community. These periodic informative instant messages could be integrated to Learning Management Systems that distance education course use. Automatized to the needs and status of the student, it is expected that they will be more effective and efficient.

As for limitations of this research, although students were selected from a variety of departments, most of them were freshmen. Secondly, there were only 99 students that participated in this study, bigger sample size could have been helpful in statistical analysis.

In future studies, if possible, researchers should include participants that are freshmen, sophomore, junior, senior undergraduate students as well as graduate students. secondly, larger sample size could be helpful to the study in terms of statistical analysis as well as generalizability.

Administrators can make use of this research results by implementing a program that sends periodic instant messages to their distance education programmes. Instructors can also use these periodic instant messages in their online courses. Developers that design the LMS softwares for distance education programmes can include such automatized instant messages. Distance learners can benefit from this research by forming messaging groups among themselves and sending similar messages periodically.

This research delved into an uncharted territory in distance education field. Sending periodic informative instant messages to distance learners throughout a semester to see how students' perception of transactional distance effected did not have a precedent. The research by itself may have contributed only so much to the field. However, by introducing a new way to effect students' perception of

transactional distance, researcher hopes that this resarch sets an example for future studies.

APPENDIX A

TRANSACTIONAL DISTANCE SCALE

		Hiç Katılmıyorum (Strongly Disagree)	Katılmıyorum (Disagree)	Fikrim Yok (Undecided)	Katılıyorum (Agree)	Tamamen Katılıyorum (Strongly Agree)
Diyalog (Dialogue)	Kişilerarası diyaloglar öğrenmeme katkı sağladı. *(Having dialogues with others helped my learning.)*	( )	( )	( )	( )	( )
	İhtiyaç duyduğum kişilerle rahatlıkla iletişime geçebildim. *(I was comfortable when I was communicating with others.)*	( )	( )	( )	( )	( )
	Anlamadığım noktalarda öğretici ya da diğer öğrencilerden destek alabildim. *(I was able to get support from others when I did not understand.)*	( )	( )	( )	( )	( )
	Kişilerarası iletişimler beni motive etti. *(Communicating with others motivated me).*	( )	( )	( )	( )	( )
	Derslerle ilgili çalışmalarımla ilgili geri bildirim alabildim. *(I was able to get feedback about my course work.)*	( )	( )	( )	( )	( )
	Öğretici ve diğer öğrencilerle bilgilerimi paylaşma ortamı buldum. *(Learning environment enabled me to share information with others.)*	( )	( )	( )	( )	( )
	Öğreticiler öğrencileri işbirliği için teşvik ettiler. *(Instructor encourged students to collaborate.)*	( )	( )	( )	( )	( )
	Öğretici ve diğer öğrenciler etkinliklere katılmamı destekliediler. *(I was supported by others in participating course.)*	( )	( )	( )	( )	( )
Yapı Esnekliği (Structure Flexibility)	Kayıtlı olduğum programdaki dersler esnek ve uyarlanabilir öğrenme yolları içeriyordu. *(Distant classes had included flexible learning methods.)*	( )	( )	( )	( )	( )
	Derslere istediğim zaman tekrar tekrar erişebildim. *(I was able to access class records repeatedly whenever I want.)*	( )	( )	( )	( )	( )
	Öğrenme içeriklerini istediğim sırada takip edebildim. *(I was able to read course materials whenever I want.)*	( )	( )	( )	( )	( )
	Kayıtlı olduğum programda yüz yüze ve online derslerin öğretim akışı iyi organize edilmişti. *(Distance and face to face classes were well organized)*	( )	( )	( )	( )	( )
	Yüz yüze dersler istediğim zaman öğrenmeme engel oldu. *(Face to face classes kept me away from learning whenever I want.)*	( )	( )	( )	( )	( )

	Kayıtlı olduğum programın yapısı anlaşılabilir olduğu için öğrenmelerimi olumlu etkiledi. (Structure of the course was understandable and had positive effect on my learning.)	( )	( )	( )	( )	( )
	Dönemin tüm içeriğine her an erişebildim. *(I was able to access full content of the course whenever I want.)*	( )	( )	( )	( )	( )
İçerik Organizasyonu (Content Organization)	Ders içeriğinin sunumu, öğrenirken izlediğim yollara uygundu. *(Presentation in distance classess was compatible with my learning methods.)*	( )	( )	( )	( )	( )
	Ders içeriğinin karmaşıklığı seviyeme uygundu. *(Course content was simple enough.)*	( )	( )	( )	( )	( )
	Ders içerikleri ve sunulduğu ortam iyi organize edilmişti. *(Course content and presentation was well organized.)*	( )	( )	( )	( )	( )
	Ders içeriğinde yeterli derecede etkinlik, uygulama ve test vardı. *(Course program included enough activites and tests.)*	( )	( )	( )	( )	( )
	Ders içerikleri ihtiyaçlarımı karşılayabilecek nitelikteydi. *(Course content had met my needs.)*	( )	( )	( )	( )	( )
	İhtiyaç duyduğum tüm kaynaklara sistemde erişebildim. *(I was able to access all the resources on LMS.)*	( )	( )	( )	( )	( )
	Derslere (yüz yüze, online) katıldığımda hep ne yapacağım kaygısını taşıdım. *(I was always anxious in distance and face to face classes.)*	( )	( )	( )	( )	( )
	Ders içeriği öğrenme sürecine etkin olarak katılmama olanak sağladı. *(Course content enabled me to participate actively on learning process.)*	( )	( )	( )	( )	( )
Kontrol (Control)	İhtiyaç duyduğum çalışma becerilerine sahibim. *(I have the necessary study skill for this course.)*	( )	( )	( )	( )	( )
	Görevlerimi bitirme zamanımı kendim belirlerim. *(I determine the deadlines of my tasks.)*	( )	( )	( )	( )	( )
	Öğrenme grubumu seçerek grupta sorumluluk aldım. *(I took on responsibiliy by choosing my study group.)*	( )	( )	( )	( )	( )
	Kendi kendimi motive ederek öğrenebildim. *(I was able to learn by motivating myself.)*	( )	( )	( )	( )	( )
	Öğrenmek istediklerim hakkında öğreticiye ısrar edebildim. *(I was able put on pressure to the instructor about the matters that I would like to learn.)*	( )	( )	( )	( )	( )
	Kayıtlı olduğum programı istediğim sürede bitirebilirim. *(I was able complete the course on due time.)*	( )	( )	( )	( )	( )
Özerklik (Autonomy)	Kişisel çalışma planı oluşturarak takip edebildim. *(I was able to design a study plan and follow it through.)*	( )	( )	( )	( )	( )
	Kişilerarası iletişime ihtiyaç kalmadan öğrenebildim. *(I did not require communication with others during my learning process.)*	( )	( )	( )	( )	( )
	Amaçlarıma ulaşabileceğim bir süreç geçirdim. *(I was able to met my learning goals.)*	( )	( )	( )	( )	( )
	Öğrenmelerimi kendi kendime gerçekleştirebildim. *(I was able to learn by myself.)*	( )	( )	( )	( )	( )

	Kendi ilerleme hızımda ilerleme olanağı buldum. *(I was able to proceed at my learning speed.)*	( )	( )	( )	( )	( )
	Programda çok fazla yönlendirmeye ihtiyaç duymadım. *(I did not require much guidance on this course.)*	( )	( )	( )	( )	( )
	Yardım kısmı sayesinde başkasına ihtiyacım kalmadı. *(I did not anyone else thanks to the "helps" section.)*	( )	( )	( )	( )	( )
	Yüz yüze eğitimler bağımsız çalışmama engel oldu *(Face to face classes hindered my independent study.)*	( )	( )	( )	( )	( )
	Sistem bana bağımsız çalışma olanağı sundu. *(I was able to study independently thanks to the distance education system.)*	( )	( )	( )	( )	( )

APPENDIX B

SENSE OF COMMUNITY SCALE

	Hiç Katılmıyorum (Strongly Disagree)	Katılmıyorum (Disagree)	Fikrim Yok (Undecided)	Katılıyorum (Agree)	Tamamen Katılıyorum (Strongly Agree)
Bu programdaki öğrencilerin birbirlerini önemsediklerini hissederim. *(I feel that others students who take this course care about me.)*	( )	( )	( )	( )	( )
Bu dersi alan diğer kişilere güvenirim. *(I trust other students who take this course.)*	( )	( )	( )	( )	( )
Bu programın eğitim ihtiyaçlarımı karşıladığını düşünüyorum. *(I think this course had met my educational goals.)*	( )	( )	( )	( )	( )
Bu programın öğrenmem için bana çokça fırsat verdiğini düşünüyorum. *(I think this course gave me lots of opportunities in terms of learning.)*	( )	( )	( )	( )	( )
Bu programdakilerle kişisel konularım hakkında düzenli olarak konuşurum. *(I regularly talk to other students who take this course about personal matters.)*	( )	( )	( )	( )	( )
Bu programdaki diğer kişilerle eğitsel değerleri paylaşırım. *(I share similar educational values with others in this course.)*	( )	( )	( )	( )	( )

APPENDIX C

INSTANT MESSAGES FOR

STRUCTURE SUBDIMENSION

1. Arkadaşlar online derslere istediğin zaman erişebilirsiniz.
   (Dear students, you can access to online classes anytime you want.)

2. Arkadaşlar ders içeriklerini istediğiniz sırada takip edebilirsiniz.
   (Dear students, you can read the course content in which order you want.)

3. Arkadaşlar dönemin tüm içeriğine istediğin zaman erişebilirsiniz.
   (Dear students, you can access the full course content anytime you want.)

4. Arkadaşlar dersin teslim etmeniz gereken 1 adet ödevi vardır, bu ödevi yapınca sisteme yüklemeniz gerekli.
   (Dear students, this course has one assignment which needs to be uploaded to LMS after completion.)

5. Arkadaşlar ödev üzerinize atandıktan sonra teslim süresi 6 haftadır.
   (Dear students, you have six weeks to complete the assignment.)

6. Arkadaşlar dersin iki tane vizesi var. (sistem üzerinden online şekilde olacak).
   (Dear students, the course has two midterms which are to be taken online.)

7. Arkadaşlar vizelerin bir hafta süresi var, bu bir hafta içinde vizeye girmeniz gerek. Bir kere girebilirsiniz ve 25 dk süreniz var tamamlamak için.
   (Dear students, you have one-week period for taking the midterm. You can only take the online midterm once and the time limit is 25 minutes.)

8. Arkadaşlar derslere canlı katılmak için, ders saatinde sistem üzerinden girebilir veya mail adresinize gelen linki kullanabilirsiniz.
   (Dear students, you can participate the live online class via using the LMS or the link in your mail adresses.)

9. Canlı dersi kaçıran veya tekrar izlemek isteyen arkadaşlar sistem üzerinden arşivi aç kısmından izleyebilirsiniz.
   (Those who miss the live class or want to rewatch it, can do so via "open archive" button on LMS)

10. Arkadaşlar, ödev ve vizelerin son tarihlerini kaçırırsanız sonradan vizelere katılamazsınız ve ödev teslim edemezsiniz.
    (Dear students, if you miss the deadlines, you cannot take the midterms or turn in the assignments.)

11. Derslere katılmanız, ödev teslim etmeniz ve vizelere katılmanız hocanızın %4 lük kanaatini kullanmasında etkilidir.
    (Please be informed, your class participation, assignment submission and taking the midterms directly influences the instructor's impression that has 4% effect on your course grade.)

12. Arkadaşlar, ödev ve vizelerinizin son tarihlerlerini sistemden kontrol edebilirsiniz.
    (Dear students, you can check the deadlines of your midterms and assignments on LMS.)

13. Arkadaşlar, ortalamanızı etkileyen faktörler: %4 1. Vize, %4 2. Vize, %4 Kanaat, %28 Ödev, %60 final dir.
    (Dear students, these are the factors and their percentages that effects your overall course grade: midterm1 4%, midterm2 %4. instructor's impression 4%, assignment 28%, final exam 60%)

APPENDIX D

INSTANT MESSAGES FOR

AUTONOMY SUBDIMENSION

1. Arkadaşlar, dersin ödevini 17 nisana kadar istediğiniz zamanda teslim edebilirsiniz.
   (Dear students, you can turn in the assignment anytime you want until april 17.)

2. Arkadaşlar, dersin vizesine bir haftalık süre içerisinde istediğiniz zamanda girebilirsiniz, ancak tek bir hakkınız var giriş için.
   (Dear students, you can take the midterms anytime you want within the one-week period, be reminded you can only take it once.)

3. Arkadaşlar iç motivasyon, dış motivasyondan daha kalıcıdır bu yüzden sizin kendi kendinizi motive etmenizde daha etkili olacaktır.
   (Dear students, it would be more effective and longer lasting that you motivate yourselves, rather than an external motivator.)

4. Arkadaşlar canlı derste, öğreticiye sormak istediğiniz, dersle ilgili istediğin konu ile ilgili soruları sorabilirsiniz.
   (Dear students, you can any questions to the instructor regarding to the class in live classes.)

5. Arkadaşlar, Kişisel bir çalışma planı oluşturup takip etmeniz senin için faydalı olacaktır.
   (Dear students, designing a personal study plan and following it through would be beneficial.)

6. Arkadaşlar dersi canlı izleyerek öğrenmenin yanında, ders içeriklerini okuyarak ve dersleri kayıttan takip ederek kendi kendine öğrenmeniz de senin için faydalı olacaktır.
   (Dear students, in addition to participating the online classes, learning by yourselves via class records and course materials would be beneficial.)

7. Arkadaşlar uzaktan eğitim sisteminde karşılaştığınız soruların çözümleri için "Yardım" kısmını incelemeyi unutmayın.
   (Dear students, do not forget to go through the "Help" section for the problems you encounter on LMS)

8. Arkadaşlar, sınav ve ödevler için kendinize hedef not belirlemeniz sizler için faydalı olacaktır.
   (Dear students, setting a course grade to achieve for yourselves would be beneficial.)

9. Arkadaşlar, ödev ve sınavlara hazırlanmak için yeteri kadar vakit ayırmanız önemlidir.
   (Dear students, it is essential that you allocate time to prepare for your midterms and assignment.)

10. Arkadaşlar ders içeriklerini okumak ve dersleri takip etmek için yeteri kadar vakit ayırmanız önemlidir.
    (Dear students, it is important that you allocate time to read course content and following the classes.)

11. Arkadaşlar, dersler, ödevler ve vizeler zor gelse de kopmamaya çalışın.
    (Dear students, try not to feel disconneted in the face of hardships of the course.)

12. Arkadaşlar, ders konuları ile ilgili yeni bilgileri kendiniz de araştırabilirsiniz.
    (Dear students, you can research new information regarding the course by yourselves.)

13. Arkadaşlar, kendi öğrenmenizin sorumluluğunu almanız sizin için önemli ve faydalıdır.
    (Dear students, it is important that you take the responsibility for your learning.)

14. Arkadaşlar, uzaktan eğitimde, zaman planlamanızı iyi yapmanız önemlidir.
    (Dear students, it is essential to make a time management in distance education.)

15. Arkadaşlar, uzaktan eğitimde, son teslim tarihlerini kaçırmamanız çok önemlidir.
    (Dear students, it is important not to miss deadlines in distance education.)

APPENDIX E

INSTANT MESSAGES FOR

SENSE OF COMMUNITY SUBDIMENSION

1. Arkadaşlar, bu grubun üyelerini birbirine bağlı bir öğrenme topluluğu oluşturması sizin için önemli ve faydalıdır.
   (Dear students, it is important that members of this group form a connected learning community.)

2. Arkadaşlar, dersle ilgili bir sorununuz olduğunda bu grupla konuşabilirsiniz.
   (Dear students, feel free to talk to the group about the problems you encounter in course.)

3. Arkadaşlar, bu grubun üyelerinin uzaktan eğitim dersinde ihtiyaçları, öncelikleri ve amaçları benzer bunu unutmayın.
   (Dear students, members of this group have similar goals and needs in the distance education course.)

4. Arkadaşlar, bu grubun üyelerinin birbirlerini tanıması önemli, isterseniz kendinizi tanıtın kısaca.
   (Dear students, feel free to introduce yourselves to get to know each other.)

5. Arkadaşlar, bu grupta bir sorun olursa beraber çözebilirsiniz.
   (Dear students, feel free to talk about problems you have regarding this group.)

6. Arkadaşlar, isterseniz grubun simgesini siz belirleyebilir, değiştirebilirsiniz.
   (Dear students, you can determine the symbol of this group.)

7. Arkadaşlar, bu grupta kendinizi rahatsız hissetmenize gerek yok (öyle hissedenler olabilir diye söylüyorum).
   (Dear students, please feel comfortable in this group.)

8. Arkadaşlar, bu grubun üyeleri birbirlerine soru sormaya çekinmesin.
   (Dear students, please feel free to ask questions to each other.)

APPENDIX F

INSTANT MESSAGES FOR

DIALOGUE SUBDIMENSION

1. Arkadaşlar uzaktan eğitim ile ilgili bir sorununuz olduğunda okulda 7. katta uzaktan eğitime gelebilirsiniz.
   (Dear students, feel free to come to distance education office if you have any problems.)

2. Dersin öğretim elemanına ulaşmanız gerekirse kendisine sistem üzerinden mesaj atabilirsiniz.
   (Please be informed, you can contact to the instructor via sending a message on LMS).

3. Canlı ders sırasında teknik bir sorunla karşılaşırsanız, teknik desteğe özel sohbet üzerinden iletebilirsiniz.
   (Please be informed, if you encounter a technical difficulty during the live classes, you can reach tech support via live chat.)

4. Bu whatsapp grubu üzerinden de sorularınız olursa iletebilirsiniz, sadece ben değil bilenler de cevap verebilir.
   (You can ask me any questions, and feel free to answer any of them by yourselves.)

5. Birbirinizle diyalog içinde bulunmanız ders açısından sizin için faydalı olur.
   (Dear students, feel free to have dialogue about the course with other members.)

6. Arkadaşlar dersin öğretim elemanına mail de atabilirsiniz sistem üzerinden
   (Dear students, you can also send a mail to the instructor on LMS.)

7. Arkadaşlar, sistem üzerinde forum da mevcuttur. Ders hakkında müzakere yapmak için forumu kullanabilirsiniz.
   (Dear students, there is a bulletin board available on LMS on which you can conduct discussions about the course.)

8. Arkadaşlar, dersle ilgili konularda dersi alan diğer arkadaşlarla haftada en bir kere bağlantı kurmanız sizin için faydalıdır.
   (Dear students, it is favorable that you contact other members al least once a week.)

9. Arkadaşlar, dersi alan diğer arkadaşlarınızla çeşitli iletişim kanallarından (email, mesaj, forum, whatsapp) iletişim kurmanız önemlidir.
   (Dear students, you can use various communication channels to conduct dialogues with other members such as email, bulletin board.)

10. Arkadaşlar, canlı derslerde aktif olarak hoca ile karşılıklı bilgi paylaşımı yapmanız sizin için faydalıdır.
(Dear students, you can have a live conversation with the instructor and share information.)

11. Arkadaşlar, canlı derslerde hoca ile karşılıklı konuşmanız sizin için faydalıdır.
(Dear students, it is important that you participate in live classes and conduct dialogues regarding the lesson.)

REFERENCES

Akdemir, A. (2011). *Web tabanlı öğrenmenin temel hemşirelik becerileri üzerine etkisi.* (Unpublished doctoral dissertation). Ege University, İzmir, Turkey.

Arıcı, N., & Yekta, M. (2005). Mesleki ve teknik eğitimde çoklu ortam araçları kullanılmış web tabanlı öğretimin öğrenci başarısına etkisi. *Ticaret ve Turizm Eğitim Fakültesi Dergisi,* (1), 144-153.

Avşar, P. (2012). *Yetişkinlerin öğrenme özelliklerine göre düzenlenmiş bir internet temelli eğitim ortamının değerlendirilmesi (Beden Eğitimi öğretmenlerine yönelik Korfbol Eğitimi örneği)*. (Unpublished doctoral dissertation). Ankara University, Ankara, Turkey.

Aydın, D. (2011). *Malzeme bilgisi dersinin Moodle açık kaynak kodlu öğrenim yönetim sisteminde işlenişinin öğrenci üzerindeki etkinliğinin değerlendirilmesi.* (Unpublished master's thesis). Bahcesehir University, İstanbul, Turkey.

Başarıcı, R. (2012). *İnternet tabanlı uzaktan eğitim programlarında öğrenme stratejileri kullanımı.* (Unpublished master's thesis). Marmara University, İstanbul, Turkey.

Bere, A. (2013). Using mobile instant messaging to leverage learner participation and transform pedagogy at a South African University of Technology. *British Journal of Educational Technology, 44*(4), 544-561.

Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J, J., & Ciganek, A, P. (2012). Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education, 58*(2012), 843-855.

Bischoff, W. R., Bisconer, S. W., Kooker, B. M., & Woods, L. C. (1996). Transactional distance and interactive television in the distance education of health professionals. *American Journal of Distance Education, 10*(3), 4-19.

Bouhnik, D., & Deshen, M. (2014). WhatsApp goes to school: Mobile instant messaging between teachers and students. *Journal of Information Technology Education: Research,* 13(1), 217-231.

Boyd, R.D. & Apps, J.W. (1980). A conceptual model for adult education. In R. D. Boyd & J.W. Apps (Eds.), *Redefining the Discipline of Adult Education* (pp. 20-34). San Francisco: Jossey-Bass.

Bunker, E., Gayol, Y., Nti, N., & Reidell, P. (1996). A study of transactional distance in an international audioconferencing course. *Technology and Teacher Education Annual*, 5(1), 40-44.

Calvo, R., Arbiol, A., & Iglesias, A. (2014). Are all chats suitable for learning purposes? A study of the required characteristics. *Procedia Computer Science*, 27. 251-260.

Chavis, D.M., Lee, K.S., & Acosta J.D. (2008). *The Sense of Community (SCI) revised: The reliability and validity of the SCI-2*. Paper presented at the 2nd International Community Psychology Conference, Lisbona, Portugal.

Chen, Y. J. (2001a). Transactional distance in World Wide Web learning environment. *Innovations in Education and Teaching International Journal, 38*(4), 327-338.

Chen, Y. J. (2001b). Dimension of transactional distance in the World Wide Web learning environment: A factor analysis. *British Journal of Educational Technology, 32*(4), 459- 470.

Chen, Y. J., & Willits, F. K. (1998) Dimensions of educational transactions in a videoconferencing learning environment. *American Journal of Distance Education, 13*(1), 1-21.

Church, K., & de Oliveira, R. (2013). What's up with WhatsApp? Comparing mobile instant messaging behaviors with traditional SMS. *Proceedings of the 15th International Conference on Human-computer Interaction with Mobile Devices and Services* (pp. 352-361). Bangalore: India.

Cifuentes, O. E., & Lents, N. H. (2011). Increasing student-teacher interactions at an urban commuter campus through instant messaging and online office hours. *Electronic Journal of Science Education, 14*(1), 1-13.

Çimenli, O. (2013). *İnternet erişimli deney modüllerinin USB tabanlı kontrolü.* (Unpublished master's thesis). Süleyman Demirel University, Isparta, Turkey.

Darrin, P. (2005). *Transactional distance and learner autonomy as predıctors of student performance in distance learning courses delivered by three modalities* (Unpublished doctoral dissertation). Tulane University, New Orleans, Louisiana.

Demirkıran, V. (2008). *Web'e dayalı bilgisayar destekli uzaktan eğitim otomasyon sistemleri.* (Unpublished master's thesis). Beykent University, İstanbul, Turkey.

Demirkol, M. (2012). *Ortaöğretim kurumlarında harmanlanmış öğrenme ortamının akademik başarıya ve öğrenci tutumlarına etkisi.* (Unpublished master's thesis). Fırat University, Elazığ, Turkey

Dewey, J., & Bentley, A. F. (1949). *Knowing and the known*. Boston: Beacon Press.

Doering, A., Lewis, C., Veletsianos, G., & Nichols-Besel, K. (2008). Preservice teachers' perceptions of instant messaging in two educational contexts. *Journal of Computing in Teacher Education*, *25*(1), 5-12.

Dursun, T. (2011). *Uzaktan eğitimde hizmet kalitesinin ölçümlenmesi ve eğitim sektöründe bir uygulama.* (Unpublished doctoral dissertation). Marmara University, İstanbul, Turkey.

Fewkes, A. M., & McCabe, M. (2012). Facebook: Learning tool or distraction? *Journal of Digital Learning in Teacher Education*, *28*(3), 92-98.

Field, A. (2000). *Discovering statistics using SPSS for windows.* Thousand Oaks, CA: Sage publications.

Field, A. (2009). *Discovering statistics using SPSS.* London: Sage publications.

Fischer, Y. (2013). *"The Facebook is dead – long live WhatsApp". De Marker.* Retrieved September 26. 2017. from http://www.themarker.com/technation/1.2126492

Gao, F., Luo, T., & Zhang, K. (2012). Tweeting for learning: A critical analysis of research on microblogging in education published in 2008–2011. *British Journal of Educational Technology, 43*(5), 783-801.

Gorsky, P., & Caspi, A. (2005). A critical analysis of transactional distance theory. *Quarterly Review of Distance Education*, *6*(1), 1-11.

Gravetter, F., & Wallnau, L. (2014*). Essentials of statistics for the behavioral sciences (8th ed.).* Belmont, CA: Wadsworth.

Güleçoğlu, E. (2012). *Kurumlarda istihdam edilen kişilerin uzaktan eğitimden tatmin olma derecelerinin belirlenmesi.* (Unpublished master's thesis). Marmara University, İstanbul, Turkey

Hanna, D. E., Glowacki-Dudka, M., & Conceição, S. C. (2000). *147 practical tips for teaching online groups: Essentials of web-based education.* Madison, WI: Atwood Publishing.

Henry, K. (2015). Measuring self-directed learning: a diagnostic tool for adult learners, *Journal of University Teaching & Learning Practice, 12*(2), 3-20.

Hillman, D. C. A., Wills, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *American Journal of Distance Education, 8.* 30-42.

Holmberg, B. (1995). *Theory and practice in distance education.* New York: Routledge.

Hopper, D. A. (2000). *Learner characteristics, life circumstances, and transactional distance in a distance education setting*. (Unpublished doctoral dissertation). Wayne State University, Detroit, Michigan.

Horzum, M. B. (2013). Uzaktan eğitimde transaksiyonel uzaklığın öğrencilerin özyeterlilik algılarına etkisi. *Journal of Educational Sciences & Practices, 12*(24), 159-174.

Höçük, S. (2011). *Ankara Üniversitesi uzaktan eğitim programına katılan öğrencilerin akademik başarılarını etkileyen faktörler.* (Unpublished master's thesis). Ankara University, Ankara, Turkey.

Hrastinski, S., Edman, A., Andersson, F., Kawnine, T., & Soames, C. A. (2014). Informal math coaching by instant messaging: Two case studies of how university students coach K-12 students. *Interactive Learning Environments, 22*(1), 84-96.

İşman, A. (2011). *Uzaktan eğitim.* Ankara: Pegem Akademi Yayıncılık.

Koçdar, S. (2011). *Uzman görüşlerine göre Türkiye'de uzaktan eğitim programlarının akreditasyonu.* (Unpublished doctoral dissertation). Anadolu University, Eskişehir, Turkey.

Lau, W., & Yuen, A. (2014). Internet Ethics of Adolescents: Understanding demographic differences. *Computers and Education*, *72*(1), 378–385.

Lowell, N. O. (2004). *An investigation of factors contributing to perceived transactional distance in an online setting*. (Unpublished doctoral dissertation). University of Northern Colorado, Greeley, CO.

McIsaac, M.S. ve Gunawardena, C.N. (1996). Distance education. Ed: D.H. Jonassen, *Handbook of research for educational communications and technology: a project of the association for educational Communications and Technology*. Pp. 403-437. New York: Simon&Schuster Macmillan.

Mısırlı, Z. A. (2007). *Web tabanlı öğrenme yönetim sistemine ilişkin öğrenci ve öğretmen görüşleri.* (Unpublished master's thesis). Balıkesir University, Balıkesir, Turkey.

Moore, M. G. (1973). Toward a theory of independent learning and teaching. *The Journal of Higher Education, 19*(12), 661-679.

Moore, M. G. (1983). The individual adult learner. In M. Tight (Ed.), *Adult Learning and Education* (pp. 153-168). London: Croom Helm.

Moore, M. G. (1989). Three types of interaction. *American Journal of Distance Education, 3*(2), 1- 6.

Moore, M. G. (1993). Theory of transactional distance. In D. Keegan (Ed.), *Theoretical principle of distance education* (pp.22-38). London: Routledge.

Moore, M. G., & Kearsley, G. (2012). *Distance education: A systems view of online learning.* Belmont, CA: Wadsworth Cengage Learning.

Olcay, A. (2011). *Turizm eğitiminde web tabanlı öğretimin öğrenci başarısına etkisi (Gaziantep Üniversitesi Turizm ve Otelcilik Meslek Yüksekokulu örneği).* (Unpublished doctoral dissertation). Fırat University, Elazığ, Turkey.

Özüsağlam, E. (2007). Web Tabanlı Matematik Öğretimi ve Ders Sunum Örneği. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *1*(21), 33-43.

Patriarcheas, K., & Xenos, M. (2009). Modelling of Distance Education Forum: Formal Languages as Interpretation Methodology of Messages in Asynchronous Text- Based Discussion. *Computers and Education, 52*(2), 438–448.

Perraton, H. (2010). *Teacher education: The role of open and distance learning*, Ottawa: Commonwealth of Learning.

Pittman V. V. (2013). Correspondence study in the American University: a second historiographic perspective. In *Handbook of distance education* (pp. 21-35). Mahwah, NJ: L. Erlbaum Associates.

Plana, M. G. C., Escofet, M. I. G., Figueras, I. T., Gimeno, A., Appel, C., & Hopkins, J. (2013). Improving learners' reading skills through instant short messages: A sample study using WhatsApp. *4th WorldCALL Conference*, Glasgow, 10-13 July 2013.

Saba, F. & Shearer, R. (1994). Verifying key theoretical concepts in a dynamic model of distance education. *American Journal of Distance Education, 9*(3), 36-59.

Salem, A. A. M. (2013). The impact of technology (BBM and WhatsApp applications) on English linguistics in Kuwait. *International Journal of Applied Linguistics & English Literature*, *2*(4), 64-69.

Scornavacca, E., Huff, S., & Marshall, S. (2009). Mobile phones in the classroom: If you can't beat them, join them. *Communications of the ACM, 52*(4), 142-146.

Selvi, K. (Ed.). (2008). *Öğretim teknolojleri ve materyal tasarımı.* Ankara: Anı Yayıncılık.

Senemoğlu, N. (2010). *Gelişim, öğrenme ve öğretim.* Ankara: Pegem Yayıncılık.

Shin, N. (2001). *Beyond interaction: Transactional presence and distance learning.* (Unpublished doctoral dissertation) Pennsylvania State University, University Park, PA.

Shin, N., & Chan, J. K. Y. (2004). Direct and indirect effects of online learning on distance education. *British Journal of Educational Technology, 35.* 275-288.

Smit, I. (2012). WhatsApp with BlackBerry; Can Messengers (BBM) be MXit?. *In Proceedings of the 14th Annual Conference on World Wide Web Applications* (pp. 125-141). Cape Peninsula University of Technology, Cape Town, South Africa.

Taylor, J.C. (1992). Distance education and technology in Australia: A conceptual framework. *International Council for Distance Education Bulletin, 28.* 22-30.

Taylor, J. C. (2001). Fifth generation distance education. *e-Journal of Instructional Science and Technology (e-JIST), 4*(1), 1-14.

Tırnovalı, A. (2012). *Uzaktan eğitimde internet tabanlı eğitim programlarının temel boyutlarına yönelik öğrenci ve öğretim elemanlarının görüşleri ve öneriler.* (Unpublished doctoral dissertation). Mersin University, Mersin, Turkey.

Trochim, W. M., & Donnelly, J. P. (2006). *The research methods knowledge base (3rd ed.).* Cincinnati, OH: Atomic Dog.

Turgut, E. (2011). *Video konferans yoluyla verilen derslerde verimliliğe etki eden faktörler.* (Unpublished master's thesis). Karadeniz Technical University, Trabzon, Turkey.

Tüysüz, C., & Aydın, H. (2007). Web tabanlı öğrenmenin ilköğretim okulu düzeyindeki öğrencilerin tutumuna etkisi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, *2*(22), 73-84.

Ünlükahraman, O. (2011). *Web tabanlı eğitimde web madenciliği uygulaması ile öğrenci davranışlarının analizi.* (Unpublished master's thesis). Fırat University, Elazığ, Turkey.

Wang, Q., Woo, H. L., & Quek, C. L. (2012). Exploring the affordances of Facebook for teaching and learning. *International Review of Contemporary Learning Research, 1*(1), 23-31.

Yousuf, İ. M. (2007). Effectiveness of mobile learning in distance education, *Turkish Online Journal of Distance Education*, *8*(4), 114-124.

Zhang, A. (2003). *Transactional distance in Web-based college learning environments: Toward measurement and theory construction*. (Unpublished doctoral dissertation). Virginia Commonwealth University, Virginia.