THE INFLUENCE OF PERSONALITY TRAITS, MOTIVATION
AND PERSUASION PRINCIPLES ON ACADEMIC
PERFORMANCE

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ABSTRACT

THE INFLUENCE OF PERSONALITY TRAITS, MOTIVATION AND PERSUASION PRINCIPLES ON ACADEMIC PERFORMANCE

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Academic success has different predictors. To improve the quality of education, the reasons behind academic success have been extensively researched in the literature. This thesis study explores the effects of personality, motivation and persuasion principles over academic performance and contributes improvement of educational activities to increase academic success. Specifically, this thesis study aims to identify the relation between personality, motivation and academic performance, to identify effective persuasion strategies on academic performance to affect the behaviors of the students and investigate the relationships between personality and persuasion strategies to identify which persuasion strategy is effective for whom. Four main studies were conducted in the scope of this thesis. Academic performance was measured in terms of course grade and Learning Management System (LMS) use throughout the study. First, a qualitative study was conducted to identify effective persuasion strategies. Second, the relationships between personality and persuasions strategies were identified. Third, the predictors of academic performance from motivation and personality were investigated. Lastly, the effects persuasion strategies over academic performance were tested via persuasive messaging in an experimental setting.

Keywords: Academic Performance, Motivation, Big Five, LMS use, Persuasion Principles

ÖZ

KİŞİLİK ÖZELLİKLERİ, MOTİVASYON VE İKNA PRENSİPLERİNİN
AKADAMİK BAŞARIM ÜZERİNDEKİ ETKİLERİ

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Akademik başarının farklı ön göstergeleri vardır. Eğitimin kalitesini arttırmak için, akademik başarının arkasındaki sebepler literatürde genişçe araştırılmıştır. Bu tez çalışması kişilik, motivasyon ve ikna prensiplerinin akademik performans üzerinde etkilerini araştırır ve akademik başarıyı arttıracak eğitsel aktivitelerin gelişmesine katkı sağlar. Bu tez belirli bir biçimde, kişilik, motivasyon ve akademik performans arasındaki ilişkiyi belirlemeyi, öğrencilerin davranışlarını etkilemek için akademik performans üzerine etkili ikna stratejileri belirlemeyi ve hangi ikna stratejisinin kimin üzerinde etkili olduğunu belirleyecek kişilik ve ikna stratejileri arasındaki ilişkiyi keşfetmeyi amaçlamaktadır. Bu tez kapsamında dört ana çalışma yürütülmüştür. Çalışma boyunca, akademik performans ders notu ve Öğrenme Yönetim Sistemi (LMS) kullanımı ile ölçülmüştür. İlk olarak, etkili ikna stratejilerini belirlemek için nicel bir çalışma gerçekleştirilmiştir. İkinci olarak, kişilik ve ikna stratejileri arasındaki ilişki belirlenmiştir. Üçüncü olarak, motivasyon ve kişilikten kaynaklı akademik performansın ön göstergeleri araştırılmış, son olaraksa, deneysel bir ortamda uygulanan ikna mesajlarıyla, ikna stratejilerinin akademik performans üzerine etkileri test edilmiştir.

Anahtar Kelimeler: Akademik Performans, Motivasyon, Beş Büyük Faktör, Öğrenme Yönetim Sistemi Kullanımı, İkna Prensipleri

To my father

ACKNOWLEDGEMENTS

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LIST OF ABBREVATIONS

A	: Agreeableness
AUTH	: Authority
BFI	: Big Five Inventory
BFP	: Big Five Personality
BSEM	: Bayesian Structural Equation Modeling
C	: Conscientiousness
C.S	: Convergence Statistics
CLB	: Control of Learning Beliefs
COM	: Commitment
CONS	: Consensus (Social Proof)
IGO	: Intrinsic Goal Orientation
E	: Extraversion
EGO	: Extrinsic Goal Orientation
FBM	: Fogg Behavioral Model
IS100	: Introduction to Information Technologies and Applications Course
KS	: Kolmogorov-Smirnov
LIKE	: Liking
LMS	: Learning Management Systems
METU	: Middle East Technical University
MSLQ	: Motivated Strategies for Learning Questionnaire
N	: Neuroticism
O	: Openness
PCA	: Principal Component Analysis
REC	: Reciprocation
SCAR	: Scarcity
SD	: Standard Deviation
SELP	: Self-Efficacy for Learning and Performance
SEM	: Structural Equation Modeling
SMS	: Short Message Service
SNS	: Social Networking Sites
TA	: Text Anxiety
TV	: Task Value

CHAPTER 1

INTRODUCTION

Academic performance refers to the output of education and is mostly measured in terms of course grade with examination. The studies in the literature, which examine academic performance, measure it as course grade, GPA or other scores which are based on classroom tasks or assignments and the output is always a grade score.

How do students become successful? Academic performance changes from student to student and depends on different factors. To identify the reasons behind the success or failure in academic performance could improve education. According to literature, personality is one of the factors affecting students' academic performance. Personality traits, widely used model of individual characteristics and differences, have been researched and linked to academic performance many times. "Big five personality" model which includes five main personality traits, *extraversion*, *agreeableness, conscientiousness, neuroticism* and *openness* (Costa & McCrae, 1992; McCrae & Costa, 1987), is the widely used personality model to predict academic performance. The meta-analysis conducted by O'Connor and Paunonen (2007) and the literature review conducted by Noftle and Robins (2007) revealed that conscientiousness is the most strongly and consistently related personality trait to academic success. The related studies showed that individuals having the characteristics of being conscientiousness are more successful in courses. Conscientiousness trait is defined as being organized, self-disciplined and the students showing the characteristics of conscientiousness may study in a disciplined way which triggers their success. Although there is a strong relation between conscientiousness trait and academic success, the relationship between the other four personality traits and academic performance varies among studies. One of the objectives of this thesis study is to test the previously hypothesized relationship of personality and academic performance in both online and blended learning environment.

Another factor that affects students' academic performance is motivation which differs from student to student. Motivation triggers success; if students are motivated, their academic performance could be better than the unmotivated students. How do we know students are motivated? There are six factors to explain academic motivation, measured by Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, 1991). These six factors are categorized under three motivation constructs: expectancy (*self-efficacy for learning performance and control of learning beliefs*), value (*intrinsic goal orientation, extrinsic goal orientation, task value)* and affect (*test anxiety*). There are researches which showed that these factors are effective in predicting students' course grade (Brackney & Karabenick, 1995; Credé & Phillips, 2011; Lin, McKeachie, & Kim, 2001). One of the objectives of this thesis study is to test the relationship between motivation and academic performance in both online and blended learning environment.

Attendance is another factor affecting students' academic performance. Studies show that students with good attendance to lectures take higher grades in academy (Brewer & Burgess, 2005; Launius, 1997; Van Blerkom, 1996). Students' attendance and participation to lectures are affected from different factors such as interactive lectures (Snell, 1999), teaching methods, and rewarding attendance (Devadoss & Foltz, 1996).

Persuasion simply refers to changing human behavior. Persuasion is a key element in behavior and attitude change (Oinas-Kukkonen, 2010) and different strategies have been developed; such as Theory of reasoned action (Fishbein, 1979), Elaboration likelihood model (Cacioppo & Petty, 1984), Fogg's principles of persuasion (Fogg, 2002), Fogg Behavioral Model (FBM) (Fogg, 2009a). A widely known work belongs to Cialdini which included six persuasion strategies: *reciprocation, authority, scarcity, social proof (consensus), commitment* and *liking* principles (Cialdini, 1993, 2001, 2004). Six persuasion principles of Cialdini were chosen in the scope of this thesis study, since they are simple to apply and they have been used many times in different contexts effectively and there are too much examples to examine. The contexts, in which these strategies have been applied to change human behavior, include online commerce, fund-raising, advertisements, traditional marketing, health information systems, restaurants, social networking sites and online environment (Cialdini, 1993, 2001; Cialdini & Goldstein, 2002; Guadagno, Muscanell, Rice, & Roberts, 2013; Iosub, Andrei, & Iacob, 2009; Kaptein, Markopoulos, de Ruyter, & Aarts, 2009). The effects of persuasion strategies on behavior change in educational activities have not clearly been researched, however there are related studies. Kristensen (2013) proposed a guide to persuasive learning which was conducted in the scope of a European Union project called EuroPLOT, which aims to explore learning and persuasive design to create persuasive learning technologies. One of the objectives of this thesis study is to investigate the reasons why/why not students attend the lectures from the perspectives of Cialdini's persuasion principles. Another objective of this thesis study is to investigate the effective persuasion strategies in changing students' behaviors and test the effects of these strategies over academic performance.

In this context, the main focus of this thesis study is to investigate the impact of individual differences on academic performance from perspectives of personality traits and academic motivation. Additionally, the current study aims to identify the effective persuasion strategies on academic performance and investigate the relationships between personality characteristics and persuasion strategies and identify which persuasion strategy is effective for whom. Specifically, the aims of the study are as below:

- To identify which persuasion strategies of Cialdini are used and how they are implemented in a course setting
- To identify the relation between personality traits and persuasion strategies
- To predict students' academic performance based on their personality traits and academic motivation
- To test the effects of persuasion strategies with persuasive messaging in course related activities
- To guide the use of persuasive messaging in a course setting

1.1 Research Questions

This thesis study aims to answer five main research questions:
1) What persuade students to attend lectures regularly?
   - Which persuasion principle is effective to change the participation behavior of students?
   - What are the triggers that can increase students' participation to lectures?

2) Does the susceptibility of the participants to persuasion strategies differ according to their personality traits?
   - What is susceptibility of each personality traits (five personality traits) to each of the six persuasion strategies?
3) Is there any relation between personality traits and students' academic performance?
   - Is there any relation between personality traits and Learning Management System (LMS) use?
   - Is there any relation between personality traits and course grade?
4) Is there any relation between motivational factors and students' academic performance?
   - Is there any relation between motivation and LMS use?
   - Is there any relation between motivation and course grade?
5) What are the impacts of persuasive messages on students' academic performance including their course grade, LMS use and motivation?

Four main studies were conducted in the scope of the thesis to answer the research questions mentioned above. First of all, a qualitative study was conducted with the participation of students and instructors. The factors that affect students' attendance and participation behavior in lectures were identified from the perspectives of six persuasion strategies of Cialdini. Reciprocation, liking, scarcity and social proof are the effective persuasion strategies identified with the qualitative study. Also in order to affect attendance behavior of students positively, how these persuasion strategies can be applied were investigated.

Second, a quantitative study was conducted to identify the relation between Big Five personality traits and susceptibilities to six persuasion strategies of Cialdini. Data was collected by employing Big Five Inventory (BFI) (John & Srivastava, 1999) and Kaptein's Susceptibilities to Persuasion Strategies Scale (STPS) (Kaptein, 2012). There are limited studies that have investigated the relation between persuasive strategies and personality traits (Halko & Kientz, 2010; Hirsh, Kang, & Bodenhausen, 2012; Saquib, 2012). However, they were not focused on Cialdini's principles totally and they were limited to certain application domains. The relations between personality and persuasions strategies were analyzed by Bayesian Structural Equation Modeling (BSEM).

Third, students' course grade and LMS use were predicted with a quantitative study implementing BFI and MSLQ to collect data in both online and blended learning environment. The casual relationships between personality, motivation, LMS use (Total access of the students to the LMS used in the course) and course grade were analyzed by BSEM.

Lastly, an experimental study was conducted to test the effects of persuasion strategies on students' course behavior by persuasive messaging. Each participant was assigned either to a treatment or a control group. During a semester, the treatment groups received messages including persuasive cues while the control groups received messages without persuasive cues or no messages. The effects of persuasive messages over LMS use, course grade and academic motivation were investigated by analyzing the differences between treatment and control groups.

1.2 Contributions of the Study

The contributions of this thesis are summarized below:
- Effective persuasion principles in changing students' course related behaviors were identified

- The relationships between five personality traits and six persuasion principles were identified and the susceptibilities of each personality trait to each persuasion strategy were proposed.
- The predictors of academic performance (in terms of LMS use and course grade) were identified based personality traits and academic motivation.
- The effects of persuasive messages on course related activities were identified.

1.3   Organization of the Thesis

The overall study consists of five main sections which was complementing each other given in
Figure 1 (Each step, their findings, their relations and the related chapters are shown).
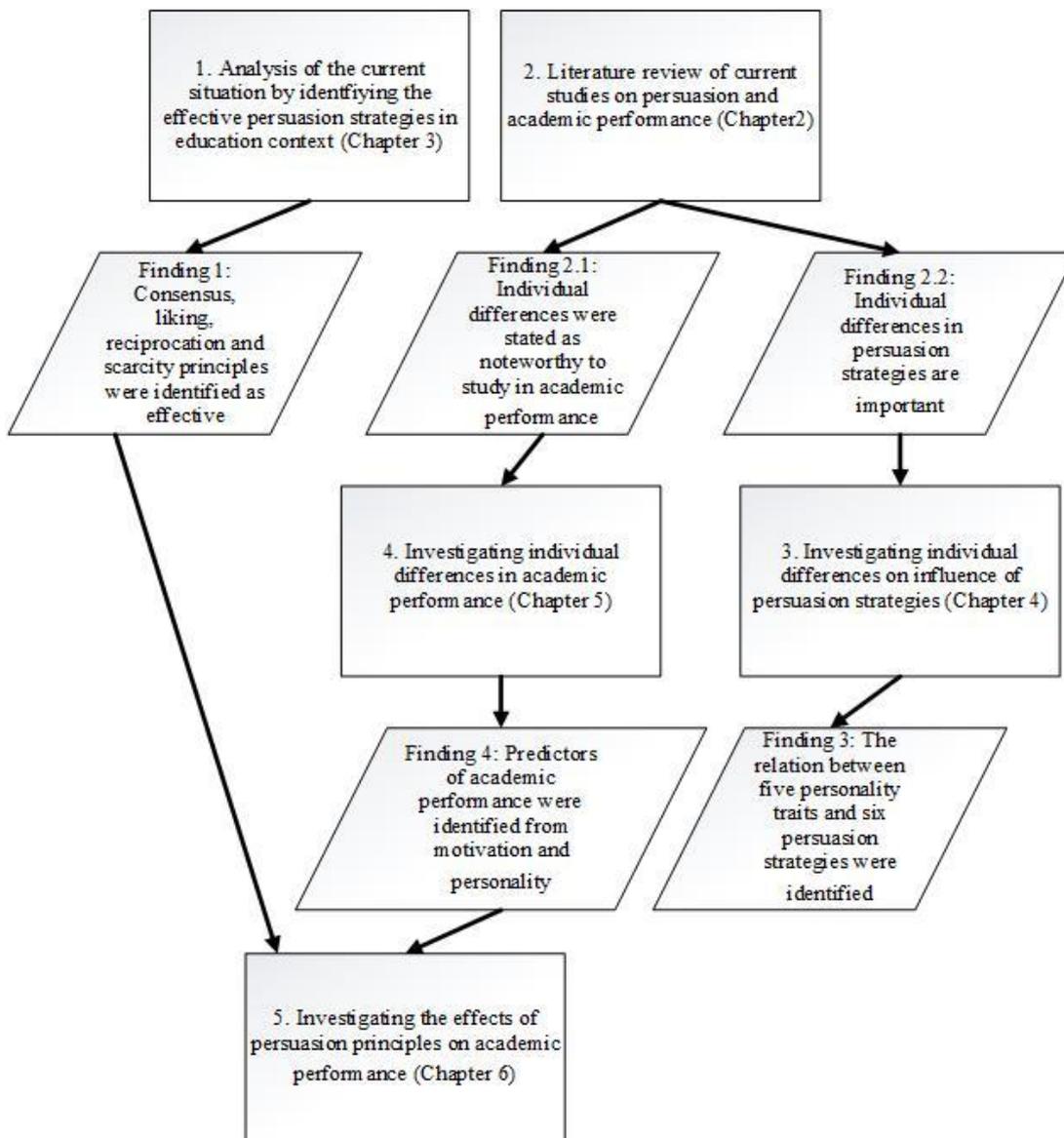
Figure 1: Organization of the study

The rest of the thesis is divided into 6 chapters to give details of each step. Chapter 2 introduces the literature review including personality traits, persuasion, motivation and their

relatedness to academic performance. Additionally, this chapter reviews Bayesian Structural Equation modeling which is used to analyze the casual relationship in the main part of the study. Chapter 3 presents the qualitative study conducted to identify which Cialdini's persuasion principles are used in course related activities intentionally or how to apply them. This chapter gives the details of two types of interviews conducted with students and instructors to identify the effective persuasion strategies. Chapter 4 introduces the quantitative study conducted to identify the casual relationships between personality traits and their propensity to be influenced by persuasion strategies. The method employed in the quantitative study, data analysis and results are given. The findings are discussed with the related literature. Chapter 5 presents the quantitative study conducted to predict academic performance from personality traits and motivation. The method employed in the quantitative study, data analysis and results are given. The findings are discussed with the related literature. Chapter 6 presents the experimental study conducted to test the effects of persuasive messages on academic performance and the results are given and discussed. Chapter 7 presents overall conclusions of the thesis and discusses future directions.

CHAPTER 2

LITERATURE REVIEW

This chapter provides the theoretical background of the study including personality traits, persuasion principles, motivation and the related studies to academic performance. In addition, the data analysis method which is Bayesian Structural Equation Modeling, is explained.

2.1   Big Five Personality (BFP) Model

Personality traits explain individual differences on behavior, cognitions and emotions. The constructions of personality traits started in 1920s (Klages, 1932). In the first years of the studies, different terms reflecting human behaviors have been listed. Approximately 18000 terms reflecting distinguishing human character were provided (Allport & Odbert, 1936). After that they categorized these terms into: personality traits, temporary states, evaluative judgement of personal conduct and reputation and physical characteristics. In 1945, Cattell (1945) reduced the number of terms into 12 traits. In 1949 Fiske (1949) created a much more simple version of Cattell's work which is known as Big Five today. Big Five term was given to this categorization by Goldberg (1981). Cobb-Clark and Schurer (2012) tested the stability of BFP traits over a four year period and concluded that, although there were small changes in mean scores, BFP traits were stable.

One of well-known other trait model is 16 Personality Factors (Cattell & Eber, 1950) which includes personality factors as Warmth, Reasoning, Emotional Stability, Dominance, Liveliness, Rule-Consciousness, Social Boldness, Sensitivity, Vigilance, Abstractedness, Privateness, Apprehension, Openness to Change, Self-Reliance, Perfectionism, and Tension. BFP model was generated from 16 personality factors. HEXACO model (Ashton et al., 2004) is another well-known trait model, which includes Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience. HEXACO is similar to BFP only it has Honesty-Humility as an additional trait.

BFP is chosen by the researcher rather than other models, since it is simpler than 16 Personality factors, its reliable than HEXACO (since it is a newer model). BFP includes 5 dimensions of personality: Extraversion or Surgency, Agreeableness, Conscientiousness, Emotional Stability versus Neuroticism, Openness or Intellect (John & Srivastava, 1999). The characteristics of big five personality traits are as following (Costa & McCrae, 1992; John & Srivastava, 1999; McCrae & Costa, 1987) and Table 1 gives the characteristics of these five traits according to low and high scores on each trait (Chen & Caropreso, 2004).

- *Extraversion*: is described as being talkative, energetic, assertive, and social.
- *Agreeableness*: is described with good-natured, cooperative and trustful terms.

- *Neuroticism*: is defined by the terms worried, insecure and it is related to the degree of emotional stability and anxiety, high scores show anxiety while low scores show emotional stability.
- *Conscientiousness*: individuals in conscientiousness trait show the characteristics of being organized, disciplined, responsible and achievement-oriented.
- *Openness*: individuals in openness trait show higher degree of intellectuality, imagination, and independent- mindedness.

Table 1: BFP Traits Characteristics

Trait	Low Score on Trait	High Score on Trait
Extraversion	Indifferent, quiet, reserved, serious, withdrawn	Energetic, fun-loving, sociable, talkative
Neuroticism	Calm, relaxed, secure, stable	Emotional, insecure, worrying
Agreeableness	Manipulative, selfish, suspicious, uncooperative	Cooperative, friendly helpful, trusting
Conscientiousness	Careless, lazy, negligent, unreliable	Dutiful, hard-working, methodical, organized
Openness	Conventional, down-to-earth, practical	Broad-minded, creative, nonconformist

2.1.1 Instruments to Measure BFP

To measure BFP, there are several instruments developed in the literature.

- *NEO-PI:* NEO Personality Inventory (NEO-PI) was formed by Costa and McCrae (1985). This instrument did not include agreeableness and conscientiousness traits.
- *NEO-PI-R:* NEO-PI was updated in 1992 as "NEO Personality Inventory-Revised" (Costa & McCrae, 1992). It includes the measures of agreeableness and conscientiousness traits too. NEO-PI-R is the most widely used and validated scale including 240 items. One of the disadvantages of NEO-PI-R is that it takes 30-40 minutes to fill.
- *NEO-FFI:* NEO-Five Factor Inventory was a shorter version of NEO-PI-R. Since NEO-PI-R has 240 items to be filled, a shorter version instrument was needed and NEO-FFI was proposed including 60 items (Costa & McCrae, 1992)
- *BFI:* Big Five Inventory was developed by John, Donahue and Kentle (1991). It includes 44 items.
- *TIPI:* Recently, Gosling, Rentfrow and Swann Jr (2003) developed Ten Item Personality Inventory (TIPI) which includes 10 items. This instrument was developed because, other instruments are too long and it provides short measurement instrument.

BFI was chosen and used to collect personality data since, it was shorter than NEO-PI-R and NEO-FF. It was older than TIPI and validated more times (Benet-Martínez & John, 1998; Gosling et al., 2003; John, Naumann, & Soto, 2008; Soto, John, Gosling, & Potter, 2008). Also this study did not need a too short instrument like TIPI.

2.2 Personality Traits and Academic Performance

Academic performance refers to the output of the education. Most of the time academic performance is measured as course grade (with examination). The studies related with academic performance in the literature measure academic performance as course grade, GPA

or other scores based on classroom tasks or assignments. Researchers dealing with the predictors of academic performance especially individual academic performance have related personality to academic performance (Ackerman & Heggestad, 1997; Chamorro-Premuzic & Furnham, 2003b). BFP model has been also widely used in studies regarding academic performance to predict academic performance from personality.

When the personality traits and their relation to academic performance are examined, conscientiousness is observed as positively related to course grade and GPA (Chamorro-Premuzic & Furnham, 2003a, 2003b; Conard, 2006; Duff, Boyle, Dunleavy, & Ferguson, 2004; Lounsbury, Sundstrom, Loveland, & Gibson, 2003; Nguyen, Allen, & Fraccastoro, 2005; O'Connor & Paunonen, 2007; Paunonen & Ashton, 2001; Poropat, 2009; Rosander, Bäckström, & Stenberg, 2011). Also the meta-analysis conducted by O'Connor and Paunonen (2007) and the literature review conducted by Noftle and Robins (Noftle & Robins, 2007) revealed that conscientiousness is the most strongly and consistently related trait with academic success. However the relationships between the other four personality traits and academic performance show mixed results in the literature.

Neuroticism is found as negatively correlated to course grade or GPA (Chamorro-Premuzic & Furnham, 2003a, 2003b) but this relation has not been reported as significant in some of the studies (Duff et al., 2004; Lounsbury et al., 2003). In another study conducted by Rosander et al. (2011), a positive significant relation was found between neuroticism and academic performance. When the relation between extraversion and academic performance is examined, extraversion trait has a negative relation with course grade or GPA (Chamorro-Premuzic & Furnham, 2003a; Nguyen et al., 2005; Noftle & Robins, 2007; O'Connor & Paunonen, 2007; Rosander et al., 2011). However this finding is not common. Openness trait was found as significantly positively related to course grade or GPA. There is a significant positive relation between openness and course grade (Lounsbury et al., 2003; Noftle & Robins, 2007; O'Connor & Paunonen, 2007; Paunonen & Ashton, 2001). However this relation is mostly weak. There are also studies that did not find a significant relation between openness trait and academic performance (Rosander et al., 2011). The study of Rosander et al. (2011) did not find a relation to total academic performance however they found positive relation between openness trait and performance in language and practical disciplines which was related to nature of openness trait: being curious and having imagination. There are not common findings to relate agreeableness to course grade or GPA, however there is one study that found significant positive correlation between agreeableness and GPA (Gray & Watson, 2002)

These findings showed that conscientiousness trait is significantly related to academic performance; however the relation of other four personality traits to academic performance varied across the studies. The common findings of conscientiousness and its relation to academic performance could be related to characteristics of this trait since the individuals showing this trait are responsible, disciplined and organized which could contribute to academic success.

2.3   Persuasion

Persuasion is generally defined to change the behaviors of others towards something (such as a system, an idea, and other people) in the context of social sciences. It is defined as "human communication designed to influence the autonomous judgments and actions of others" (Simons, Morreale, & Gronbeck, 2001). Persuasion is a key element in behavior and attitude change (Oinas-Kukkonen, 2010). Persuasion is simply making somebody to do something. Persuasion differs from coercion in not including torture, negative output, domination, force or threats (Simons et al., 2001). Persuasion can be seen in every part of our lives, since people always try to influence other people's behaviors and attitudes intentionally or unintentionally for some reasons. For example, health care professionals try to influence

their clients via persuasion while marketers use persuasion to increase their product sale. In persuasion, there are two parties: persuader and persuadee. In order to increase the ability of persuader there are different strategies and theories have been developed;

- Theory of Reasoned Action (Fishbein, 1979): This model is for prediction of behavioral intention to do something. This model states that "convince the audience who are valued by others, so that you can guide the audience how you act".
- Elaboration Likelihood Model (Cacioppo & Petty, 1984): It is a general theory of attitude change describing how attitudes are formed and how attitudes are changed. The main idea is that there are two routes to persuasion, a central and a peripheral route. Persuasion occurs with careful consideration of information presented about the subject under central route which requires message elaboration. Persuasion occurs with positive or negative cues under peripheral route.
- Fogg proposes five principles by considering computing products as social actors (Fogg, 2002):

  - *Principle of attractiveness:* this principle states that when a computing technology is visually attractive (interface, device, or onscreen characters), it becomes more persuasive.
  - *Principle of similarity:* People have tendency to be persuaded by computing products that are similar to themselves in some way.
  - *Principle of praise:* Offering praises in the form of words, images, symbols or sounds make people to be open to persuasion.
  - *Principle of reciprocity*: People mostly feel to reciprocate when a favor has been done to them. If a computing technology does a favor for the users then the user will feel the need to pay back.
  - *Principle of authority:* If the computing technology takes the form of authority, it will be more persuasive (will have the power of persuasion).

- The behavior model (FBM-Fogg Behavior Model): It was proposed by Fogg (Fogg, 2009a) to understand the drivers of human behaviors. There are three factors in this model: motivation, ability and trigger. According to this model, to achieve a target behavior, individual should have motivation, ability and trigger. The persuasive design should focus on to increase the motivation for target behavior, to consider the ability of audience and to use effective triggers.

A widely known work belongs to Cialdini (Cialdini, 1993, 2001, 2004). In his work, Cialdini distinguished six persuasion strategies that can be applied to change behavior of people which are detailed in the following subsection.

2.3.1 Cialdini's Six Principle of Persuasion

Cialdini proposes six principles of persuasion that triggers the behavior of people (Cialdini, 1993, 2001, 2004). Cialdini states that persuasion occurs by basic principles which can be taught, learned and applied. The six influence techniques proposed and the ideas behind the corresponding technique are as follows:

- *Principle of reciprocation:* "People repay in kind".
- *Principle of scarcity*: "People want more what they have less". When something is scarce, people will value it more.
- *Principle of authority*: "People defer to experts." When a request is made by a legitimate authority, people are inclined to follow / believe the request.
- *Principle of commitment and consistency*: "People align with their clear commitments." People do what they are told to do.

- *Principle of social proof*: "People follow the lead of similar others". People rely on the people around them.
- *Principle of liking*: "People like people who like them". This principle relies on similarity and praise.

Two of the principles of Cialdini and Fogg (mentioned in the previous section) are almost same: principle of reciprocity- principle of reciprocation and principle of authority-principle of authority. The idea behind these principles is same. The researcher of the thesis chose these six persuasion principles of Cialdini in the scope of this study, since they are simple to apply and applied many times in different context effectively including online environment. The related studies with the application of these persuasion principles are given in the following paragraphs of this section.

Cialdini gives clues about how to apply these six persuasion principles (Cialdini, 2001; Coster, 2013; Wissler, Cialdini, & Schweitzer, 2002). Table 2 shows the clues to apply the persuasion strategies and example expressions from the literature.

Table 2: How to apply Cialdini's persuasion principles?

Persuasion Strategy	Clues to Apply	Example Expressions
Reciprocation	This influence strategy can be applied by giving gifts, favors and concessions	- "In return for providing us with your friend's addresses, we will send you a copy of the results of our study" (Kaptein et al., 2009) - Gift: Durable "green" shopping bag (Seethaler & Rose, 2006), free gifts (Cialdini, 2003)
Scarcity	To apply this strategy, the researcher should emphasize the unique benefits, mention opportunities and use deadlines.	- "There are a few days left"(Groves, Cialdini, & Couper, 1992) - "There are only 50 copies of this book left nationwide" (Kaptein & Eckles, 2012)
Authority	This strategy can be implemented by mentioning expertise	- "I would recommend this book to anyone."—Stephen King (Kaptein & Eckles, 2012)
Commitment and consistency	To apply this influence strategy, one should make the target groups make public commitment, since people should be consistent with their previous commitments.	- Making commitments active and public
Consensus (social proof)	This strategy can be applied by giving examples of similar individuals' behaviors	- "Over a million copies sold!" (Kaptein & Eckles, 2012)
Liking	This principle depends on similarity and praise, people like who likes them and behave similarly.	- Factors enhancing liking: similarity of attitude, background, dress, praise, cooperation, and physical attractiveness(Groves et al., 1992)

These principles were researched in different contexts in the literature. Table 3 summarizes application of persuasion strategies in different contexts. One of the researches was conducted by Kaptein et al. (2009) to measure the individual differences susceptibility to these six principles with an online questionnaire. The questionnaire includes questions to measure susceptibilities to persuasion derived from the six principles. In the study, the participants were required to share their friends' email addresses with the researcher who provides two statements, one of which includes two cues: "All of the other participants provided several email addresses to us" (relying on reciprocation) and "In return for providing us with your friend's addresses, we will send you a copy of the results of our study" (relying on social proof). The relation with the cue-condition and no-cue condition with the number of provided e-mail addresses was analyzed. A significant relation was found in the condition which includes persuasion cue. The study concluded that using persuasive cues can increase the conformity with the desired request.

Another study examining the persuasion principles of Cialdini was conducted by Guadagno et al. (2013) focusing on two principles: liking (also denoted as likability) and social proof (also denoted as social validation) in the context of online social interaction. This study aims to examine whether the influence principles likability and social validation are effective in online context. In the study, an experiment condition was created based on a total of nine conditions which consist of the Cartesian product of three values (likable, unlikable, no likability control) of the feature "Likability of communicator" and three values (willing to help, refusing to help, no response control) of the feature "Social validation". Participants were asked to read an online blog which was created according to a condition to which they were randomly assigned (such as a blog of a likeable person, a blog that request help). The study concluded that social validation is influential in this context, however likability of blog owner is not influential.

The study conducted by Iosub et al. (2009) examined Cialdini's six principles of influence in the context of social networking sites by taking into consideration the marketing objectives (member acquisition, member retention and user loyalty). The aim of the study was to identify how social influence principles are integrated to the design of sites, to identify the principles that value adding impacts on sites. Three social network sites were analyzed in the study from three perspectives: social influence principles-marketing objectives, social influence principles-social network site and marketing objectives-social network site. The study showed that social network sites are organized mostly according to social principles (reciprocation, authority, social proof, and liking) and these principles were under-represented in social design however designers unconsciously apply these two principles in design. The study recommends that consistency and scarcity influence principles should be implemented in social network design to take competitive advantage.

Table 3: Application of persuasion principles in different context

Context	Principles	Reference
Fundraising	**Reciprocation:** Free gifts or trinkets through the mail, gift in the envelope of the fundraising letters. **Scarcity:** "Visit the church under construction before its finish". **Authority:** "Uncover organization expertise". Monterey Bay Aquarium distributes free Seafood Watch pocket guides showcasing their own research on sustainable fisheries. **Commitment:** Hospital asked foundation trustees to state publicly and specifically what they would commit to do for the capital	(Cialdini, 2003)

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	campaign. **Social Proof:** Showing the list of who have already donated, increases donation of others.	
Online environment taking emails of the participants	**Reciprocation:** (Writing cue) "In return for providing us with your friend's addresses, we will send you a copy of the results of our study". **Social Proof:** (Writing cue) "All of the other participants provided several email addresses to us".	(Kaptein et al., 2009)
Traditional marketing	**Reciprocation:** Gift, free samples. **Scarcity:** Using phrases like: "Limited Edition", "Limited number of copies", "Purchase NOW and get a discount", "Limited Opportunity available for Only 3 days!!!" **Authority:** Using experts in advertising. **Commitment:** low-balling and foot-in-the-door tactics in sales. **Social Proof:** Using such phrases: "World's number 1 computer", "6 million men around the world use Gillette". **Liking:** Using celebrities in advertising, using "women like us" in advertising for Dove products or Activia yogurt.	(Cialdini, 1993)
Survey participation	**Reciprocation:** Offering incentive before survey provides higher participation. Providing informational letter before survey. Interviewers provides specific information. **Scarcity:** emphasize the value to a respondent of "making your voice heard", "having your opinion count", coupled with saying that "the opportunity is rare", saying that "there are a few days left" and "I'm not sure I'll be able to interview you if I don't do it now." **Authority**: Emphasize the sponsor of the survey if the sponsor is a legitimate authority (government, educational institutions). The effect will be negative if the sponsor does not have a status (certain commercial organizations). **Commitment:** Draw connections between participating in a survey and the respondent's committed beliefs, attitudes and values. **Social Proof:** Identify other respondents as a social validation tool (but it may cause confidentiality problems). **Liking:** The liked person can refer to either the interviewer or the sponsor organization. Factors enhancing liking: similarity of attitude, background, dress, praise, cooperation, and physical attractiveness (the interviewer can bring one or more of these factors to the survey situation).	(Groves et al., 1992)
Travel (TravelSmart services) three phases: pre intervention, announcement letter,	**Reciprocation:** Offering durable "green" shopping bag as an incentive. **Scarcity:** Pointing out that the recruitment phone call is a unique opportunity to receive different	(Seethaler & Rose, 2006)

Recruitment call	TravelSmart services that are normally not free of charge. **Authority:** Accompanying letter is signed by the local council and the local traders association. The same source, logo and appearance of the TravelSmart announcement letter were used for the letter of the Green Bag. **Commitment:** Accompanying letter with request to reduce plastic bag use was sent. First commitment step; Based on the success of the Green Bag program the local residents are invited by the promoters to participate in the next step. The caller draws the attention to the fact that the promoters of the Green Bag now follow up with their promotion of TravelSmart: The promoters themselves are consistent and committed to further action. **Social Proof:** Seeing the bag of the people around, pointing out that the TravelSmart services have found to be useful by participants in other program areas. **Liking:** Including a voucher for the local shopping strip in the bag, the local residents are praised for their (highly visible) participation in using the Green Bag.	
Online environment (blog reading and fund)	**Social proof:** (Social validation) Comment of the fictitious students. **Liking:** (Likability) The support of the university football team.	(Guadagno et al., 2013)
Peer-to-peer community	**Reciprocation:** (Reward) Hierarchical membership and better quality of service bound with the memberships.	(Cheng & Vassileva, 2005)
Health Promotion domain (health related messages)	**Scarcity:** "We expect a lot of people so please sign up before all available slots are filled". **Authority:** "Both physicians and general practitioners recommend at least 30 minutes of moderate activity, such as walking, during a day. The lunch walks are a great place to start!" "Eating two pieces of fruit a day is recommended by the World Health organization. Our service would make it easier to reach that target". **Social Proof:** "In other companies 1000s of people are already joining in on similar initiatives". "Other companies have picked up similar ideas by providing fruit during lunchtime for reduced prices for employees. If we all join in, we could make this service happen!"	(Kaptein, Lacroix, & Saini, 2010)
Mobile Health	**Authority: "**The World Health Organization advices to be active on a daily basis. Being inactive for prolonged periods is bad for your health". **Commitment: "**You have already been using the activity monitor. Keep active in order to reach your daily goals."	(Dantzig, Geleijnse, & Halteren, 2013)

	Consensus: "Get of your chair and move. 95 % of the participants have already increased their physical activity. Follow their example!" **Scarcity:** "Every day without physical activity is a missed chance to reach a healthier life. Stay active!"	
Evaluating books in online environment	**Scarcity:** This is a limited edition signed by the author! There are only 50 copies of this book left nationwide. **Authority:** "I would recommend this book to anyone."—Stephen King "Every household should have a copy of this"—American Authors Book Review Committee **Social Proof:** Over a million copies sold! Voted best fictional book by college students.	(Kaptein & Eckles, 2012)
Restaurants	**Reciprocation:** Offering chocolate at the end of a meal to increase tips. Fortune cookies given at the end of the meal at Chinese restaurants. **Authority:** Food experts. **Commitment:** To make people inform the restaurant about cancellation of their reservation: use the following sentence: "Will you please call if you have a change to your plans?" instead of "Please call if you have to change your plans".	(Wissler et al., 2002)

2.3.2 Persuasive Technologies

Persuasion term has been brought to the Information Systems (IS) domain by the researchers to explain the behavior changes of humans toward computing systems. When considered computers in the context of persuasion, there are two types of persuasion: computer-mediated persuasion and human-computer persuasion. In computer-mediated persuasion, people persuade other people via computer-based communication like e-mails, messages and blogs. On the other hand, in human computer persuasion, computer technologies persuade people when they interact with the computers (Oinas-Kukkonen & Harjumaa, 2008). According to Fogg (1999) computers can be accepted like human persuaders and they can change the behaviors of human in many different domains like health, safety and education. With advances in technology computing devices like mobile devices and applications are used in changing human behavior in addition to computers.

Persuasion strategies mentioned in section 2.3 and 2.3.1 are also used in persuasive technologies to change human behavior via different technology channels. In addition to persuasion strategies and theories, Fogg (2009b) proposed eight design steps for creating successful persuasive technology from his experiences and academic studies to guide both academics and practitioners. These steps can be conducted sequentially or some steps can be conducted parallel with each other. These steps are not rigid just guidelines to make the design more effective.

- Choose a simple behavior to target: In this step the target goal is reduced into small objectives, since achieving small goals have bigger effects than expected, since small things lead adopting more ambitious behaviors.

- Choose a receptive audience: In this step, the target audience is selected. The audience should be responsive. The more receptive audience should be selected for the target behavior.
- Find what prevents the target behavior: The designer should find what prevents the target behavior. The audience may be lack of motivation, ability or well-timed trigger to perform the target behavior.
- Choose a familiar technology channel: The designer should select the technology channel to reach the audience by considering the previous three steps. The technology channel may be mobile phone, web, digital game, e-mail. The critical point of this step is choosing a familiar technology channel with the audience, because adopting a new technology is also a behavior change.
- Find relevant examples of persuasive technology: The designer should examine the existing examples of persuasive technology that are relevant to the current issue. It is not easy to find an exact example, so that examples of similar behavior, similar audience or same technology channel should be found and examined.
- Imitate successful examples: In this step, the designer imitates what is working from the successful examples.
- Test and iterate quickly: The designer tests various experiences.
- Expand on success: After successful experiences, the designer makes the target behavior more difficult.

2.3.3 Individual Differences in Applying Persuasion Strategies

The effectiveness of the persuasion strategies varies among individuals since each individual can give different responses to same influence strategy. The relationship between the susceptibility of users to different persuasion strategies and their compliance to requests was studied by Kaptein et al. (2009). They created a survey to measure individuals' susceptibilities to persuasion principles of Cialdini and conducted an experiment where cued and non-cued persuasive requests designed according to Cialdini's principles were sent to the individuals in an e-mailing list. Then their compliance to these requests were assessed. They concluded that individuals' compliance increases when a persuasive cue is incorporated to a request. Later, Kaptein (2012) proposed a structured scale to measure the susceptibility of people to Cialdini's six strategies. Also Kaptein et al. (2010) showed that the responses of people to persuasive messages differ according to their persuadability level (low, medium or high). Ünal, Temizel & Eren (2014) showed that some users may even negatively respond to a persuasive message when compared to those for whom no influence strategies are used. These results have paved the way to for personalization of persuasion applications according to individual differences (Hsieh, Munson, Kaptein, Oinas-Kukkonen, & Nov, 2014).

Personality traits are important in implementing effective influence strategies. Hirsh et al. (2012) discussed that persuasive messages are more effective when the message is framed according to the personality traits of people in persuasive communication. Halko and Kientz (2010) explored the relationship between BFP traits and persuasive technologies in the context of health-mobile applications. Participants of the surveys were asked about their perceptions about storyboards incorporating authoritative (instruction style), cooperative and competitive (social feedback), extrinsic and intrinsic (motivation type), positive and negative reinforcement persuasive strategies. Their results showed that personality traits have different impacts on the effectiveness of the persuasive technology strategies. They concluded that personality types could be used to adapt persuasive strategies to meet the needs of users. Orji, Vassileva, & Mandryk (2014) examined the relationship between ten persuasion strategies (customization, simulation, self-monitoring, suggestion, personalization, simulation, praise, reward, comparison, competition, and cooperation) and seven gamer types (Achiever, Conqueror, Daredevil, Mastermind, Seeker, Socializer, and

Survivor) to motivate healthy behavior. They proposed the most and least effective persuasion strategies for each gamer type to guide personalized persuasive game design. Kaptein, Markopoulos, de Ruyter, & Aarts (2015) stated that trait differences affect responses to persuasion principles. In his seminar paper, Saquib (2012) proposed a methodology to investigate the relationship between the BFP traits and four of the influence strategies of Cialdini. However, the results of this research were inconclusive.

2.3.4 Persuasion Profiling

Persuasion profiles refer to "sets of estimates of the effectiveness of particular influence strategies on individuals" (Kaptein, Eckles, & Davis, 2011). Persuasion profiles are used by persuaders to select the most effective influence strategy to reach their target. Persuasion profiles are created by taking into account individuals' differences. For example these differences can be based on their demographic information such as age and gender, their personality traits or their behavioral data (Kaptein & Eckles, 2010). Persuasion profiles are used in adaptive persuasive systems.

Researches show that persuasion profiles can increase the effectiveness of the persuasive technologies (Kaptein et al., 2011). In this study an experimental online bookstore is set up and customers are required to browse books by titles and mark them for purchase. They alternate the types of pitches by authority, social proof and like influence strategies and track the most persuasive argument for each person. For example, while some customers may follow the expert review (authority), some may follow popular titles. In the study, by identifying the persuasion strategies effective on customers, they increased the performance of recommendation by 30 to 40 percent (Pariser, 2011).

In the study conducted by Kaptein (Kaptein, 2011), persuasion profiles were implemented in e-commerce setting. User tracker system was used to adapt the right influence strategy to the right user. Scarcity and Consensus strategies were tested in product presentation. The study resulted that using adaptive system and persuasion profiling increased the site performance.

2.3.5 Persuasive Messaging

Persuasive messages refer to communication that intends to influence in a specific way (Walji & Zhang, 2008). Most of the persuasive attempts depend on generating persuasive messages independent from the medium that the message is delivered. These messages are used to influence decision making. Persuasion strategies are used to create persuasive messages and persuasive messaging focuses on the message itself. There are different applications of persuasive messaging in different contexts. The study conducted by Walji & Zhang (2008) represents persuasive messages in appointment reminder for a clinic. In the creation of the messages, four influence strategies of Cialdini were considered: commitment and consistency, liking, authority, scarcity. The study did not test the influences of the messages on real patients; the messages were evaluated by clinicians, university students and staff.

Kaptein, De Ruyter, Markopoulos, & Aarts (2012) conducted a study which uses persuasive short text messages (SMS) to reduce snacking. They created 40 messages depending on four influence principles of Cialdini: authority, scarcity, consensus, commitment. They chose three messages per influence strategy and tested in an experimental design with real participants according to participants' persuadability. They concluded that persuasive text messages are effective in changing behavior especially when the right influence strategy was chosen for the right participant.

Kaptein and van Halteren (2013) implemented persuasive messaging service by sending e-mail reminders to upload activity data for a commercial activity promotion service. Scarcity,

authority and consensus influence strategies were employed in the messages which were personalized according to the name of the participants. The message effectiveness of persuasive messages were found higher compared to neutral messages which was measured by a questionnaire.

In the study conducted by Goh, Seet and Chen (2012) the impact of persuasive SMS over students' self-regulated learning were measured. Motivated Strategies for Learning Questionnaire (MSLQ) was employed to test students' self-regulated learning as pre-test and post-test. The persuasive messages based on Fogg's persuasive principles (simplifications, tailoring, suggestion, conditioning, tunneling) were sent to treatment group between pre-test and post-test. Their results showed that there is a significant difference between the MSLQ scores of the students in control group where no persuasive messages were sent and treatment groups which received persuasive messages.

2.4   Academic Motivation

To predict academic performance, researchers conducted studies on many different factors. Academic motivation is one of important predictors of academic success. Motivation has an important impact on students' behaviors and learning (Fairchild, Horst, Finney, & Barron, 2005) and is related to learning outcomes and performance. In educational researches, researchers used different motivational theories to examine academic motivation (Fortier, Vallerand, & Guay, 1995); expectancy-value theory (Berndt & Miller, 1990); goal theory (Meece & Holt, 1993); self-efficacy theory (Zimmerman, Bandura, & Martinez-Pons, 1992); intrinsic motivation (Deci & Ryan, 1985). The current study chose MSLQ to measure the motivation of the students which includes 6 factors of motivation, which also covers self-efficacy, intrinsic and extrinsic motivation mentioned in different approaches. The details of MSLQ and related studies are given in the next section.

2.5   Motivated Strategies for Learning Questionnaire (MSLQ)

There are different motivational factors and scales researched in the literature to measure college students' motivation for a specific course such as Achievement Motivation Inventory (AMI) (Schuler, Thornton III, Frintrup, & Mueller-Hanson, 2004); Echelle de Motivation en Education (EME) (Vallerand, Blais, Brière, & Pelletier, 1989; Vallerand et al., 1992) and MSLQ. In the scope of this study, the six factors measured by MSLQ was taken into consideration (Artino Jr, 2005; Pintrich, 1991). MSQL was designed to measure college students motivation and self-regulated learning by relating to a specific course (Artino Jr, 2005). MSLQ measures 6 motivational factors under three constructs. The details of these six motivation factors and the related studies are given below:

Value construct

- *Intrinsic Goal Orientation (IGO)* refers to students' perceptions of engaging in a learning task for challenge, curiosity or mastery. A high score of intrinsic goal orientation for an academic task indicates that the students participate in these tasks for themselves. Students with high intrinsic motivation take higher course grades (Brackney & Karabenick, 1995; Credé & Phillips, 2011; Lin et al., 2001) or higher levels of intrinsic value was correlated with higher level of student achievement (Pintrich & De Groot, 1990)
- *Extrinsic Goal Orientation (EGO)* represents extrinsic reasons to participate in a task. The reason could be grade, rewards or competition. Students with high extrinsic goal orientation participate academic tasks to gain the grade or rewards not for the task itself. For example, students with medium or high extrinsic motivation take higher course grades (Lin et al., 2001).

- *Task Value (TV)* refers to students' perception of how the task is important and useful. A positive correlation between task value and course grade was reported in the study of Brackney and Karabenick (1995).

<u>Expectancy construct:</u>

- *Control of Learning Beliefs (CLB)* refers to students' beliefs where they can control their efforts to learn and this will provide positive outcome. Control of learning beliefs was found as positively correlated with course grade (Lin et al., 2001).
- *Self-Efficacy for Learning and Performance (SELP)* refers to expectancies of ability to accomplish a task. Self-efficacy positively predicts students' course grade (Brackney & Karabenick, 1995; Credé & Phillips, 2011) as well as their GPA (Yusuf, 2011). Similar to IGO, higher level of self-efficacy was reported as associated with higher level of student achievement (Pintrich & De Groot, 1990).

<u>Affect construct:</u>

- *Test Anxiety (TA)* includes students' negative thoughts that prevent their performance. Test anxiety was found as negatively related to course grade (Brackney & Karabenick, 1995; Credé & Phillips, 2011; Pintrich & De Groot, 1990).

2.6   Bayesian Structural Equation Modeling

Structural Equation Modeling (SEM) is a statistical method to conduct confirmatory factor analysis, to create structural models and to investigate relationships between latent and observed variables (Hoyle, 1995). The relationship could be represented in either graphical form or equational form. SEM is one of the mostly used method in behavioral sciences to test the hypotheses (Gefen, Straub, & Boudreau, 2000). By using SEM, dependent variables can be predicted from independent variables. There are two general applications of SEM depending on the least square estimation and maximum likelihood estimation (Gefen et al., 2000).

Bayesian Structural Equation Modeling (BSEM) is an alternative to general applications of SEM to handle the assumptions of them (Lee, 2007). Different from the two forms of traditional SEM, BSEM depends on Markov Chain Monte Carlo (MCMC) (Muthén & Asparouhov, 2011). In MCMC method, previous sample was used to generate the next sample with a Markov chain (Dunson, Palomo, & Bollen, 2005). MCMC is like a bootstrapping mechanism that estimates the shape of posterior distribution.

BSEM has many advantages and is differentiated from traditional SEM (Dunson et al., 2005):

- BSEM allows nonlinearity, interactions, missing data, mixed categorical variables.
- BSEM could be implemented with small sample size.
- BSEM does not have normal distribution assumption, so that it provides flexibility.
- BSEM uses priors which is distinguishing feature of Bayesian inference, which are the specifications of prior distribution for the model parameters (Kaplan & Depaoli, 2013).

BSEM requires the specification of priors before analysis. Prior distributions for model parameters are defined before the analysis for each model parameters. Prior information is important since inference of the model is based on the posterior distributions of model parameters and posterior distributions rely on prior distributions. Priors could be non-informative (also called as "vague" or "diffuse") or informative. Non-informative priors

mostly defined as the uniform distribution over a range of values. When there is enough information about the shape and the scale of the distribution, it could be defined as informative priors (Hoyle, 2012). Also previous studies and models information could be valuable for prior information.

Model Convergence in BSEM can be checked from Gelman-Rubin convergence diagnostics, C.S statistics in Amos (Arbuckle, 2012; Gelman, Carlin, Stern, & Rubin, 2004). For model convergence, the value of C.S. should be smaller than 1.002, 1.000 represents the best model convergence while 1.10 or smaller values are sufficient for many analysis (Gelman et al., 2004).

Model fit in BSEM is simply assessed with posterior predictive p value (Kaplan & Depaoli, 2013). Having p value around 0.5 represents very good fit of model to data (Dunson et al., 2005; Muthén & Asparouhov, 2011). However, models are acceptable when p is between 0.3 and 0.7 (Song & Lee, 2006). A zero value of p indicates that the model does not represent the data (model misfit).

The Bayesian analysis has been implemented in various studies to; validate short term personality scale (Milojev, Osborne, Greaves, Barlow, & Sibley, 2013) and path analysis between observed variables (Gaumé & Wunsch, 2010). In addition, the BSEM has been employed to conduct CFA (Muthén & Asparouhov, 2011). Additionally, BSEM was employed in medical research (Oztaner, Taskaya Temizel, Erdem, & Ozer, 2014). BSEM methodology is given in details in (Arbuckle, 2012; Dunson et al., 2005).

2.7   Implications of the Literature Review

- Personality traits could be used to identify individual differences and could be used as the predictor of outcome in different contexts. BFP model is the widely used model of personality.
- Persuasion is directly related to behavior change. There are different approaches to persuasion. Cialdini's six persuasion strategies are widely used persuasion approach in persuasion researches, which are effective to chance human behavior in different context.
- There are different mediums to apply persuasion strategies. Persuasive messaging is one of the applications of persuasion.
- Individual differences are important in application of persuasion strategies.
- Motivation and personality are predictor of academic performance and related with the learning behaviors.
- Persuasion may be applied to change learning behaviors of students.

CHAPTER 3

HOW TO PERSUADE STUDENTS FOR ACTIVE PARTICIPATION IN COURSE ACTIVITIES? - A QUALITATIVE APPROACH

The previous chapter detailed the six persuasion principles of Cialdini. In this chapter, a quantitative study is presented to understand how these persuasion strategies are applied in education context or how to apply them. Two interviews were conducted: the first interview was conducted with instructors (referred as study 1 hereafter in this chapter) and the second one was conducted with students (referred as study 2 hereafter in this chapter). In the following parts of this chapter, the method employed is presented and the results of the interviews are given and discussed.

3.1 Method

In order to get an idea of how students are influenced to attend the lectures and to participate in educational activities from the perspectives of Cialdini's six persuasion principles, two interviews were conducted with students and instructors to reach:

- The persuasion principles that are effective to change behaviors of students,
- Whether we can use online tools comprising learning management systems, e-mail and social networking sites to persuade students for participating in educational activities and if so how.

This part of the study aims to answer the following research questions:

1) What persuade students to attend lectures regularly?
   - Which persuasion principle is effective to change the participation behavior of students?
   - What are the triggers that can increase participation to lectures?

3.1.1 Study 1- Sampling and Data Collection

An interview schedule was designed and employed to collect data. It included questions on how instructors make students participate to their courses. The questions were prepared by taking into account Cialdini's persuasion principles. There are 14 questions asked which are given in Appendix A. Some questions also have sub-questions which are asked according to the answer of the corresponding question. The questions were asked in Turkish. Before conducting the interview, it was pilot tested with two teaching assistants and some questions were revised for clarity.

The interview was conducted with 8 instructors from different departments at Middle East Technical University (METU). The interviews were conducted at the first two months of fall semester of 2013. Table 4 shows the demographic data of the participants. In the study, the sample size was not specified previously; instructors from different departments and different ages were tried to be reached: total 8 instructors participated to the study. Their age changes between 34 and 66.

There are instructors from different faculties like educational sciences and engineering sciences. The instructors' participants were selected from different departments to get an idea of how instructors from different departments pay attention to students' attendance and how they encourage students to attend the lectures regularly. All instructors give lecture in the same university (METU) in Turkey. The participants were contacted personally via e-mail or phone. The interviews lasted about 15 minutes and conducted in the offices of the instructors. All of their speech was recorded. All the interviews were conducted by the same interviewer.

Table 4: Instructors' demographics (lecturing period: in number of years; number of courses implies the number of different courses given by the instructor)

Participant ID	Gender	Age	Department	Lecturing period	Academic title	Number of courses
P1	Female	66	Educational Sciences	26	Prof. Dr.	5
P2	Male	37	Computer Engineering	7	Assoc. Prof. Dr.	6
P3	Female	43	Mining Engineering	15	Prof. Dr.	6
P4	Male	42	Business Administration	20	Assoc. Prof. Dr.	3
P5	Male	39	Mechanical Engineering	10	Assist. Prof. Dr.	3
P6	Male	46	Mathematics	24	Prof. Dr.	6
P7	Male	38	Petroleum and Natural Gas Engineering	3	Assist. Prof. Dr.	4
P8	Female	34	Civil Engineering	7	Assoc. Prof. Dr.	3

3.1.2 Study 2- Sampling and Data Collection

An interview schedule was designed and employed to collect data from students. The interview included questions on students' participation to the courses and what factors affect their participation. There are 19 questions which are given in Appendix B. The interviews were conducted with students who previously took the introductory information technology course.

The interview was pilot tested with a PhD student and some questions were revised for clarity. It was conducted with 11 students. The interviews were conducted at the first two months of fall semester of 2013. The student participants were selected from the former students who completed the introductory information technology (IS100) course offered to all the departments in METU (Except Computer Education department). This course has been chosen in the scope of the study, since students are not attentive towards this course and students' attendance to the course is not regular: every semester 50% of the registered students are failing with NA (Not Attended) grade. Students are allowed to take the course in face-to-face classes or online. The demographics of the participants are given in Table 5. The participants of the study were contacted personally via e-mail. The interviews were

conducted in the office of the interviewer or school library and lasted 15 minutes. All of their speech was recorded and the interviews were conducted by the same interviewer.

Table 5: Students' demographics

Participant ID	Gender	Age	Department
P1	F	21	Chemical engineering
P2	M	22	Business administration
P3	F	26	Early math education
P4	F	22	Physics
P5	F	22	Physics
P6	F	22	International relations
P7	F	25	Physics education
P8	M	28	Elec. and Elect. Engineering
P9	M	22	Economics
P10	M	25	Computer engineering
P11	M	26	Computer engineering

3.1.3 Analysis Approach

In the analysis of interview data, content analysis was performed which is based on transforming raw data into categories or themes based on interpretation. In content analysis, the categories and themes can be generated by following previous theories and findings or the codes could be generated inductively (Berg & Lune, 2004) (Zhang & Wildemuth, 2009).

First of all, all interviews were transcribed as soon as possible without waiting for completion of the interviews. The coding strategy was defined including the coding units. The raw data was separated to coding units question by question. All coding units were defined to codes by a single researcher. After coding all units, all interviews were checked again for consistency by the same researcher. After the codes were defined, the codes were reviewed by two other researchers who are both PhD students and have sufficient experiences and the raw data were checked (Creswell, 2012). Finally, all codes were grouped into categories and the main themes were identified in the data.

3.2 Results and Discussion

3.2.1 Results of the Study 1

From the first interview, four persuasion principles of Cialdini's were identified as effective strategies to attend/participate the lectures from the perspectives of the instructors: social proof, liking, reciprocation and scarcity. Additionally, grade level of the students, number of the students in lectures, the medium of the instruction and students responsibility were identified as effective factors in attending/participating the lectures.

Social Proof (Consensus)

Cialdini states that people follow the lead of others similar to themselves (Cialdini, 2004). Social circle (friends of the students) and the classroom environment are the major elements of social proof in education context. Study 1 seeks the reasons why students attend and participate to the courses from the perspective of instructors. Most of the participants mentioned that most of the students are affected by their friends, including friends in the same departments, friends from different departments and friends from their dormitories. Students mostly are affected by their friends in selecting courses (especially selecting

elective courses), selecting sections (the same course is offered in different sections and different instructors), and attending a course.

The other element of social proof is classroom environment. In order to attend lectures regularly, the students should be a part of the community in the classroom. If a student is excluded from the community, s/he may not attend the course regularly. If students in a class do not attend lectures regularly, a student may follow their behavior.

Liking

Cialdini states that people follow the behavior of people that they like (Cialdini, 2004). According to the results of study 1, attitude towards instructor and strict behavior of the instructor seem to be the key two elements of liking. All the participants mentioned that if students like the instructor, they will follow his/her instructions, attend the lectures regularly and enjoy attending the lectures. One of the participants has given an example: some students in his courses are more willing to attend his courses and participate to all class activities regularly. However these students do not behave in the same manner in the courses of other instructors. He realized that situation when he talked to other instructors who are his friends.

The other element of liking is strict behavior of the instructor. This type of behavior includes strict rules about attendance, strict rules in class activities and the limited communication with the students. The interview results show that the strict rules of instructors may be helpful to make students attend classes, but it does not cause a continuous behavior. Students do not like instructors who follow strict rules and as a result they may not be willing to attend and participate to their courses.

Reciprocation

According to Cialdini, reciprocation is the re-pay behavior of people such that when you make a favor to a person, s/he has a tendency to repay back (Cialdini, 2004) There are three elements of reciprocation in the results of study 1: grading attendance, awarding bonus points to attendance and/or participation. According to the results of study 1, most of the instructors take attendance in their lectures as a department rule or as their own choice and attendance points constitute part of the total grade of the course. Some of the instructors award bonus points to the attendance on top of the total grade. For example they calculate total grade over 110 including 10 points for attendance. 7 of the participants mentioned that when attendance is graded, the students become more willing to attend the lectures. Although, most of the instructors oppose the idea of grading attendance, they still use this strategy to make students attend the lectures. Also, two of the instructors give bonus points to active participation during lectures such as asking questions, answering questions, taking part in activities during lecture. They apply bonus grade strategy in this way, because they mentioned that if only attendance is graded then the students will attend the lecture to get the bonus grade. But if you grade participation, they will participate in lecture actively to get the bonus grade.

Scarcity

Scarcity refers to people's tendency to have the limited one (Cialdini, 2004). When something is scarce, people are more willing to do it. Instructors remind important dates such as homework deadline, exam date in class and via e-mail. These reminders mostly give information about limited time the students have in order to do homework or to study for the exams. Four of the participants mentioned that reminding the time left has a positive effect on students to do their homework or to study for their exams.

Class activities

In addition to the findings related to the persuasion principles, course activities which are effective in making students attend the lectures were identified. The activities are class exercises, group works, discussions, class presentations, and quizzes. Most of the participants mentioned that when the lectures included class activities, the attendance of the students became higher since the students prefer to participate in activities instead of listening instructors' presentations.

Other factors

According to the results of study 1, the factors other than the persuasion principles which affect students' attendance and participation to the lectures were determined. These factors are as follows:

- *Level*: the graduate students are more willing to attend to and participate in the courses than the undergraduate students.
- *Number of students:* If the classes are over capacity, the instructors have difficulty in interacting with students.
- *Medium of the instruction:* In METU, the medium of instruction is English. The students, who have inferior English language skills, do not participate in the lectures actively although they attend the lectures regularly. When they are allowed to speak Turkish, they actively participate in the lectures by asking questions and answering the questions of the instructor. When the instructors want to take the attention of the students to the topic, they start to talk in Turkish.
- *Responsibility:* Despite all the efforts regarding awarding attendance in the classes, all the instructors think that attending lectures should be the responsibility of the students and the students who are aware of their responsibility attend the lecture regularly.

3.2.2   Results of the Study 2

The results of the second interview revealed four persuasion strategies of Cialdini's as effective strategies to attend/participate to lectures from the perspectives of students: reciprocation, scarcity, social proof and liking. Additional course specific factors were identified: class activities, course content, course materials, homework and enjoyment. Also three online tools (Learning Management System, online discussion group, social networking sites) were identified that students wanted to use.

Reciprocation

In the results of study 2, the element of reciprocation is bonus points for attendance. Nine of the participants mentioned that if the attendance is graded as bonus points in addition to total grade of other course activities, they become more willing to attend the courses regularly to get the bonus grade.

Scarcity

Students have a tendency to forget important deadlines so they prefer to be informed about deadlines of homework and date of exams, so that they will not miss any of them. Also they want to know the remaining time for a deadline.

Social proof (Consensus)

Students are influenced by their classmates. If there is a perception among students that the course is unimportant or easy, they become unwilling to attend the lectures. Nine of the participants mentioned that if they hear something negative about the course from their classmates, they will have a tendency not to attend the course.

<u>Liking</u>

If students like instructors, they become more willing to attend the instructor's lectures. In addition, if the lectures are uninteresting and instructors remain distant from their students particularly in lecture settings, students may not want to attend lectures.

<u>Course Specific Factors</u>

According to the results of study 2, some course specific factors were identified which are effective in students' attendance:

- *Class activities*: Class activities are seen as being effective by students, since they think that they can learn the content of the course by doing related activities.
- *Content*: If students have a perception that the content of a course is useful and they can relate the content to real life situations, their participation behavior changes in a positive way. Similarly, if they think that the content is uninteresting; students are not willing to attend lectures regularly. Students find the content uninteresting when the topics are repeated or detailed significantly. In addition, students think that IT related courses' content should always be up-to date.
- *Course materials*: Course materials should be appropriate to teach the content. For example, there are course videos for the introductory information technology course, students can watch at any convenient time. These videos attract attention of the students.
- *Interesting homework*: The content of the homework should be interesting in order to attract the attention of students.
- *Enjoyment*: If students enjoy during lectures, they are more willing to attend lectures.

<u>Online tools</u>

The use of online tools and the students' attitudes towards their use were explored. Students are willing to use online tools for their courses, since they want to access course materials at any time, at any location. Furthermore they think that online tools facilitate communication between instructors and students as well as between students. According to the results, three online tools were identified:

- *Learning Management System:* The use of learning management systems is supported by the students since; they can easily reach course materials at any time, at any location. But some students mentioned that 24/7 availability of course materials is an excuse for them not to attend face-to-face classes regularly since they think they can compensate for missed classes by watching online video lectures. In addition, the learning management system should be available at all times and it should be user-friendly otherwise students are not willing to use such systems.
- *Online discussion group:* Online discussion groups are seen as effective tools to discuss course related topics out of class. Students are willing to participate in these groups, because they think that by discussing, they can learn the topics more easily.
- *Social networking site (SNS):* The popularity of social networking sites like Facebook and their wide use by students and their continuous availability makes them an attractive discussion community. The students were asked about the use of SNS to support learning community and their answers changed from participant to participant. Four of the participants were opposed to their use in learning activities, the remaining were willing to use them as supporting tools because they think that they can easily reach course related information using SNS.

<u>Other factors</u>

In addition to aforementioned factors, there are other factors which are effective in students' attendance: eagerness to learn and knowledge level. Here eagerness to learn refers to students' desires to learn. If students' desires are high, they will be more motivated to attend the lectures. Knowledge level refers to how much students are familiar with the course content. If students believe that they already know the content (whole or partial), they will be less motivated to attend to the lectures.

CHAPTER 4

THE EFFECTS OF PERSONALITY TRAITS OVER PERSUASION STRATEGIES

The previous chapter identified how the persuasion principles of Cialdini were employed in course participation and educational activities from the perspectives of instructors and students. This chapter investigates what persuasion strategies are more effective for whom. More specifically, the Big Five personality traits of Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness are investigated in relation to susceptibilities of six influence strategies of Cialdini that are Reciprocation, Authority, Liking, Scarcity, Commitment and Consensus. Quantitative data collection was employed to collect data. In the following parts of this chapter, the method employed, data analysis and results are presented; the findings are discussed with the related literature.

4.1 Method

Recent studies show that individuals could give different responses to the same persuasion strategies which leads to personalization of persuasion strategies for better effectiveness. This study investigates what persuasion strategies are more effective for whom. More specifically, the relationship between the Big Five Personality traits (extraversion, neuroticism, agreeableness, conscientiousness and openness) and six persuasion strategies (authority, reciprocation, scarcity, liking, commitment and consensus) is explored. This part of the thesis aimed to answer the following research questions:

1) Does the susceptibility of the participants to persuasion strategies differ according to their personality traits?
   - What is susceptibility of the each personality traits (five personality traits) to each of the six persuasion strategies?

Hypotheses

The following hypotheses were formulated based on the findings obtained from the related literature.

Authority strategy implies the inclination to comply more with a statement or request made by a legitimate authority. Agreeable people are altruistic, sympathetic, and eager to help others (Costa & McCrae, 1992). These people have cooperative values and exhibit positive interpersonal relationship skills (Zhao & Seibert, 2006). A person who are high on agreeableness trait is also bound to fear from not complying with the laws, policy and procedure defined by the authority as incompliance will result in prosecution and being punished. Negligence of laws, procedure and laws generally portray low end of agreeableness (Karim, Zamzuri, & Nor, 2009). Conscientious people also show

responsibility for themselves and other people. They are organized, disciplined, responsible and achievement-oriented. Individuals high on this trait confirm to rules and regulations (Karim et al., 2009). In addition, Halko and Kientz (2010) found a negative relation between openness and authoritative persuasion type. Openness is reflected in a higher degree of intellectuality, imagination, and independent-mindedness (John & Srivastava, 1999; McCrae & Costa, 1987). Thus,

Hypothesis 1a: Individuals who are high on the agreeableness and conscientiousness traits are inclined to authority persuasion strategy.

Hypothesis 1b: Individuals who are low on the openness trait are inclined to authority persuasion strategy.

Reciprocation strategy suggests that people might feel obliged to return a favor (Cialdini, 2004). Even they had never asked for, they can reciprocate to favors (Cialdini, 2004; James & Bolstein, 1990). Gouldner (1960) defines reciprocity as the universal belief that people should help those who helped them in the past. According to Gouldner (1960) people repay back the services they have received in the past from an individual or group of individuals as they think it is the right thing to do but not for what they expected in return. In the study of Dohmne, Falk, Huffman and Sunde (2008) the determinants of trust and reciprocal inclinations (positive and negative) were investigated relating survey measures of social preferences to the measures of BFP using data from the German Socio-Economic Panel Study. They found that all big five personality traits have a significant and positive impact in the regressions for the positive reciprocity. So the following hypothesis was developed,

Hypothesis 2: Individuals high on the agreeableness, conscientiousness, neuroticism, extraversion and openness traits are all inclined to reciprocation persuasion strategy.

Scarcity is related to valuing more of scarce things. For example, some people may feel obliged to buy the very last item in an e-shopping web site. Neuroticism trait is characterized by anxiety, fear, frustration and loneliness (Thompson, 2008). It refers to being worried and insecure. Neurotics people also react too strongly to all types of stimuli (Eysenck & Eysenck, 1975). In a study conducted on phishing scam e-mails, the users are sent e-mails promising a product to the first users to click the link (Scarcity), it is observed that neurotic user clicked more than others (Halevi, Lewis, & Memon, 2013). In addition, in e-commerce settings, a purchasing event created with a time-limited option or discounted offer can result in a form of stress associated with a desire for the product due to its scarcity (Sundström, Balkow, Florhed, Tjernström, & Wadenfors, 2013). This fear of losing the limited option may affect neurotic people's behavior. The scarcity related questions of STPS scale based on Cialdini's principles are mainly about giving value to rare products. Shopping motives are defined as individuals' motives that induce consumers to shop which were found as significantly related with big five traits in the literature (Guido, 2006). The study of Guido, conducted based on well-known scale of Tauber (1972) includes questions about motives such as pleasure in bargaining, self-gratification and sensory stimulation. Researchers found that there is a significant relationship between extraversion trait and value shopping (Guido, 2006; Karl, Peluchette, & Harland, 2007) which is about the enjoyment for seeking special discounts. Extravert individuals are known as being outgoing, energetic, and social. Therefore,

Hypothesis 3: Individuals high on the neuroticism and extraversion traits favor scarcity persuasion strategy more than others.

Commitment and *consistency* denote people's tendency to align with their earlier clear commitments. People inclined to this strategy tend to follow through their appointments whenever they commit to them. If they miss an appointment, they make it up. Individuals

high in conscientiousness trait tend to be more goal oriented, organized, hardworking and reliable. They were shown to be related to all aspects of punctuality such that they have the ability and motivation to appear on time in different situations in the literature (Ashton, 1998; Back, Schmukle, & Egloff, 2006; Hattrup, O'Connell, & Wingate, 1998; Judge, Martocchio, & Thoresen, 1997). In addition, conscientious individuals were reported as goal committed (Barrick, Mount, & Strauss, 1993) and self-regulated (Jensen-Campbell et al., 2002). Self-regulated people tend to follow their promises. Consciousness and agreeable individuals were shown to be related to all aspects of punctuality (Back et al., 2006). They are more motivated to stick to mutual agreements. Thus,

Hypothesis 4: Individuals high on the conscientiousness and agreeableness personality traits favor commitment persuasion strategy.

Social proof (*consensus*) is a principle signifying the propensity to follow the lead of similar others and *liking* encompasses the propensity to say 'yes' to people they like. In consensus strategy, people observe others while making their decisions. Individuals tend to comply with a persuasive message if they observe other people have also complied. This strategy is particularly effective in situations of high uncertainty and ambiguity (Cialdini, 2001). Agreeable people were reported as good team members (Peeters, Tuijl, Rutte, & Reymen, 2006) and cooperative and it is important for them to be fit in. On the other hand, closed individuals feel more comfortable with familiar and traditional experiences (McCrae & Sutin, 2009). These individuals may need the opinions of someone they trust or like in unfamiliar settings. Likeability strategy is about the tendency of being influenced by someone who is similar or familiar to us. In a study, agreeableness and extraversion traits were found as significant predictors of social acceptance in a meta-analytic review about children's peer relations (Newcomb, Bukowski, & Pattee, 1993). Both of these traits were linked most consistently to measures of likeability (Wortman & Wood, 2011). As a result, the following two hypotheses are proposed:

Hypothesis 5: Individuals high on agreeableness and extraversion and low on openness traits are more inclined to consensus and liking strategies than others

4.1.1 Participants

All the participants were undergraduate students taking IS100 course at METU, which is one of the leading public universities in Turkey. All of the participants were Turkish students. The survey link was sent to total 658 students, but 381 students participated in the study (59 % response rate). 64 entries were eliminated, because they either left the survey incomplete or gave same score to all items. Also the participants who gave inconsistent answer were eliminated. Of the remaining participants, 186 were female and 131 were male. The average age was 22.18 (SD=2.03).

4.1.2 Procedure

To conduct the study with human participants, the necessary permission was obtained from METU Research Center for Applied Ethics (Appendix C). Participation to the research was totally voluntary. An online survey link was sent to the participants' school email addresses at the beginning and at the end of the semester.

4.1.3 Instruments and Measures

An online survey was conducted to collect data. The survey consisted of three sections to measure the variables of personality, susceptibility to persuasion principles and demographic profile of the participants.

Personality Traits

To measure personality traits, Big Five Inventory was chosen, which includes 44 items (John & Srivastava, 1999). BFI was chosen, since it has been reported to be highly reliable despite having fewer items than NEO Personality Inventory-Revised (NEO- PI-R) and NEO-Five Factor Inventory (NEO-FFI) (Gosling et al., 2003). Also BFI is older than TIPI and validated more. The items were rated on a 5-point Likert scale from 1-Strongly disagree to 5-Strongly agree.

BFI was translated into Turkish by Ünal (2015) and tested with a pilot study in the scope of this study. The items are given in Appendix D (both the English and Turkish versions). In the pilot study, total 21 participants have filled the survey. Cronbach's alpha scores for 5 subscales of BFI are given in Table 6 for pilot study. All of the subscales were found reliable, only agreeableness had low but acceptable reliability score.

Table 6: BFI Pilot study Cronbach's alpha scores

Personality Factor	Cronbach's Alpha	Number of Items
Extraversion	0.861	8
Agreeableness	0.623	9
Conscientiousness	0.863	9
Neuroticism	0.873	8
Openness to Experience	0.841	10

Susceptibility to Persuasion Strategies Scale

Kaptein's scale, Susceptibility to Persuasion Strategies (STPS) (Kaptein, 2012) was used to measure the degree of propensity for being influenced by the six strategies. The scale was translated into Turkish and its reliability was tested with a pilot study. The items were rated on a 7-point scale, from 1-completely disagree to 7- completely agree. The measurement items are given in Appendix E.

47 subjects participated in the pilot study. They filled the scale online. There was a comment section after the scale and the subjects have given their feedbacks about the translation via this form. After that, the researchers conducted face-to-face interviews with 10 of the participants to check the understandability of the Turkish version of the scale. According to the feedbacks of the participants, some of the items were revised. According to reliability (given in Table 7), only the liking seems to be problematic, since it had a low reliability score, so that the items for liking were revised after reliability analysis.

Table 7: STPS Pilot study Cronbach's alpha scores

Persuasion Strategy	Cronbach's Alpha	Number of Items
Authority	0.764	5
Scarcity	0.748	5
Commitment	0.648	5
Consensus	0.773	5
Liking	0.346	5
Reciprocation	0.803	5

BSEM was selected to analyze the models to handle the strict assumptions of regression analysis and to identify the causality between variables, which correlation analysis does not give. Multiple regression analysis has assumptions of suitable specification of the model, linear relationship between variables, no multicollinearity between predictor variables and normality (Alavifar, Karimimalayer, & Anuar, 2012; Field, 2009). The details of BSEM is given in section 2.6.

4.2   Results

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS 18) and Analysis of Moment Structure (Amos 21).

4.2.1   Reliability Analysis

To examine the internal consistency of scales, Cronbach's alpha (coefficient alpha) was checked (Ary, Jacobs, & Razavieh, 2002). The Cronbach's alpha scores were computed for each subscale in the dataset (given in Table 8). The internal consistency measured by the Cronbach's alpha score should not be less than 0.7. All subscales of the questionnaire except for agreeableness trait had a good internal consistency of $\alpha > 0.7$, however this factor was included in the further analysis since the alpha score was slightly lower than the required value.

Table 8: Cronbach's alpha scores for BFI and STPS (main data collection)

Scale	Subscale	Cronbach's Alpha	Number of items
Personality Traits (44 items)	Extraversion (E)	0.819	8
	Agreeableness (A)	0.615	9
	Conscientiousness (C)	0.762	9
	Neuroticism (N)	0.810	8
	Openness (O)	0.792	10
Susceptibility to Persuasion Principles (30 items)	Reciprocation (REC)	0.869	5
	Scarcity (SCAR)	0.774	5
	Authority (AUTH)	0.821	5
	Consensus (CONS)	0.733	5
	Liking (LIKE)	0.772	5
	Commitment (COM)	0.669	5

4.2.2   Principal Component Analysis

The factor structure of STPS was validated using PCA with direct oblimin rotation in line with Kaptein's study (Kaptein, 2012) since the Turkish version has not been verified. Therefore, its factor structure was validated using PCA. PCA was chosen since it is mathematically simpler than factor analysis (Stevens, 1996). PCA requires minimum 10 cases for each variable (Nunally & Bernstein, 1978). The sample size of 317 participants and 30-item scale was adequate to employ PCA. The Kaiser–Meyer–Olkin value was 0.820, which is higher than the recommended value of 0.6 (Tabachnik & Fidell, 2007). Bartlett's test of Sphericity was found statistically significant (Approx. Chi-Square = 3794, df = 325, sig = .000), which supports the factorability of the correlation matrix. PCA revealed six components explaining 63.30% of total variance. Pattern Matrix is given in Table 9.

Table 9: STPS Pattern matrix

	Component						Cronbach's Alpha
	1	**2**	**3**	**4**	**5**	**6**	
REC3	.869						
REC2	.863						
REC5	.779						0.869
REC1	.765						
REC4	.734						
CONS3		.851					
CONS5		.764					
CONS4		.683					0.776
CONS2		.650					
AUTH4			-.798				
AUTH2			-.775				
AUTH3			-.717				0.821
AUTH1			-.652				
AUTH5			-.628				
SCAR2				-.768			
SCAR3				-.754			
SCAR5				-.752			0.774
SCAR1				-.651			
SCAR4				-.580			
LIKE3					.830		
LIKE5					.807		0.760
LIKE4					.699		
LIKE2					.551		
COM1						.892	
COM2						.856	0.739
COM5						.539	
Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.							
a. Rotation converged in 11 iterations.							

A composite score was computed for each personality trait and persuasion principle after reliability and PCA. These scores were later used in the models. Table 10 presents the descriptive statistics of the scores for all variables. Our dataset is highly skewed towards 7, particularly for reciprocation and commitment strategies. This may be expected since those who are more committed to a goal may be more inclined to attend the study than those who are not.

Table 10: Descriptive statistics of scores for personality traits and influence strategies

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Extraversion (E)	317	1.250	5.000	3.420	0.720
Agreeableness (A)	317	1.670	5.000	3.571	0.508
Conscientiousness (C)	317	1.220	5.000	3.196	0.603
Neuroticism (N)	317	1.000	5.000	2.991	0.738
Openness (O)	317	1.500	5.000	3.702	0.588
Reciprocation (REC)	317	1.000	7.000	5.296	1.173
Scarcity (SCAR)	317	1.000	7.000	4.623	1.336
Authority (AUTH)	317	1.600	7.000	4.678	1.119
Consensus (CONS)	317	1.000	7.000	3.896	1.253
Liking (LIKE)	317	1.000	7.000	4.868	1.101
Commitment (COM)	317	2.000	7.000	5.465	1.110

4.2.3 Correlation Analysis

In order to examine the interrelatedness of five personality traits and six influence strategies, zero-order correlation coefficients were computed. Table 11 gives the correlation coefficients. Weak to moderate correlations among subscales of personality traits were found. Extraversion trait was weakly correlated to reciprocation, scarcity and commitment influence strategies. Agreeableness trait was weakly correlated to reciprocation, authority, liking and commitment influence strategies. Conscientiousness trait was weakly correlated to reciprocation and authority influence strategies while it was moderately correlated to commitment strategy. Neuroticism was not correlated to any of the persuasion strategies significantly. Openness trait was weakly correlated to reciprocation, consensus and commitment strategies.

Table 11: Correlation coefficients between each parameter of personality traits and persuasion strategies

Correlations											
	E	A	C	N	O	REC	SCAR	AUTH	CONS	LIKE	COM
E	1	.171**	.303**	-.361**	.467**	.177**	.193**	0.004	-0.099	0.076	.212**
A		1	.172**	-.236**	.245**	.216**	0.04	.245**	0.049	.263**	.231**
C			1	-.269**	.226**	.186**	0.032	.235**	-0.045	-0.063	.363**
N				1	-.149**	-0.024	0.079	-0.022	0.072	-0.023	-0.108
O					1	.134*	0.082	-0.083	-.201**	-0.026	.234**
REC						1	.283**	.382**	0.088	.364**	.384**
SCAR							1	.312**	.246**	.267**	0.107
AUTH								1	.309**	.203**	.378**
CONS									1	.279**	0.02
LIKE										1	.224**
COM											1
**. Correlation is significant at the 0.01 level (2-tailed).											
*. Correlation is significant at the 0.05 level (2-tailed).											

4.2.4 Modeling the Relationship between Personality Traits and Influence Strategies

To identify the relationships between the personality traits and influence strategies and to test the hypotheses, six models were analyzed with BSEM in Amos. BSEM was selected to test the hypotheses, since correlation analysis does not make prediction and give the direction of the relation between variables.

Table 12: Model Statistics of BSEM for the prediction of influence strategies

	Reciprocation	Scarcity	Authority	Consensus	Liking	Commitment
Posterior Predictive p	0.49	0.50	0.48	0.50	0.48	0.47
Convergence Statistics	1.0017	1.0014	1.0012	1.0014	1.0016	1.0014
R^2	0.110	0.070	0.140	0.050	0.110	0.190

Table 13: Parameter estimates of BSEM for the prediction of influence strategies

Parameter Estimates (Estimation of Each Influence Strategy)				
			95% Confidence Interval	
Parameter	Mean	Std. Error	Lower Bound	Upper Bound
Commitment←Conscientiousness	0.543	0.005	0.337	0.737
Commitment←Agreeableness	0.322	0.005	0.089	0.559
Commitment←Openness	0.208	0.006	-0.002	0.419
Authority← Openness	-0.374	0.004	-0.576	-0.176
Authority ← Conscientiousness	0.436	0.005	0.237	0.637
Authority ← Agreeableness	0.553	0.005	0.327	0.788
Consensus← Agreeableness	0.250	0.006	-0.038	0.527
Consensus ← Openness	-0.174	0.005	-0.385	0.036
Liking ← Agreeableness	0.629	0.006	0.388	0.868
Liking ← Openness	-0.229	0.006	-0.467	-0.009
Liking←Extraversion	0.185	0.005	0.004	0.378
Liking←Conscientiousness	-0.222	0.005	-0.433	-0.020
Reciprocation← Agreeableness	0.458	0.005	0.209	0.719
Reciprocation ← Conscientiousness	0.271	0.005	0.048	0.493
Reciprocation ← Extraversion	0.227	0.004	0.046	0.411
Reciprocation ←Neuroticism	0.179	0.004	-0.016	0.375
Scarcity← Neuroticism	0.301	0.005	0.090	0.508
Scarcity ← Extraversion	0.476	0.004	0.270	0.684

Figure 2 shows the models created in Amos Graphics (only the significant relations are presented). In these models, the nodes represent the variables and the links represent the causal relationships between these variables. Convergence statistics value smaller than 1.002 indicates model convergence in BSEM (Gelman et al., 2004). All six models converged well and had a posterior predictive p value of around 0.5, which shows that models fit the data well. Table 12 presents Posterior predictive p, convergence statistics and sample for each model). The final parameters of the best-fitted models are given in Table 13. The standardized direct effects of personality traits on the susceptibility to influence strategies are given in Table 14.
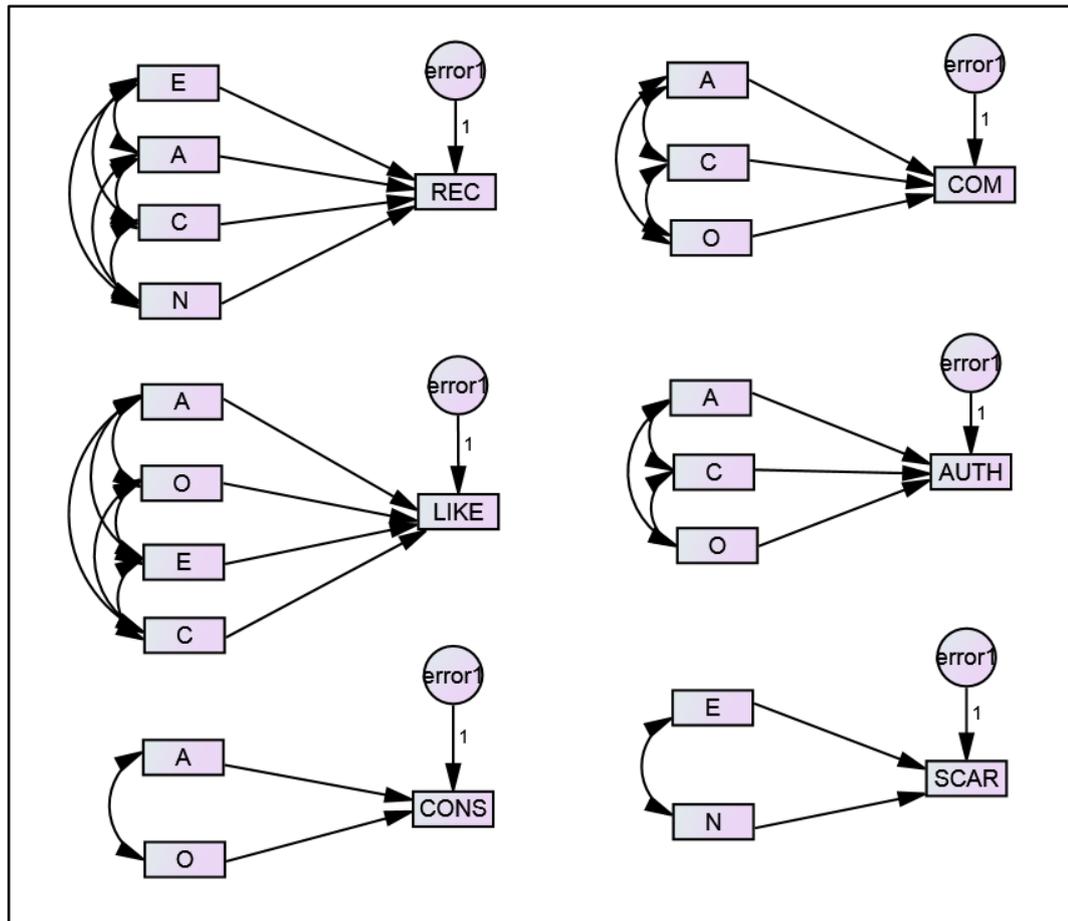
Figure 2: Amos representation of the six models created for the relationships between the personality traits and influence strategies

(Note that C: Conscientiousness, E: Extraversion, A: Agreeableness, N: Neuroticism, O: Openness, REC: Reciprocation, COM: Commitment, LIKE: Liking, AUTH: Authority, CONS: Consensus, SCAR: Scarcity)

Table 14: Standardized direct effects of personality traits over influence strategies

	Reciprocation	Scarcity	Authority	Consensus	Liking	Commitment
Extraversion	0.139	0.255			0.121	
Agreeableness	0.197		0.252	0.101	0.289	0.147
Conscientiousness	0.139		0.234		-0.121	0.310
Neuroticism	0.112	0.166				
Openness			-0.196	-0.222	-0.122	0.124

For all models, statistically significant relations between personality traits and the susceptibility to influence strategies have been obtained. The analyses revealed that agreeableness, conscientiousness significantly contributed to susceptibility to authority (Hypothesis 1a was supported) while openness negatively contributed to authority strategy (Hypothesis 1b supported) (R2=0.140). Extraversion, conscientiousness, agreeableness and neuroticism significantly contributed to susceptibility to reciprocation strategy (R2=0.110) (Hypothesis 2 was partially supported, since there was not a significant path from openness to reciprocation). Extraversion and neuroticism significantly contributed to susceptibility to scarcity strategy (R2= 0.070) (Hypothesis 3 was supported). Agreeableness, conscientiousness and openness significantly contributed to susceptibility to commitment strategy (R2= 0.190) (Hypothesis 4 was supported). Also openness was found related to

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commitment strategy which was not hypothesized. Agreeableness, extraversion, conscientiousness and openness significantly contributed to liking strategy (R2= 0.110). The relation between conscientiousness was un-hypothesized. Agreeableness, and openness contributed to the consensus strategy (R^2=0.050) (Hypothesis 5 was partially supported, since there was not a significant path from extraversion to consensus strategy).

Table 15 summarizes the hypothesis tested.

Table 15: Hypothesis testing

Hypothesis	Result
Hypothesis 1a: Individuals who are high on the agreeableness and conscientiousness traits are inclined to authority persuasion strategy.	Supported
Hypothesis 1b: Individuals who are low on the openness trait are inclined to authority persuasion strategy.	Supported
Hypothesis 2: Individuals high on the agreeableness, conscientiousness, neuroticism, extraversion and openness traits are all inclined to reciprocation persuasion strategy.	Partially supported
Hypothesis 3: Individuals high on the neuroticism and extraversion traits favor scarcity persuasion strategy more than others.	Supported
Hypothesis 4: Individuals high on the conscientiousness and agreeableness personality traits favor commitment persuasion strategy.	Supported
Hypothesis 5: Individuals high on agreeableness and extraversion traits are more inclined to consensus and liking strategies than others.	Partially supported

4.3   Conclusion and Discussion

The current study investigated the relationship between personality and susceptibility to persuasion strategies, identifying which personality traits are affected by which persuasion strategies for the first time in the literature. The BSEM was employed to investigate the relationships. Significant relations between personality traits and influence strategies were found, which indicate that personality is important in the influence strategy selection process. Agreeableness is the most susceptible personality trait compared to the other traits. Openness trait is the least susceptible personality trait to persuasion strategies. All personality traits (except openness) are susceptible to reciprocation strategy

For *authority* principle, our results revealed that individuals showing the characteristics of agreeableness and conscientiousness favor authority strategy while those who are open to experience are less influenced by this strategy. A conscientious person is characterized as being organized, self-disciplined and following rules, and therefore is expected to more likely to follow authority, regulations and rules (Karim et al., 2009). The relationship between agreeableness trait and authority can be attributed to agreeable people's negative feelings towards being penalized in case of not complied with the rules, authority and regulations (Karim et al., 2009). Agreeableness or sociability refers to friendly and modest behavior (Peabody & Goldberg, 1989). Therefore, they may be more inclined to listen to authority figures and obey directions from their supervisors. Also an unhypothesized relationship between openness and authority strategy was found. The BSEM result indicated that individuals with higher openness scores are not likely to favor authority although the correlation between authority and openness is negative but not significant. Openness implies how open-minded a person is. These people are open to new experiences and ideas. On the other hand, people strongly influenced by authority persuasion principle tend to cite authoritative sources to support their ideas. A study, where the relation between openness and authoritarianism concepts was investigated, concluded that while closed individuals follow authority without questioning, open individuals are reluctant to follow opposing ideas

and represents these to their social interactions and family life (McCrae & Sutin, 2009). Our findings are parallel with this study.

For *reciprocation principle,* a significant and positive relation between reciprocation strategy and extraversion, agreeableness, conscientiousness and neuroticism traits have been found. According to BSEM results, openness trait was found as insignificant although it was significant in correlation analysis. The most significant traits were agreeableness and conscientiousness which are in line with the results of the study (Dohmen et al., 2008). The reasons of why these personality traits are affected by this strategy vary. For agreeable and consciousness individuals, the main reason can be attributed to their tendency to altruism. On workplace relationship context, Barrick and Mount (1991) stated that people high in conscientiousness trait are aware of the constant back and forth exchange of favors and plan for the next time they may need help. These people tend to be driven by doing the "right thing" and in the context of social exchange, these people return favors not for obligation but for feeling of indebted. Agreeable individuals are inherently altruistic and tend to be sensitive to the needs and well-beings of other people making altruism, an important facet in reciprocation behavior. For extravert individuals, the reason of their inclination to reciprocation cannot be sufficiently explained based on their feeling of indebtedness. Extravert people are characterized as being energetic and enthusiastic. In fact, altruism behavior is a complex phenomenon and it has been extensively studied recently (Oda et al., 2014). In this study, it was concluded that altruism differs according to the recipient. Their results revealed that extraversion and agreeableness traits significantly contributed to altruism toward friends and acquaintances (adjusted R^2 = .268) and extraversion and agreeableness significantly contributed to altruism toward strangers (adjusted R^2 = .119). Oda et al. (2014), also explained that reciprocal altruism is maintained in a prosocial environment and extravert individuals may prefer a social environment where they engage reciprocal helping behaviors. As a result, extravert people may engage in reciprocal behavior as to be accepted in a social environment. Neuroticism is weakly associated with reciprocation inline with the study of Dohmen et al. (2008).

For *commitment* strategy, conscientiousness trait was found as the most significant feature in predicting the inclination to commitment strategy with BSEM analysis. In addition, agreeableness, and openness traits were also found significant by both correlation analysis and BSEM analysis. Conscientious individuals are organized, and punctual (Back et al., 2006). The study conducted by Barrick et al. (1993) researhced extraversion and conscientiousness traits' and goal commitment's effects over sales volume and performance rating of sales representatives and found significant relation between conscientiousness and goal commitment. Conscientious and agreeable people are also self-regulated and therefore they are more likely to follow their promises in order to consistent with their previous behaviour (Jensen-Campbell et al., 2002). Besides, agreeable people may prefer to commit to their promises in order to keep their interpersonal relationships healthy. Commitment is an important strategy for becoming influential in a social enviroment. Breaking promises or inconsistent behaviour and statements may depict a person as untrustable and individual's social status may be impaired. Although extraversion trait was found as significant in the correlation analysis, its effect was not significant according to BSEM results. Also an unhypothesized relationship between openness and commitment was found. It was speculated that individuals who are open to experiences may prefer to be inline with their previous statements that are made to their peers or friends. Closed individuals are known as conservative and resistant to change (McCrae & Costa, 1987) However, the commitment strategy of Cialdini is not about inclination to change but being persistent with previous statements and act accordingly.

For *scarcity* principle, extraversion and neuroticism were found to have a positive relation with scarcity. Neurotic people may worry or fear about missing the opportunities, thus may

be affected by this strategy. This effect was also observed in the study of Halevi et al. (2013) where the authors sent an e-mail to users promising a product to the first users to click the link and individuals with high neuroticism scores clicked on the link more than others. The majority of scarcity items developed by Kaptein are concerned with how valuable and special a product is when it is rare. The underlying reasons of the strong relation between extraversion trait and scarcity can be sought out in shopping behavior context. Extravert people seek out opportunities and excitement (McElroy, Hendrickson, Townsend, & DeMarie, 2007). Researchers found that there is a significant relationship between extraversion trait and hedonic motivations in shopping domain (Guido, 2006; Karl et al., 2007). A hedonic shopper looks for maximum net pleasure whereas a utilitarian shoppers give importance to price rather than quality. Value shopping is the enjoyment for seeking special discounts and gratification shopping refers to shopping to create a positive feeling such as to feel better or give a special treat to oneself (Kim, 2006). As a consequence, extravert people may find scarce items attractive to buy them. In addition, this experience may give them excitement and they may feel very special when they buy the last item.

For *consensus* strategy, the correlation analysis showed that openness was negatively related to consensus. According to BSEM, agreeableness effect on predicting the propensity to consensus strategy was positive and significant and openness effect was negative and significant. High agreeable individuals are cooperative and are reported to have a higher level of empathy for others. Social proof states that people are more likely to take behavioral cues from other people. Consequently, agreeable people may be more inclined to be influenced by the consensus strategy as compared to others. On the other hand the negative relation between openness trait and consensus strategy implies that people who have high openness scores may not follow other people and tend to search for new opinions. The results suggest that they may be believe in the superiority of their ideas and imaginations over other people.

For *liking* strategy, the correlation analysis showed a positive and significant relation between agreeableness trait and liking strategy. BSEM results revealed that the effects of agreeableness and extraversion traits on prediction the propensity to liking strategy is positive and significant whereas the effect of openness and conscientiousness traits is significant and negative. The results indicate that agreeable people are most likely to favor this strategy. Likability comes in many forms; showing familiarity or similarity with individuals, making complements and cooperative efforts. Since agreeable people show empathy for others and care for others' feelings, they may be inclined to be affected by their peers, hence they may be more susceptible to the liking strategy than others.

CHAPTER 5

PERSONALITY AND MOTIVATION AS PREDICTOR OF LMS USE AND COURSE GRADE

The literature review in chapter 2 revealed that students' academic performance could vary according to individual differences for the perspectives of their personality traits and motivation. This chapter investigates the relationships between personality traits, motivation, LMS use and course grade in online and blended learning environment. In the following parts of this chapter, the method employed, data analysis and results are presented. Lastly the findings are discussed with the related literature.

5.1 Method

The main focus of this part of the study is to predict students' academic performance from their personality and academic motivation. The previous studies showed that personality traits have been related to educational context and there have been numerous researches to link personality traits to academic performance. It is also clear that students' motivation is an important predictor of their academic success and motivation differs from student to student.

This chapter aims to answer the following research questions.

1) Is there any relation between personality traits and students' academic performance?
   - Is there any relation between personality traits and LMS use?
   - Is there any relation between personality traits and course grade?
2) Is there any relation between motivation factors and students' academic performance?
   - Is there any relation between motivation and LMS use?
   - Is there any relation between motivation and course grade?

Hypothesis

The studies showed that conscientiousness trait is most significantly related trait to academic performance; the conscientious students are more successful. The relations of remaining four personality traits to academic performance varies. It was expected to have parallel results of the relation between conscientiousness trait and academic performance with the literature. No other specific hypotheses were proposed for the remaining four personality traits, since the previous findings varied. So that,

Hypothesis 1a: Conscientiousness trait predicts course grade in both online and blended course.
Hypothesis 1b: Conscientiousness trait predicts LMS use in both online and blended course.

The studies in literature show that students' motivation is an important predictor of their academic success and motivation differs from student to student. The scope of this study covers the six motivational factors measured by MSQL which are intrinsic goal orientation, extrinsic goal orientation, task value, test anxiety, self-efficacy for learning and performance and control of learning beliefs. The most significantly related motivation is intrinsic one to academic performance. Additionally, self-efficacy is another factor that is related to academic achievement. Most of the time, test anxiety is negatively related to academic achievement; students with high test anxiety get low grades. The following hypotheses were proposed for motivation factors with light of literature.

Hypothesis 2a: Intrinsic goal orientation predicts course grade in both online and blended course.
Hypothesis 2b: Intrinsic goal orientation predicts LMS use in both online and blended course.
Hypothesis 3: Self-efficacy predicts course grade and LMS use in both online and blended course.
Hypothesis 4: Test anxiety predicts course grade in both online and blended course.

No other hypotheses were proposed for other three motivation factors. However, all these relations were tested during analysis. There is a gap whether there is a relation with LMS use and course grade or not. This study also aims to identify whether there is a relationship between LMS use and course grade.

Hypothesis 5: LMS use predicts course grade in both online and blended course.

5.1.1 Participants

A total of 316 undergraduate students, who enrolled in an introductory IT course (IS100) in METU participated to the study. The participants were the same participants of Chapter 4. Only one of the participants was eliminated because of having an extreme LMS use. 189 (109 female, 80 male) of the students enrolled in online class of the course and 127 (76 female, 51 male) of the students enrolled in blended class of the course. Average age of the online participants were 22.27 (SD=2.17) while average age of the blended course participants were 22.03 (SD=1.78). Blended classes of the course were conducted in METU computer laboratories and students have used LMS during the lecture. Online classes of the students only used the LMS whenever, wherever they want; they only took exams in computer laboratories two times in a semester.

5.1.2 Procedure

To conduct the study with human participants, the necessary permission was obtained from METU Research Center for Applied Ethics. The data was collected at the first month of second semester of 2014 (LMS use and grade scores were obtained at the end of the semester). The online class participants were sent an online survey link to their school e-mail addresses. The blended class participants were reached by the researchers in the laboratories where the course were conducted. Participation to the study was voluntary. The total time to fill the survey was about 20 minutes.

5.1.3 Instruments and Measures

Personality Traits

To measure personality, BFI with 44 items was used (John & Srivastava, 1999). The details of BFI are given in section 4.1.2. The scale was given in Appendix D.

Motivated Strategies for Learning Questionnaire-Motivation part (MSLQ)

Motivated Strategies for Learning Questionnaire has two parts: motivation and learning strategies (Pintrich, 1991). Only the motivation part of MSLQ, which have 31 items to measure 6 factors, has been used. Two items were excluded since they did not match with our context. 29 items were rated a seven point scale from 1-not all true of me to 7-very true of me. The Turkish version of the scale was used which were translated and validated by Sungur (2004). The scale was given in Appendix F as used in data collection process and its English version.

Grade and LMS use measures

Participants' average grade was computed from their midterm exam, final exam and homework scores during the semester. The exam questions of midterm and final exams were assumed as reliable and validated measures of grade, since the questions have been used in the context of the related course for six years and they are checked every year for clarity. The students used NetClassR which had been regularly used by METU for all courses until 2014. The instructors used the system to distribute lecture notes, to give assignments, to make announcements, to send e-mail to students, to announce students' grades, to conduct exams. The system logged the access of the students to the system. During the semester when the study was conducted, students' LMS logs were recorded for the participants who have involved in the study. Every participant has a LMS use score which represents the total number of their access to LMS in the semester. The students have used the LMS total 12 weeks in the semester. The system did not give the actual system use information, it just kept the records of students' accesses. It was assumed that the students used the system in those accesses. Also the system made students log out when they were not active in a certain time, so we assumed in this study that the higher access number may refer to higher system use.

5.1.4 Analysis Approach

BSEM was used to analyze the casual relationship between personality traits, motivation, and LMS use and course grade. The details of BSEM are given in Section 2.6.

5.2   Data Analysis and Results

5.2.1   Preliminary Analysis

To examine the internal consistency of the questionnaire, Cronbach's alpha (coefficient alpha) was checked (Ary et al., 2002; Pallant, 2001). The Cronbach's alpha should be 0.7 or above for internal consistency. Cronbach's alpha was computed for each subscale under BFI and MSLQ for online and blended class separately (Table 16). Extrinsic Goal Orientation under motivation scale was excluded as it has got low alpha score for both online and blended class participants. This could be caused by that the items which measures EGO are related to taking good grades or higher grades than other students, especially concern of total grades: the participants of the study were from a non-credit course and grade related items could be unrelated to them. Agreeableness, intrinsic goal orientation, test anxiety and control of learning beliefs have slightly lower alpha scores, so these factors were included in the main analysis.

Table 16: Coefficient alpha scores for BFI and MSLQ

	Number of items	Coefficient Alpha	
		Online Class	Blended Class
Extraversion (E)	8	0.836	0.785
Agreeableness (A)	9	0.597	0.639
Conscientiousness (C)	9	0.763	0.760
Neuroticism (N)	8	0.806	0.814
Openness (O)	10	0.805	0.767
Intrinsic Goal Orientation (IGO)	3	0.662	0.582
Test Anxiety (TA)	5	0.681	0.650
Task Value (TV)	6	0.889	0.884
Extrinsic Goal Orientation (EGO)	3	0.102	0.141
Control of Learning Beliefs (CLB)	4	0.682	0.672
Self-efficacy for Learning Performance (SELP)	8	0.872	0.891

Table 17: Descriptive statistics of all variables of BFI and MSLQ

		N	Min	Max	Mean	SD	Median
Online Class	**E**	189	1.25	5.00	3.39	0.75	3.50
	A	189	1.67	5.00	3.56	0.51	3.56
	C	189	1.22	4.67	3.16	0.61	3.11
	N	189	1.50	5.00	3.03	0.74	3.00
	O	189	1.50	5.00	3.69	0.61	3.70
	IGO	189	1.00	6.67	3.17	1.33	3.00
	TA	189	1.00	7.00	3.84	1.29	3.80
	TV	189	1.00	7.00	4.09	1.39	4.17
	CLB	189	1.00	7.00	4.70	1.23	4.75
	SELP	189	1.00	7.00	4.48	1.17	4.38
	LMS	189	0.00	178.00	13.52	25.16	3.00
	Grade	189	0.00	87.60	55.72	23.10	61.30
Blended class	**E**	127	1.25	5.00	3.46	1.25	3.50
	A	127	2.44	4.78	3.58	2.44	3.60
	C	127	1.78	5.00	3.24	1.78	3.22
	N	127	1.00	4.88	2.94	1.00	3.00
	O	127	2.40	5.00	3.71	2.40	3.70
	IGO	127	1.00	7.00	3.85	1.00	4.00
	TA	127	1.00	6.40	3.52	1.00	3.60
	TV	127	1.00	7.00	4.63	1.00	4.83
	CLB	127	1.75	7.00	4.87	1.75	5.00
	SELP	127	1.00	7.00	4.76	1.00	4.88
	LMS	127	0.00	246.00	58.91	45.59	51.00
	Grade	127	0.00	89.70	59.39	23.76	66.85

After reliability analysis, a composite score was computed by averaging the corresponding items for each personality traits and motivation factors. Table 17 presents the descriptive statistics of the scores. For LMS use and course grade variables, SD is larger which shows the values of these variables in the data set are far away from the mean. In the context of the

study, the results are not restricted to mean. The larger value of SD for LMS use and course grade might be because of the zero scores in these variables. This caused these variables to become non-normal. To interpret the average score of these variables it was appropriate to look median score which is not affected from extreme scores.

5.2.2 Correlation Analysis

In order to examine the interrelatedness of the variables in the data set, correlation coefficients were computed. The effect sizes for correlation coefficient given in Field (2009) was considered to evaluate the values of the correlations: $r=0.1$-small effect, $r=0.3$-medium effect, $r=0.5$-large effect. Table 18 shows the correlations between personality traits, motivation factors, LMS use and course grade among online participants. Weak to moderate correlations among the subscales of personality traits were found. Among the subscales of personality traits, conscientiousness trait is weakly correlated to both LMS use and course grade. Weak to high correlations among the subscales of MSLQ were found. Intrinsic goal orientation and task value were weakly correlated to course grade. Self-efficacy was weakly correlated to both course grade and LMS use. LMS use was weakly correlated to course grade.

Table 18: Correlation coefficients between all variables for online class

	IGO	TA	TV	CLB	SELP	E	A	C	N	O	Grade	LMS
IGO	1	.354**	.668**	.337**	.372**	.039	.171*	.179*	-.180*	.028	.169*	.134
TA		1	.253**	.003	-.029	-.038	.019	.177*	.158*	.018	.124	.015
TV			1	.480**	.466**	.069	.208**	.121	-.186*	.067	.178*	.104
CLB				1	.511**	.091	.11	-.059	-.112	.04	.057	.095
SELP					1	.068	.052	.159*	-.154*	.215**	.217**	.201**
E						1	.257**	.303**	-.375**	.523**	.051	-.041
A							1	.142	-.295**	.244**	.094	.066
C								1	-.248**	.218**	.205**	.163*
N									1	-.195**	.03	.047
O										1	-.092	-.008
Grade											1	.160*
LMS												1
**. Correlation is significant at the .01 level (2-tailed).												
*. Correlation is significant at the .05 level (2-tailed).												

Table 19 illustrates the correlations between personality traits, motivation factors, LMS use and course grade among blended course participants. There are weak to high correlation among the subscale of motivation. Task value and test anxiety were weakly correlated to LMS use. Weak to moderate correlations among the subscales of personality traits were found. Conscientiousness trait was weakly correlated to course grade. Moderate correlation between LMS use and course grade was found.

When the results of correlation were compared between blended class and online class the following findings were obtained:
- While self-efficacy was correlated with LMS use and course grade in online class, it was not in blended class.
- Intrinsic goal orientation was correlated to course grade in online class while it was not in blended class.
- Task value was correlated to course grade in online class while it was correlated to LMS use in blended class.

- Test anxiety is correlated to LMS use in blended class while it was not in online class.
- Conscientiousness was correlated to course grade in both online and blended class. Its effect size was larger in blended class.
- LMS use is correlated to course grade in both online and blended class. Its effect size was larger in blended class.

Table 19: Correlation coefficients between all variables for blended class

	IGO	TA	TV	CLB	SELP	E	A	C	N	O	Grade	LMS
IGO	1	.256**	.647**	.253**	.046	-.064	.059	.038	.131	-.011	.044	.126
TA		1	.082	.01	-.360**	-.126	.066	-0.04	.180*	-.109	-.047	.208*
TV			1	.430**	.350**	-.01	.087	.117	.069	.035	.064	.174*
CLB				1	.359**	-.084	.189*	-.025	-.048	.112	-.019	-.06
SELP					1	.195*	-.071	.14	-.239**	.227*	.03	-.098
E						1	.018	.292**	-.331**	.362**	.004	-.06
A							1	.205*	-.142	.230**	.024	.032
C								1	-.289**	.227*	.244**	.082
N									1	-.067	-.005	.095
O										1	.082	.036
Grade											1	.383**
LMS												1
**. Correlation is significant at the .01 level (2-tailed). *. Correlation is significant at the .05 level (2-tailed).												

5.2.3 Course Grade Prediction: BSEM

To identify the casual relations between all variables and test the hypotheses, two structural models with observed variables were created in Amos Graphics 21 and analyzed with BSEM; one model for online course participants and one model for blended course participants. BSEM was selected to test the hypotheses, since correlation analysis do not make prediction and give the direction of the relation between variables. The structural models were created to predict course grade from LMS use, personality traits and motivational factors.

In Amos, a C.S value smaller than 1.002 indicates model convergence (Gelman et al., 2004). When the C.S was below 1.002, the model was accepted during analysis. Model C.S are given in Table 20. Weakly informative priors were used during the analysis, where the means of model parameters were set to a bounded uniform distribution (Dunson et al., 2005; Hoyle, 2012). The admissibility test was used to prevent improper posteriors. Model fit was tested with posterior predictive p value. P value around 0.5 gives best model fit (Dunson et al., 2005; Muthén & Asparouhov, 2011) ; models are acceptable when p is between 0.3 and 0.7 (Song & Lee, 2006). The models have predictive p value 0.48 and 0.29 which are acceptable (given in Table 20). The graphical representations of the models are given in Figure 3. Only the significant paths are represented in the figure with standardized direct effects of predictor variables over course grade and LMS use. The parameter estimates obtained in Bayesian analysis are given in Table 21. Posterior distributions of the regression weights were also checked during analysis.

Table 20: Model statistics

	Online Course	Blended Course

Posterior Predictive p	0.29	0.48
Convergence Statistics	1.0018	1.0018
R^2	0.100	0.200

Table 21: Parameter estimates of BSEM for predicting course grade

	Parameter Estimates (Estimation of Course Grade)				
				95% Confidence Interval	
	Parameter	Mean	Std. Error	Lower Bound	Upper Bound
Online Course (a)	Grade←LMSUse	0.095	0.003	-0.037	0.221
	LMSUse←SELP	3.835	0.058	0.840	6.843
	Grade←SELP	3.401	0.059	0.519	6.129
	Grade←C	6.190	0.162	0.537	11.936
	LMSUse←C	5.544	0.151	0.031	11.086
Blended Course (b)	Grade←LMSUse	0.189	0.002	0.108	0.274
	LMSUse←TA	7.399	0.128	0.876	13.662
	LMSUse←TV	5.188	0.112	-0.599	11.055
	Grade←C	8.630	0.144	2.426	15.058

When the *Model-a* is examined (
Figure 3-a), LMS use, self-efficacy and conscientiousness are the direct/indirect predictors of course grade for online course (R^2=0.100). Conscientiousness trait has a positive path to LMS use and course grade which supports Hypothesis 1a and Hypothesis 1b. Hypotheses 2a and 2b were not supported, since there was not any significant path from intrinsic goal orientation to either course grade or LMS use, although there was correlation between intrinsic goal orientation and course grade. There is positive path from self-efficacy to course grade and LMS use which supports hypothesis 3. Hypothesis 4 was not supported, since there was not a significant path between test anxiety and course grade. With the significant path between LMS use and course grade, hypothesis 5 was supported.

When the *Model-b* is examined (
Figure 3-b), test anxiety, task value, conscientiousness trait and LMS use are found as the direct/indirect predictors of course grade (R^2=0.200). Conscientiousness trait has a positive path to course grade which supports Hypothesis 1a. Hypothesis 1b was not supported since there is not a significant path from conscientiousness trait to LMS use. Hypothesis 2a and 2b were not supported, since there was not a significant path from intrinsic goal orientation either course grad or LMS use. Hypothesis 4 was not supported since there was not a significant path from self-efficacy to either course grade or LMS use. There was no significant path between test anxiety and course grade so that Hypothesis 5 was not supported. However, there was a significant path between text anxiety and LMS use, which was not hypothesized. With the significant path between LMS use and course grade, hypothesis 5 was supported. The hypotheses results were summarized in Table 22.
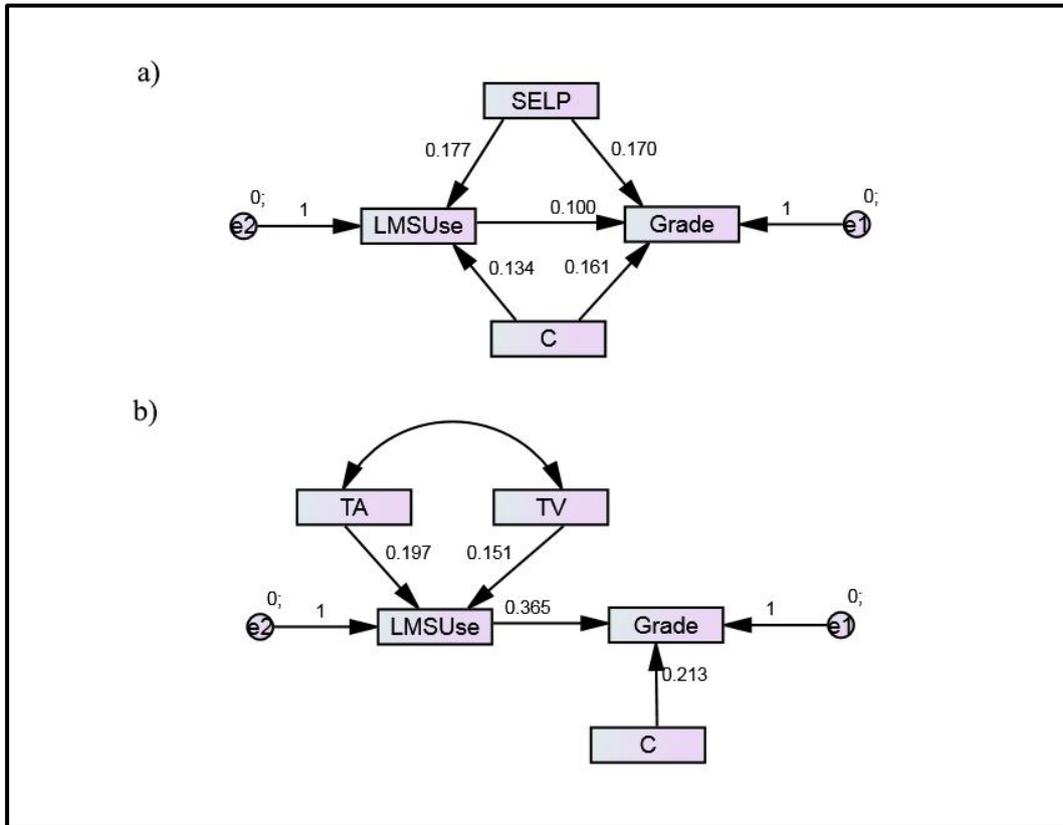
Figure 3: a) Structural Model- Online Class b) Structural Model- Blended Class

(Note that C: Conscientiousness, SELP: Self-efficacy for learning performance, TA: Test Anxiety, TV: Task value)

Table 22: Hypotheses testing results

Hypothesis	Result
Hypothesis 1a: Conscientiousness trait predicts course grade in both online and blended course.	Supported
Hypothesis 1b: Conscientiousness trait predicts LMS use in both online and blended course.	Partially supported
Hypothesis 2a: Intrinsic goal orientation predicts course grade in both online and blended course.	Not supported
Hypothesis 2b: Intrinsic goal orientation predicts LMS use in both online and blended course.	Not supported
Hypothesis 3: Self-efficacy predicts course grade and LMS use in both online and blended course.	Partially supported
Hypothesis 4: Test anxiety predicts course grade in both online and blended course.	Not supported
Hypothesis 5: LMS use predicts course grade in both online and blended course.	Supported

5.3 Conclusion and Discussion

Academic success has many predictors. The literature review showed that two predictors of academic performance are personality and motivation. Many of the previous studies linked the personality traits and academic motivation to academic performance separately and there

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are significant findings showing that personality and motivation affect academic performance in terms of course grade, GPA or other. The goal of this study was to examine the effects of personality and motivation over academic performance together in both online course setting and blended course setting. The effects of personality (measured with BFI) and academic motivation (measured by MSLQ) over academic performance (measured as course grade) were investigated with a quantitative study in both online and blended learning environment. Additionally, the study explored the relationships between personality, motivaton and LMS use and the relation between LMS use and academic performance. Correlation analysis was conducted to understand the interrelatedness of all variables. After that, course grade and LMS use were predicted from motivation and personality traits with BSEM in Amos. Two models were created to predict course grade: one model for online course setting and one model for blended course setting. In online course setting, students do not attend face-to-face lectures; they use the LMS to access lecture notes, to upload assignments and to follow course announcements. In blended course setting, students attend face-to-face lectures conducted in computer laboratories. Students also use LMS during the lectures to access lecture notes. Students are free to register face-to-face class or online class.

Personality traits contribute to course grade in both online course setting and blended course setting. Significant relation between conscientiousness trait and course grade was found in both online and blended course setting with both correlation and BSEM analysis. This result confirms the results of the previous studies by Noftle and Robins (2007), Poropat (2009), O'Connor and Paunonen (2007) and Nguyen et al. (2005). The significant relation between conscientiousness and course grade implies that students with the characteristics of conscientiousness trait are more successful at exams. Conscientious individuals are known as being organized, disciplined and responsible (John & Srivastava, 1999; McCrae & Costa, 1987), so that the students with these characteristics may study in a more disciplined way than other students and take high grades. Also conscientiousness trait is positively and significantly related to LMS use in online context. In online class, students only use LMS to study lecture notes, to upload assignments and to follow course announcements and they do not attend face-to-face lectures. Conscientious individuals are responsible, disciplined and organized which make the relation between conscientiousness trait and LMS use meaningful. Students with the characteristics of conscientiousness could use LMS more than other students. Although there is a significant relation between conscientiousness and LMS use in online course setting, this relation is not significant in blended course setting. This could be resulted from that the students in blended course setting use the LMS in only lecture time and they may not use out of class.

The relation between conscientiousness, LMS use and course grade implies that, responsible and disciplined students are more successful in online course setting. The study additionally found self-efficacy as predictor of both LMS use and course grade in online course setting. Self-efficacy refers to students' ability to accomplish a task and their beliefs that they can do the task. Students with higher self-efficacy are likely to work harder than other students and achieve the tasks (Bandura, 1997; Linnenbrink & Pintrich, 2002). In online courses, students do not attend face-to-face lectures and they have to study by themselves to take higher grades, which requires higher self-efficacy and discipline supporting the positive relation between conscientiousness trait and LMS use and course grade and supporting the relation between self-efficacy and LMS use and course grade. Also the previous studies showed that self-efficacy positively predict students' course grade (Bandura, 1997; Brackney & Karabenick, 1995; Credé & Phillips, 2011), GPA (Yusuf, 2011) and academic achievement (Linnenbrink & Pintrich, 2002; Nilsen, 2009; Zimmerman et al., 1992). The result of current study is parallel with these studies.

Test anxiety refers to negative feelings of being unsuccessful in exams. The previous studies have found negative relation between test anxiety and course grade (Brackney & Karabenick, 1995; Credé & Phillips, 2011). Interestingly, the current study did not find any

direct relation between test anxiety and course grade. This could be resulted from the context of the study. Since the participants of the study were the students of a non-credit course in which course grade did not contribute to students' GPA as a percentage. This may not result higher anxiety in exams. Although, there is not a significant relation between test anxiety and course grade, there is a positive path from test anxiety to LMS use for blended course context, which also indirectly affect course grade. This implies that students with higher test anxiety use LMS more than the others in blended course setting. The students having higher test anxiety may study lecture notes more than other students so that they may use the LMS more than others.

Task value refers students' perception of how the task is important for the students. A significant path from task value to LMS use was found in blended course setting. This significant relation implies that if the students find the course content useful, they study lecture notes more. In the study of Brackney and Karabenick (1995), a positive correlation was found between course grade and task value. In the current study, task value indireclty affects course grade over LMS use. It was speculated from the findings that students are more successful when they find the course content useful and important.

With integration of technology to education, LMS have been used in both online lectures and face-to-face lectures. The present study investigated the use of LMS and its relation to course grade in both online class and blended class. LMS use was measured as a total score of the access of the students to LMS. It was found that LMS use positively affected course grade in both online and blended class. This result implies that the students, who study lecture notes more, may take higher grades in the course. This finding could contribute the success of the students by encouraging the use of LMS especially in online settings.

The course was conducted differently in online and blended course setting, so the data was analyzed separately. When the results of correlation analysis of the online course setting and blended course setting is compared, conscientiousness trait was found correlated to course grade in both of the setting having higher coefficient in blended course setting. Intrinsic goal orientation was found significantly correlated to course grade in online setting while it was not correlated to course grade in blended course setting. Task value was correlated to course grade in online setting while it was found correlated to LMS use in blended course setting. Although self-efficacy was found correlated to course grade and LMS use in online course setting, it was not found correlated to course grade and LMS use in blended course setting. Test anxiety was correlated to LMS use in blended course setting while it was not correlated in online course setting. Lastly LMS use was found correlated to course grade in both of the course setting having higher correlation coefficient in blended course setting. The results of the BSEM analysis was found almost similar to results of the correlation analysis in both of the course settings. Only the significant correlations between intrinsic goal orientation and course grade, task value and course grade were not found as significant relation in BSEM analysis for online course setting. All of the significant correlations in blended course setting were found as significant relations in BSEM analysis for blended course setting.

CHAPTER 6

THE IMPACTS OF PERSUASIVE MESSAGES ON STUDENTS MOTIVATION, LMS USE AND COURSE GRADE

Persuasive messaging is one of the widely used applications of persuasive technologies. In this study, the effects of Cialdini's six persuasion principles in course activities were studied. An experimental study was conducted by creating and sending persuasive messages to students. This chapter introduces the details of this experimental study. In the following parts of this chapter, the method employed in the study, data analysis and discussion of the findings are presented.

6.1 Method

Students' course attendance, course participation, course grade and LMS use depend on many factors. In chapter 5, we concluded that in online course, students LMS use and course grade depend on self-efficacy and conscientiousness personality trait. In blended course, students' course grade depends on conscientiousness trait while LMS use depends on test anxiety and task value factors. In this part of the study, we investigate whether sending persuasive message is effective in increasing course participation, students' motivation and delivering the tasks within deadlines. We also explore whether it increases the number of accesses to LMS. The success of persuasive message was measured by changes in the target behavior. In this context, this part of the study aims to answer the following research questions:

- What are the impacts of persuasive messages on students' course grade?
- What are the impacts of persuasive messages on students' LMS use?
- What are the impacts of persuasive messages on students' motivation?
- How do students perceive persuasive messages in education context?

Motivation is important in persuasion since individuals with high motivation are more likely to perform the target behavior (Fogg, 2009a). In other words, persuasive messages may be effective if the target person has the ability to accomplish the target behavior and has the motivation to trigger the target behavior. In this study, we measured students' academic motivation at the beginning and at the end of the course.

6.1.1 Persuasive Message Creation

Cialdini's persuasion strategies were used to create persuasive messages. Persuasive messaging focuses on the message itself. The goal of sending messages is to get the attention of students to the course, and increase their use of LMS. Consequently, we investigate

whether it has an effect on students' achievement from the course. Meanwhile to reach these target aims, we have identified simple goals directly or indirectly affecting the target. Fogg (2009b) suggested that to reach the target goal, it could be more effective to separate it into small goals, because in persuasion researches, the target goal should be simple to achieve. For each message the following steps were conducted (from the study of Fogg (2009b)).

- Simple goals have been identified.
- The audience was defined.
- The technology channel was chosen which is familiar to target audience (e-mail, video, Facebook technology channels were selected interchangeably).
- Similar persuasive messages experiments were examined.
- Experiments have been tested.

Each message has a course specific target behavior and includes linguistic expressions implementing one or more persuasion strategies. Messages were personalized to participants based on their name, grade, and message type/content. A study (Berkovsky, Freyne, & Oinas-Kukkonen, 2012) mentioned that personalization increases the effectiveness of the persuasive messages. So that personalization was employed in the messages.

To create persuasive messages, the applications' cues of Cialdini were considered and applied which are mentioned in section 2.2.1. Total 21 persuasive messages were created. The details of persuasive messages are given in Table 23, including message type, intended persuasion principles and the aimed target behavior. Example messages for both control and treatment groups are given in Appendix G.

Table 23: Persuasive message list

#	Message Type	Intended Influence Strategy	Target Behavior
1.	Facebook group invitation	Authority	Join Facebook group
2.	Video message	Authority, liking	Attend the course regularly, to use LMS
3.	Webinar invitation	Authority	Join the webinar session
4.	Facebook group invitation	Consensus	Join Facebook group
5.	Facebook video sharing	Authority	Watch, like or make comment on the video
6.	Facebook question	Consensus	Answer the question as a comment
7.	Facebook video sharing	Consensus	Watch, like or make comment on the video
8.	Webinar invitation	Scarcity, authority	Join the webinar session
9.	Facebook video sharing	Scarcity, consensus	Watch, like or make comment on the video
10.	Online quiz	Scarcity, authority, consensus	Take the quiz (the quiz was not graded, it was just an exercise for the exam)
11.	Midterm exam reminder	Scarcity	Take midterm exam
12.	Assignment announcement	Scarcity, authority	Submit the assignment

13.	Facebook video sharing	Consensus	Watch, like or make comment on the video
14.	Assignment commitment	Commitment	Answer the question which is related to the assignment
15.	Facebook video sharing	Consensus	Watch, like or make comment on the video
16.	Facebook video sharing	Scarcity	Watch, like or make comment on the video
17.	Assignment resubmission	Consensus, scarcity	Submit assignment
18.	Assignment announcement	Scarcity, authority	Submit assignment
19.	Facebook video sharing	Scarcity, consensus	Watch, like or make comment on the video
20.	Assignment resubmission	Consensus, scarcity	Submit assignment
21.	Final exam reminder	Scarcity	Take the final exam

6.1.2 Participants

147 students attending IS100 course were sent messages during the second semester of 2014 (2 treatment groups, two control groups). The treatment and control groups were created according to:

- Class type: online or blended class. One treatment and one control group were created for each class type making a total of 4 groups.
- Personality traits scores were computed (From the chapter 4 and 5). The mean score for each personality trait in each group was similar to each other.
- Susceptibilities to persuasion principles were computed for each participant (From chapter 4 and 5). The mean score for each persuasion principle in each group was similar.
- Motivation scores were computed. The mean score for each motivation factor in each group was similar. Appendix I represents the mean scores of all variables for all groups.
- The departments of the students were considered in group creation. Appendix J gives the department information for all groups

At the end of the semester the students (total 147 students) were sent a survey to evaluate the messages and their motivation. 114 of the students filled the survey, 105 of them were useful so that in the analysis, these students were considered. The number of the students in the groups is given in Table 24. Average age of the participants is 21.65 (SD=1.705). 70 of the participants are female while 33 of the participants are male (2 of them did not mention his/her gender).

Table 24: Number of students in experiment groups

Group Type	Course	Number of participants
Treatment	Online class	26
	Blended class	24
Control	Online class	30
	Blended class	25
Total		105

6.1.3 Procedure

To conduct the study, the necessary permission was taken from METU Research Center for Applied Ethics (Appendix C). The Figure 4 presents the stages of the study.
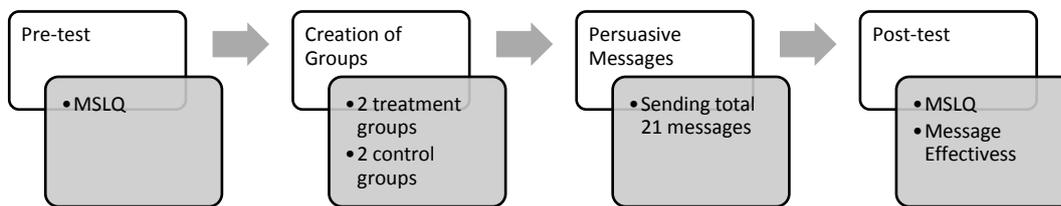
Figure 4: Experiment steps

Initially, the students filled a pre-test comprising MSLQ and demographic data (additionally including personality traits and susceptibilities to persuasion strategies scales). Control and treatment groups were determined according to the aforementioned criteria. During the semester, the treatment groups were sent persuasive messages and control groups were sent non-persuasive messages or no message. At the end of the semester, the participants filled the post-survey comprising MSLQ and message effectiveness scale. Finally, data analysis was performed.

6.1.4 Instrument and Measures

Motivated Strategies for Learning Questionnaire

Motivation part of MSLQ was used to measure motivation of the students. The details of the scale are given in section 5.1.3. The scale is given in Appendix F.

Message Effectiveness

At the end of the semester, to measure the effectiveness, necessity and usefulness of the messages, 16 items were asked rated 5-point Likert scale (1: Strongly disagree to 5: strongly agree) comprising three subscales: general reminder (referring to all messages sent during the semester), midterm reminder (referring the message to remind the midterm exam), homework reminder (referring the messages to remind the assignments). One of the items was negative in each subscale, the remaining were positive. The items are given in Appendix H.

During the semester, LMS logs were recorded for the participants who have involved in the study. Every participant has an LMS use score which represents the total number of their access to LMS in the semester. The duration of the LMS access was not considered since this information is not available. The participants' course grade was computed from their midterm exam, final exam and homework scores at the end of the semester.

6.2   Data Analysis and Results

6.2.1 Reliability Analysis

In order to check the internal consistency of the scale in pre-test and post-test, Cronbach's alpha coefficient was computed (Field, 2009; Pallant, 2001). All of the subscales have good scores for internal consistency except EGO which was excluded in the further analysis because of having low alpha score. The items that measures EGO are related to taking good grades or higher grades than other students, especially concern of total grades: the course is non-credit and course grade does not affect students' total grade so EGO could be unrelated to context and have low alpha score. The alpha scores for message effectiveness subscales are given in Table 25, which are good scores for internal consistency.

Table 25: Coefficient alpha scores for message effectiveness scale

	Number of items	Coefficient Alpha
General Reminder	5	0.841
Midterm Reminder	4	0.806
Homework Reminder	4	0.841

6.2.2 Descriptive Statistics

After reliability analysis, a composite score was computed for each motivation factor and subscales of message effectiveness from the corresponding items. The descriptive statistics of the all variables are given in Table 26 for online class participants and blended class participants.

6.2.3 Normality Check

Normality distribution was checked for all variables with Kolmogorov-Smirnov test (Field, 2009; Pallant, 2001) to determine the further analysis methods. Normality was checked with Kolmogorov-Smirnov (KS) test for each control and treatment groups separately (The results are given in Appendix K). According to KS results, MessageG, LMS use, IGO1, TA2, MessageM and Grade variables were not normally distributed in online group data. MessageG is not normally distributed in blended group data.

6.2.4 Homogeneity of Variance

This assumption refers to the variance of a variable should not change when you go through level of that variable (Field, 2009). To check homogeneity of variance in control and treatment groups for all experiment variables, Levene's test was used in SPSS. The variances for all variables of motivation, grade and LMS use were equal in online class data for control and treatment groups. The variances for all variables of motivation, grade and LMS use were equal in blended class data for control and treatment groups. Appendix L presents the results of Levene's test.

Table 26: Descriptive statistics of experiment data

		Online Class						Blended Class				
	N	Mean	Median	Std. D	Min	Max	N	Mean	Median	Std. D	Min	Max
IGO_1	56	2.85	2.67	1.19	1.00	5.67	49	3.71	3.67	1.48	1.00	7.00
TA_1	56	4.09	4.20	1.36	1.00	7.00	49	3.70	3.60	1.37	1.00	6 .80
SELP_1	56	4.19	4.31	1.22	1.00	6.88	49	4.72	4.88	1.18	2.00	7.00
CLB_1	56	4.46	4.75	1.26	1.00	7.00	49	4.62	4.75	1.26	1.75	7.00
TV_1	56	3.70	3.92	1.40	1.00	6.33	49	4.45	4.67	1.32	1.00	6.67
IGO_2	56	3.17	3.33	1.30	1.00	5.67	49	3.95	4.00	1.59	1.00	7.00
CLB_2	56	4.87	5.00	1.17	1.25	7.00	49	4.73	4.75	1.29	1.50	7.00
TA_2	56	3.86	3.90	1.31	1.00	6.80	49	3.33	3.20	1.32	1.40	6.40
SELP_2	56	4.22	4.25	1.16	1.00	7.00	49	4.75	4.75	1.11	2.50	6.63
TV_2	56	4.19	4.50	1.49	1.00	7.00	49	4.72	4.83	1.35	1.33	7.00
MessageG	56	4.05	4.00	0.81	1.80	5.00	49	4.07	4.00	0.72	2.40	5.00
MessageM	56	3.84	3.75	0.79	2.00	5.00	49	3.79	4.00	0.85	1.50	5.00
MessageH	56	3.88	4.00	0.84	1.75	5.00	49	3.94	4.00	0.92	1.25	5.00
Grade	56	61.71	63.74	16.66	20.60	83.90	49	69.24	70.35	11.58	19.50	89.70
LMS Use	56	18.00	4.50	24.88	0.00	95.00	49	73.12	65.00	45.96	3.00	210.00
**1 refers to score at pre-test. 2 refers to score at post-test for motivation factors.												

6.2.5 *What are the impacts of persuasive messages on students' course grade?*

To test the effects of persuasive messages on course grade, the grade differences between the control and treatment groups were analyzed for online class and blended class separately.

Online Group

In online control group, the grade was not normally distributed according to KS test, so that the difference was checked with Mann-Whitney test (Field, 2009). Mann Whitney test indicated that course grade was greater for control group (Mdn=71.30) than for treatment group (Mdn=60.32), U=253.5, p=0.025 in online group.

Blended Group

In blended class, course grade was normally distributed for control and treatment groups, so that an independent –samples t-test was conducted to compare course grade for control and treatment groups (Field, 2009). There was no significant difference in the course grade for control (μ=70.41, SD=8.21) and treatment (μ=68.10, SD=14.17) groups.

6.2.6 *What are the impacts of persuasive messages on students' LMS use?*

To test the effects of persuasive messages on LMS use, LMS use differences between control and treatment groups were analyzed.

Online Group

LMS use was not normally distributed for both control and treatment group, so LMS use differences between control and treatment group were tested with Mann-Whitney test. Mann Whitney test indicated that, there is no significant difference in LMS use for treatment (Mdn=3.50) and control (Mdn=5.00) groups, U=384.5, p=0.925. However the average LMS use in treatment group is higher than the average LMS use in control group.

LMS use for blended group was normally distributed for both control and treatment group, so that the difference was tested with independent-samples t-test. There was no difference in LMS use for treatment (μ=62.79, SD=47.33) and for control (μ=83.04, SD=43.23) group.

6.2.7 What are the impacts of persuasive messages on students' motivation?

Students' motivation was measured with MSLQ at the beginning and at the end of the semester. To examine the effects of persuasive messages on students' motivation the difference between pre and post motivation scores was examined.

Online Group

IGO1 and TA2 were not normally distributed, so that the differences for these variables were tested with Wilcoxon Signed-Ranks Test (Field, 2009). There is no difference between pre and post scores of IGO and TA for treatment and control groups.

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SELP, TV and CLB variables are normally distributed so that to compare pre-test and post-test scores for these variables, paired-sample t-test was conducted in both control and treatment groups. As displayed in Table 27, no statistically significant differences were observed in pre-test to post-test scores for CLB and TV in treatment group, for SELP in both treatment and control groups. In control group, there are statistically significant differences in pre-test to post-test scores for CLB and TV. The results showed that in control group, task value and control of learning beliefs increased.

Table 27: Paired sample t-test for SELP, TV and CLB in online group

Group Type			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Sig. (2-tailed)
Treatment	Pair 1	SELP_1 SELP_2	0.010	1.396	0.274	-0.554	0.574	0.035	25	0.972
	Pair 2	CLB_1 CLB_2	-0.144	1.497	0.294	-0.749	0.460	-0.491	25	0.628
	Pair 3	TV_1 TV_2	-0.449	1.377	0.270	-1.005	0.107	-1.662	25	0.109
Control	Pair 1	SELP_1 SELP_2	-0.063	1.372	0.250	-0.575	0.450	-0.250	29	0.805
	Pair 2	CLB_1 CLB_2	-0.625	1.238	0.226	-1.087	-0.163	-2.764	29	0.010
	Pair 3	TV_1 TV_2	-0.533	1.090	0.199	-0.940	-0.126	-2.680	29	0.012

Blended Group

In blended group, the pre-test and post-test scores of motivation were compared with paired-sample t-test (Field, 2009). As displayed in Table 28, there are not statistically significant differences in pre-test to post-test scores for all motivation scores in both control and treatment groups.

Table 28: Paired sample t-test for IGO, TA, SELP, CLB and TV in blended group

	Gtype		Paired Differences					t	df	Sig. (2-tailed)
			Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
						Lower	Upper			
Treatment	Pair 1	IGO_1 IGO_2	-0.264	1.445	0.295	-0.874	0.346	-0.895	23	0.380
	Pair 2	TA_1 TA_2	0.317	1.116	0.228	-0.154	0.788	1.390	23	0.178
	Pair 3	SELP_1 SELP_2	-0.177	0.988	0.202	-0.594	0.240	-0.878	23	0.389
	Pair 4	CLB_1 CLB_2	0.104	1.255	0.256	-0.426	0.634	0.407	23	0.688
	Pair 5	TV_1 TV_2	-0.292	1.308	0.267	-0.844	0.261	-1.092	23	0.286
Control	Pair 1	IGO_1 IGO_2	-0.213	1.669	0.334	-0.902	0.476	-0.639	24	0.529
	Pair 2	TA_1 TA_2	0.416	1.304	0.261	-0.122	0.954	1.595	24	0.124
	Pair 3	SELP_1 SELP_2	0.110	1.108	0.222	-0.347	0.567	0.496	24	0.624
	Pair 4	CLB_1 CLB_2	-0.310	1.449	0.290	-0.908	0.288	-1.069	24	0.295
	Pair 5	TV_1 TV_2	-0.253	1.388	0.278	-0.826	0.320	-0.913	24	0.370

6.2.8 How do students perceive persuasive messages in education context?

Three subscales were created for three types of messages in order measure the opinion of the students. After reliability analysis, a composite score was computed for each subscale. The scores for each group were compared.

Online Group

Three scores corresponding to students' opinions about the messages were computed in treatment and control group. The students in treatment groups are more positive (μ=4.17, SD=0.75) about the messages they have received than the students who are in control group (μ=3.93, SD=0.84). When the score for midterm message was examined, the treatment groups students are more positive (μ=3.97, SD=0.79) than the control group students (μ=3.72, SD=0.78). Also, the score for homework message is higher in treatment group (μ=4.05, SD=0.72) than the control group (μ=3.73, SD=0.91) (Table 29).

Table 29: Message scores for online group

Group Type		MessageG	MessageM	MessageH
Treatment	Mean	4.177	3.971	4.058
	N	26	26	26
	Std. Deviation	0.760	0.798	0.726
Control	Mean	3.933	3.725	3.733
	N	30	30	30
	Std. Deviation	0.843	0.786	0.912

<u>Blended Group</u>

Three scores corresponding to students' opinions about the messages were computed in treatment and control group. The students in treatment groups are more positive (μ=4.10, SD=0.52) about the messages they have received than the students who are in control group (μ=4.03, SD=0.87). When the score for midterm message was examined, the treatment groups students are more positive (μ=3.90, SD=0.63) than the control group students (μ=3.68, SD=1.01). Also, the score for homework message is higher in treatment group (μ=4.14, SD=0.64) than the control group (μ=3.75, SD=1.10) (Table 30).

Table 30: Message scores for blended group

Group Type		MessageG	MessageM	MessageH
Treatment	Mean	4.108	3.906	4.146
	N	24	24	24
	Std. Deviation	0.527	0.638	0.647
Control	Mean	4.032	3.680	3.750
	N	25	25	25
	Std. Deviation	0.877	1.019	1.102

6.3 Conclusion and Discussion

Total 21 messages were sent to treatment groups and control groups. Treatment groups' messages included persuasive cues depending on Cialdini's six persuasion principles while control group messages did not. The aim of the messages was to generally increase the attention of students to the course and improve their attendance to course and course activities. This aim was tried to be reached by simple goals (such as creating social network discussion groups, reminding assignments, giving mini quizzes, reminding exams). To analyze the effects of the messages on students' participation to the course, we compared course grade, LMS use, motivation (all of which refers to general attendance to the course) differences in control and treatment groups.

First of all, in online class, there was significant difference between treatment and control group in course grade. Course grade was significantly greater in control group than the treatment group in online class. This result implies that persuasive messages did not affect students' course grade in online experiment group, since control group's course grade was higher than the treatment group. In blended class, there was not any significant difference for course grade in control and treatment group, which implies that the persuasive messages did not affect course grade in blended experiment group too. Goh et al. (2012) researched the effects of persuasive SMS intervention on students' course grade and found significant difference between the group who received the SMS intervention and who did not receive SMS intervention. In this study, the students' course grade performance was significantly higher in the group who received SMS intervention. The current study did not reach this result. The reason, why this finding was not present, could be that the experimental setting of the study was different from the referenced study setting where they did not send any messages to control group. The current study sent messages to control group too but the messages did not have persuasive cues. In the literature, there are studies which mentioned that reminders have been considered an effective persuasive design strategy particularly in health domain (Klasnja & Pratt, 2012). It was speculated that implementing a persuasive cue in a message does not create a significant difference in education context. The use of reminders is effective by itself.

Second, the difference in LMS use between treatment and control group was analyzed. Statistical difference was not found between the LMS use of the treatment and control groups in both online and blended group. However the average LMS use was greater in

treatment group than the control group in online group while the average LMS use is higher in control group than the treatment group in blended group. These results show that persuasive messages did not make significant effect on LMS use. These results also could be caused by sending messages to control group too mentioned above; the reminder messages could be effective by itself.

When the pre-test and post-test scores for intrinsic goal orientation, test anxiety, self-efficacy, task value and control of learning beliefs were examined, control of learning beliefs and task value increased significantly in online control group. There is no significant difference between pre-test and post-test scores in blended group for all motivation factors. Goh et al. (2012) examined the effects of persuasive SMS intervention on students' motivation and self-regulated strategies. They analyzed the difference between all items of MSLQ. They found significant difference in four of the items of self-efficacy and one item of control of learning beliefs between treatment and control group in pre-test scores. They also found significant difference in three items of task value, one item of extrinsic goal orientation and two items of control of learning beliefs between control and treatment group in post-test scores. The results of the current study was similar with the referenced study, since both of the studies did not find significant difference between control and treatment groups in pre-test and post-test scores. Also the referenced study analyzed the single items difference however the current study computed a composite score for each motivation factor under MSLQ and analyzed the difference between these scores.

Lastly the current study asked the students their opinions about the messages sent to both control and treatment groups. When the opinions of the participants were examined, it was concluded that participants in treatment groups in both online and blended class were positive about the persuasive messages compared to the control group which received non-persuasive messages. Although the difference is marginal, this might indicate that messages with persuasive cues are seen more positive by the students.

CHAPTER 7

CONCLUSION AND FUTURE WORK

Academic performance of students depends on numerous factors. Personality traits are one of the factors affecting students' academic performance. "Big five personality" model, which includes five main traits: *extraversion*, *agreeableness, conscientiousness, neuroticism* and *openness* (Costa & McCrae, 1992; McCrae & Costa, 1987) is the widely linked personality model to academic performance. The meta analysis of personality traits and academic performance conducted by O'Connor and Paunonen (2007) and the literature review conducted by Noftle and Robins (2007) revealed that among the five personality traits conscientiousness is the mostly significantly related trait to academic success. The students showing the characteristics of conscientiousness are more successful. Although the relation between conscientiousness trait and academic success is strong, the relation between other four personality traits and academic success is not clear.

Motivation is another factor affecting students' academic performance. There are six factors to identify academic motivation, measured by Motivated Strategies for Learning Questionnaire which are *intrinsic goal orientation, extrinsic goal orientation, task value, test anxiety, self-efficacy for learning performance and control of learning beliefs* (Artino Jr, 2005). These factors are effective to predict students' academic performance. For example, these factors predict students' course grade (Brackney & Karabenick, 1995; Credé & Phillips, 2011; Lin et al., 2001). In addition to motivation, students attendance and participation to the lectures affect their academic performance; students with good attendance take higher grades (Brewer & Burgess, 2005; Launius, 1997; Van Blerkom, 1996). Interactive lectures (Snell, 1999), teaching methods, and rewarding attendance (Devadoss & Foltz, 1996) are the factors that affect students' attendance.

Persuasion is the key of behavior and attitude change. There different theories and strategies developed to investigate behavior change. One of the works that examines persuasion is the six persuasion strategies developed by Cialdini: *reciprocation, authority, scarcity, social proof (consensus), commitment* and *liking* principles (Cialdini, 1993, 2001, 2004). These strategies have been used and applied in different contexts to change the behaviors of individuals such as online commerce, fund-raising, marketing, advertisements. However the effects of these persuasion strategies in changing students' behavior in courses have not been clearly researched.

In order to address the research questions mentioned before, four different studies were conducted. These studies aimed to investigate (1) the effective persuasion strategies of Cialdini in course behaviors, (2) individual differences in susceptibility to persuasion strategies, (3) individual differences from personality and motivation perspectives in academic performance, (4) the effects of persuasive messaging in academic performance.

First of all, the factors that affect students' course participation from the perspective of Cialdini's six persuasion principles were identified. There are different factors affecting students attendance to lectures and their course grade; their motivation, the rewarding mechanism and so on. Specifically, how the instructors persuade their students to attend their lectures and how the students are persuaded to attend the lectures, were examined with regards to persuasion strategies. Two types of interviews were conducted with instructors and students. The results of the qualitative study show that reciprocation, liking, scarcity and social proof are the effective persuasion strategies to make students attend the lectures and follow lectures. If instructors want to make their courses more attentive, they can use rewarding strategy like bonus point (reciprocation principle), make himself/herself liked by the students (liking principle), make limited lectures, give limited times (scarcity principle), make the classroom environment open to everyone (social proof) and use online tools to support their lectures (LMS, online discussion groups). As a limitation, this study concentrated on Cialdini's six persuasion strategies: the interview questions were prepared around these strategies. Additional factors that could affect students' attendance and participation was ignored. Additionally, the number of participants was relatively low and all of them were from the same university.

Second, the individual differences in susceptibilities to six persuasion strategies of Cialdini were examined with a quantitative study. From the previous studies it was known that, different individuals could respond differently to same persuasion strategy. The relationships between BFP traits and persuasion strategies were identified. Kaptein (2012) mentioned that when the persuasive requests are tailored to the individuals, compliance to persuasive request increases. The results of our study can be useful for persuasive system designers to create effective persuasive systems according to the personality characteristics of users. Having this information in advance can help develop more effective and customized persuasive systems. The results imply that for example when the authority strategy is used in the design of a persuasive application in a domain such as electronic commerce, and health, it could be customized considering the agreeableness, conscientiousness and openness personality traits of the target audience of the persuasive application. These people are more likely to be influenced from the authority strategy, using doctors or other authoritative figures in persuasive design of health-related applications can be more effective. Knowing the susceptibility of person in advance increases the impact of persuasive applications on individuals' behavior. For example, extravert and neurotic people are affected significantly from scarcity principle and a customized persuasion application where last opportunities or limited number of items or limited time are mentioned, is more likely to increase their attentiveness. To apply reciprocation strategy in a persuasive application, a rewarding mechanism (such as badges, labels, points, discounts and coupons) could be used to affect extraverted, agreeable, neurotic and conscientious individuals to make them reach the target behavior. An agreeable individual may likely to follow their social network. A persuasive system may present the actions of people in their social network to affect agreeable individuals. As commitment strategy is about being in line with previous behavior and statement, a persuasive system can be designed as to make users committed to the target action in written format before asking them to perform it. For example an inquiry via a questionnaire could be used to make people commit something in a persuasive intervention. As a limitation of this study is the limited age range of the participants. Although the results were out of context, they could be adapted easily to education context because of the participants. Additionally, although the correlation results reasonably overlap with the BSEM results, there is a significant difference in liking strategy as there is no direct linear relationship between liking and traits including conscientiousness, openness and extraversion but a nonlinear relationship.

Third, the relationship between personality traits, motivation, LMS use and course grade were investigated with a quantitative study. Self-efficacy and LMS use were the predictors of course grade in both online and blended learning environment. Self-efficacy was the

predictor of LMS use in online environment while, task value and test anxiety were the predictors of LMS use in blended course. These relationships could be helpful for instructors to encourage their students to use LMS more to take higher grades and increase their academic performance. Also, to increase students' academic performance, instructors could encourage students to be more disciplined in studying, encourage their feelings about accomplishment of difficult activities and tasks. This study also investigated the relations of other three personality traits and four motivation factors, but no significant results were found. It is known from the literature that the relations between these personality traits and course grade vary. The results of the study are parallel with the literature. The limitations of this study was that data was collected from an introductory IT course which is conducted online and blended learning environment; data could be collected from different courses to increase generalizability.

Lastly, this thesis study investigated the effects of persuasion strategies on students' academic performance via persuasive messaging in an experimental setting. Although persuasive messages did not make any statistically significant effect over course grade, LMS use and motivation when the difference between control and treatment groups checked, the study revealed that persuasive messages were perceived more positively by the students. This implies that messages including persuasive cues make more positive impacts on students when compared to messages without persuasive cues. One of the limitations of this study was to send reminder messages to control groups too: the persuasive effects of reminder messages were ignored which could affect the results.

7.1   Future Work

The overall study generally focused on the six persuasion strategies of Cialdini, since there are different applications of these strategies in different contexts in the literature to take an example. Also the scale of Kaptein, STPS, is a useful measurement instrument to identify individuals' susceptibilities to persuasion strategies of Cialdini. Further investigations could be conducted with different persuasion strategies. For example, first, this thesis study contributed to research area by identifying the effective persuasion principles in course activities from the perspectives of Cialdini's persuasion strategies. Further investigations are required to identify other effective persuasion principles in addition to those of Cialdini. Second, this thesis study contributed to research area by investigating the relationship between six persuasion principles and five personality traits and identified who is affected from which persuasion principles. Although, some of the principles of Cialdini's and Fogg's are similar, different strategies could be considered in future studies, since there are different persuasion approached applied in different context. Tailoring persuasive applications according to personality could improve the effects of them on each individuals. Also all the participants of this part of the study are university students. The study could be repeated with a wider age range of participants as well as with participants from different cultures. Third, the study contributed to research area by investigating the relationship between motivation, personality, LMS use and course grade. This part of the study was conducted with participation of students of an introductory IT course which is conducted online and blended learning environment. The study could be repeated in different course contexts. Also LMS use was represented a total score of students access to LMS which was assumed that student use LMS in those accesses, since the system did not give actual use, that's the students may just log in the system and leave without using it. A more comprehensive system could be used to repeat the study. In model analysis, the effects of mediator variables were not analyzed in the scope of this study: future works are needed to test the effects of mediators. Lastly, this thesis study investigated the effects of persuasive messaging (depending on Cialdini's six persuasion strategies) on academic performance in terms of course grade, LMS use and motivation. Although, statistically significant results were not found, the messages were perceived positively by the students. For further investigation for the use of persuasive

messages in changing students' behavior (or changing behavior of individuals in any context), this study suggested the following guides:

- Experimental study is needed to test the effects of persuasive messages.
- The persuasive effects of reminder message itself should not be ignored.
- Persuasive messages could be effective in changing students' behavior, however they should be applied carefully.
- The content of persuasive messages could be created with persuasive cues from existing examples from the literature depending on different persuasion strategies.
- Persuasive messages could increase the participation of the students to the courses in both online and classroom environment.
- Individuals from the audience could be involved in message creation process.
- The target behavior should be easy to accomplish to increase the effects of persuasive messages.
- The scale of Kaptein, STPS, could be implemented to identify individuals' susceptibilities to persuasion strategies.
- Individuals could be effected differently from persuasions strategies which should be considered by the designer of any kind of persuasive applications.

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APPENDICES

Appendix A-Interview Questions of Instructors

Demographic Questions

1. Age:
2. Department:
3. Degree:
4. How many years have you been lecturing?

Questions:

1. What do you think about students' attendance and participation in your lectures? Is it important whether they attend your classes regularly and actively or not?
2. Do you do anything to increase students' attendance and participation to your lectures?
   (a) During your lectures do you ask questions or make discussions?
   (b) Do you talk to your students about their attendance?
3. What do you do in order to increase students' attendance in online platform that you are using to support your lectures?
4. Do you use any rewarding mechanism to increase students' participation? For example do you give bonus grade to attendance?
5. Have you experienced any situation where a student has stopped attending your class in the middle of the term? If yes, have you contacted with your student in order to understand the reasons?
6. What do you do to motivate your students to submit their homework on time?
7. Do you remind your students the deadline of the exams and homework? For example do you send e-mail messages to remind? If yes, do you think it is effective on students to remind the important deadlines?
8. Do you want commitment (written or oral) from your students about attendance? If yes, is it effective?
9. Do you make your students work in groups during activities?
10. How do you create groups? Do students who know each other well (close classmates) want to be in the same group?
11. Is it an advantage to put the close classmates in the same group?
12. Do students like group works? Do they participate regularly?
13. Do you think that students' attitude towards instructor affect their participation to the lecture?
    (a) If the students like the instructor, do they attend the lectures regularly? Do you have any experience for this?
    (b) If instructors follow strict rules, do you think it impairs their attendance?
14. Do you think that students' classmates affect their attendance to the lectures?
    (a) If students think that they are a part of the class community, do you think that affects their attendance?
    (b) Do you think the relationship between classmates affect their attendance?
15. Do you want to add anything else?

Appendix B-Interview Questions of Students

Demographic Questions

1. Gender:
2. Age:
3. Department:

Questions

1. How was your attitude towards IS100 course before taking the course? Did you hear anything about the course, negative or positive?
2. How was your attitude towards IS100 course after taking the course?
3. Do you think that IS100 course improve your computer skills?
4. How was your attitude towards computer before and after taking the course?
5. How was your attendance while you were taking the course? Did you attend lectures regularly?
6. What motivated your attendance to the lectures?
7. Were you affected from compulsory attendance, grade, insufficient computer skills, and eagerness to learn?
8. What affects your attendance apart from taking the required grade to pass the course?
9. Did the instructors at your department affect your participation to IS100 course?
10. Did the instructor of the course affect your attendance?
11. How was the attitude of your classmates towards IS100 Course? Did they affect you?
12. If your friends have negative attitudes towards IS100 course, what do you say them to attend the lectures regularly?
13. If regular participation to the course is awarded with bonus grade, are you affected positively?
14. What do you think if the deadlines like exam date, homework deadlines are reminded with e-mail? Does it affect your attendance in a positive way?
15. What kind of online supporting tools do you want to use in the course?
    (a) Is learning management system enough for out of class communication?
    (b) Do you support use of SNS? Why or why not?
16. What do you think about the content of the course?
17. What do you think about the course activities? Are they adequate?
18. What do you think about using online discussion groups to support the courses?
19. In order to improve the course what kind of activities can be added to course content?
20. Do you want to add anything else?

Appendix C-Ethical Clearance

Sayı: 28620816/239-337

19 Ağustos 2013

Gönderilen: Y.Doç.Dr.Tuğba Taşkaya Temizel
Bilişim Sistemleri Bölümü

Gönderen : Prof. Dr. Canan Sümer
IAK Başkan Vekili

İlgi : Etik Onayı

Danışmanlığını yapmış olduğunuz Bilişim Sistemleri Bölümü Doktora öğrencisi Nurcan Alkış'ın "A Persuasion Framework for Improving Online Participation in Social Networking in The Context Of Higher Education" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

19/08/2013

Prof.Dr. Canan Sümer
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkan Vekili
ODTÜ 06531 ANKARA

Sayı: 28620816/ 277 — 405

07.10. 2013

Gönderilen: Y.Doç.Dr.Tuğba Taşkaya Temizel
              Bilişim Sistemleri Bölümü

Gönderen :   Prof. Dr. Canan Özgen
              IAK Başkanı

İlgi   : Etik Onayı

Danışmanlığını yapmış olduğunuz Bilişim Sistemleri Bölümü Doktora öğrencisi Nurcan Alkış'ın "'A Persuasion Framework for Improving Online Participation in Social Networking in The Context Of Higher Education" isimli araştırması "İnsan Araştırmaları Komitesi" tarafından uygun görülerek gerekli onay verilmiştir.

Bilgilerinize saygılarımla sunarım.

Etik Komite Onayı

Uygundur

07/10/2013

Prof.Dr. Canan Özgen
Uygulamalı Etik Araştırma Merkezi
(UEAM) Başkanı
ODTÜ 06531 ANKARA

Appendix D-Big Five Inventory

English Version:

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly	Diagree a little	Neither agree nor disagree	Agree a little	Agree strongly
1	2	3	4	5

1.	Is talkative
2.	Tends to find fault with others
3.	Does a thorough job
4.	Is depressed, blue
5.	Is original, comes up with new ideas
6.	Is reserved
7.	Is helpful and unselfish with others
8.	Can be somewhat careless
9.	Is relaxed, handles stress well
10.	Is curious about many different things
11.	Is full of energy
12.	Starts quarrels with others
13.	Is a reliable worker
14.	Can be tense
15.	Is ingenious, a deep thinker
16.	Generates a lot of enthusiasm
17.	Has a forgiving nature
18.	Tends to be disorganized
19.	Worries a lot
20.	Has an active imagination
21.	Tends to be quiet
22.	Is generally trusting
23.	Tends to be lazy
24.	Is emotionally stable, not easily upset
25.	Is inventive
26.	Has an assertive personality
27.	Can be cold and aloof
28.	Perseveres until the task is finished
29.	Can be moody
30.	Values artistic, aesthetic experiences
31.	Is sometimes shy, inhibited
32.	Is considerate and kind to almost everyone
33.	Does things efficiently
34.	Remains calm in tense situations

35.	Prefers work that is routine
36.	Is outgoing, sociable
37.	Is sometimes rude to others
38.	Makes plans and follows through with them
39.	Gets nervous easily
40.	Likes to reflect, play with ideas
41.	Has few artistic interests
42.	Likes to cooperate with others
43.	Is easily distracted
44.	Is sophisticated in art, music, or literature

Turkish Version:

Aşağıda size uyan veya uymayan birçok karakteristik verilmiştir. Lütfen verilen ifadeye katılıp katılmadığınızı size en uygun şıkkı seçerek işaretleyiniz.

Kesinlikle Katılmıyorum	Katılmıyorum	Kararsızım	Katılıyorum	Kesinlikle Katılıyorum
1	2	3	4	5

1.	Konuşkan
2.	Başkalarının kusurlarını bulmaya eğilimli
3.	Mükemmel iş çıkaran
4.	Depresif, hüzünlü
5.	Orjinal, yeni fikirler üreten
6.	Çekingen
7.	Yardımsever, bencil olmayan
8.	Biraz dikkatsiz
9.	Rahat, stresle başa çıkabilen
10.	Pek çok farklı şeyi merak eden
11.	Enerji dolu
12.	Başkalarıyla tartışma başlatan
13.	Güvenilir bir çalışan
14.	Gergin olabilen
15.	Zeki, engin fikirleri olan
16.	Pek çok etkinlik organize eden
17.	Affedici bir doğası olan
18.	Dağınık olmaya eğilimli
19.	Sıkça endişelenen
20.	Hayal gücü yüksek
21.	Sessiz olmaya eğilimli
22.	Genel olarak güven duyan
23.	Tembel olmaya eğilimli
24.	Duygusal olarak dengeli, kolay üzülmeyen
25.	Yaratıcı, yenilikçi
26.	İddialı bir kişiliğe sahip
27.	Soğuk ve uzak olabilen

28.	İşini tamamlayana kadar azimle çalışan
29.	Karamsar, ruhsal durumu çabuk değişen
30.	Estetikle, sanatla ilgili etkinlikleri önemseyen
31.	Bazen utangaç, tutuk
32.	Düşünceli ve hemen herkese karşı nazik
33.	Verimli çalışan
34.	Gergin durumlarda sakin kalmayı başaran
35.	Rutin işleri tercih eden
36.	Cana yakın, arkadaş canlısı
37.	Bazen başkalarına karşı kaba
38.	Planlar yapan ve o planları takip eden
39.	Çabuk sinirlenen
40.	Fikirlerle ilgilenmeyi, paylaşmayı seven
41.	Sanatsal konulara ilgisi az
42.	Başkalarıyla işbirliği yapmaktan hoşlanan
43.	Kolaylıkla dikkati dağılan
44.	Resim, müzik veya edebiyat alanlarında donanımlı

Appendix E- Susceptibility to Persuasion Strategies Scale (STPS)

Completely disagree						Completely agreee
1	2	3	4	5	6	7

1.	When a family member does me a favor, I am very inclined to return this favor.
2.	I always pay back a favor.
3.	If someone does something for me, I try to do something of similar value to repay the favor.
4.	When I receive a gift, I feel obliged to return a gift.
5.	When someone helps me with my work, I try to pay them back.
6.	I believe rare products (scarce) are more valuable than mass products
7.	When my favorite shop is about to close, I would visit it since it is my last chance.
8.	I would feel good if I was the last person to be able to buy something.
9.	When my favorite shampoo is almost out of stock I buy two bottles
10.	Products that are hard to get represent a special value.
11.	I always follow advice from my general practitioner
12.	I am very inclined to listen to authority figures.
13.	I always obey directions from my superiors
14.	I am more inclined to listen to an authority figure than a peer.
15.	When a professor tells me something I tend to believe it is true.
16.	If someone from my social network notifies me about a good book, I tend to read it.
17.	When I am in a new situation I look at others to see what I should do.
18.	I often rely on other people to know what I should do.
19.	It is important to me to fit in.
20.	I will do something as long as I know there are others doing it too.
21.	I will do a favor for people that I like
22.	The opinions of friends are more important than the opinions of others.
23.	If I am unsure, I will usually side with someone I like.
24.	I accept advice from my social network.
25.	When I like someone, I am more inclined to believe him or her.
26.	Whenever I commit to an appointment I always follow through.
27.	I try to do everything I have promised to do.
28.	When I make plans I commit to them by writing them down
29.	Once I have committed to do something I will surely do it.
30.	If I miss an appointment, I always make it up.

Turkish Version:

Belirtilen ifadeye katılıp katılmadığınızı uygun şıkkı seçerek belirtiniz. Eğer belirtilen ifadeye hiç katılmıyorsanız 1'i işaretleyiniz. Eğer belirtilen ifadeye katılıyorsanız size uygun katılım derecesini seçiniz.

Hiç katılmıyorum						Tamamen katılıyorum
1	2	3	4	5	6	7

1.	Aile üyelerimden biri bana bir iyilik yaptığı zaman, bu iyiliğin karşılığını vermekte çok istekli olurum.
2.	Yapılan bir iyiliğin karşılığını her zaman öderim.
3.	Eğer birisi benim için bir iyilik yaptıysa, aynı değerde birşey yaparak iyiliğin karşılığını vermeye çalışırım
4.	Bir hediye aldığım zaman,kendimi bir hediye ile karşılık vermek zorunda hissederim.
5.	İşimle ilgili bir konuda birinden yardım aldığımda, karşılığını vermeye çalışırım
6.	Nadir bulunan ürünlerin, çok bulunan ürünlere göre daha değerli olduğuna inanırım
7.	En sevdiğim mağaza kapanacağı zaman, son şansım olacağını düşünerek oraya uğramak isterim
8.	Eğer en son kalan ürünü ben alabildiysem, kendimi iyi hissederim.
9.	Sürekli kullandığım şampuanın stokları bitmek üzereyse, iki adet satın alırım
10.	Nadir bulunan ürünler özel bir değer taşır.
11.	Doktorumun tavsiyelerine kesinlikle uyarım.
12.	Otoritelerin ve konunun uzmanlarının görüşlerine çok değer veririm.
13.	Üstlerimin verdiği talimatlara her zaman uyarım.
14.	Otoritelerin ya da konunun uzmanlarının görüşlerini arkadaşlarımın görüşlerinden daha çok dikkate alırım.
15.	Hocalarımdan biri birşey söylediği zaman, söylediği şeyin doğru olduğuna inanırım.
16.	Sosyal çevremden birisi bir kitabın güzel olduğunu söylerse, o kitabı okumaya eğilim gösteririm.
17.	Yeni bir durumla karşılaştığımda karar verebilmek için diğerlerinin ne yaptığına bakarım.
18.	Ne yapacağımı belirlemek için çoğu kez diğerlerinin ne yaptığını dikkate alırım.
19.	Aykırı düşmemek benim için önemlidir.
20.	Başkaların aynı şeyi yaptığını bildiğim sürece ben de onu yapmaya devam ederim
21.	Sevdiğim insanlar için iyilik yaparım
22.	Arkadaşlarımın fikirleri, diğer herkesin fikirlerinden daha önemlidir
23.	Emin olmadığım bir konuda genellikle sevdiğim insanların fikrini benimserim.
24.	Arkadaşlarım ve yakınlarımdan tavsiye alırım.
25.	Sevdiğim insanlara inanmaya daha eğilimli/meyilli olurum.
26.	Bir randevuya söz verdiysem, her zaman randevuma sadık kalırım.
27.	Önceden söz vermiş olduğum herşeyi yapmaya çalışırım

28.	Plan yaptığım zaman, planlarımı yazarak taahhüt ederim
29.	Planlarımı arkadaşlarım ile paylaşıyor olmam onları gerçekleştirmemde yardımcı olur.
30.	Birşeyi yapmayı kafama koyduysam kesinlikle yaparım.

Appendix F- Motivated Strategies for Learning Questionnaire (MSQL)

English Version:

The following questions ask about your motivation for, attitudes about this class. Remember there are no right or wrong answers, just answer as accurately as possible. Use the scale below to answer the questions. If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

Not all true of me						Very true of me
1	2	3	4	5	6	7

1.	In a class like this, I prefer course material that really challenges me so I can learn new things.
2.	If I study in appropriate ways, then I will be able to learn the material in this course.
3.	When I take a test I think about how poorly I am doing compared with other students.
4.	I think I will be able to use what I learn in this course in other courses.
5.	I believe I will receive an excellent grade in this class.
6.	I'm certain I can understand the most difficult material presented in the readings for this course.
7.	Getting a good grade in this class is the most satisfying thing for me right now.
8.	When I take a test I think about items on other parts of the test I can't answer.
9.	It is my own fault if I don't learn the material in this course.
10.	It is important for me to learn the course material in this class.
11.	The most important thing for me right now is improving my overall grade point average, so my main concern in this class is getting a good grade.
12.	I'm confident I can learn the basic concepts taught in this course.
13.	If I can, I want to get better grades in this class than most of the other students.
14.	When I take tests I think of the consequences of failing.
15.	I'm confident I can understand the most complex material presented by the instructor in this course.
16.	In a class like this, I prefer course material that arouses my curiosity even if it is difficult to learn.
17.	I am very interested in the content area of this course.
18.	If I try hard enough, then I will understand the course material.
19.	I have an uneasy, upset feeling when I take an exam.
20.	I'm confident I can do an excellent job on the assignments and tests in this course.
21.	I expect to do well in this class.
22.	The most satisfying thing for me in this course is trying to understand the content as thoroughly as possible.
23.	I think the course material in this class is useful for me to learn.
24.	When I have the opportunity in this class, I choose course assignments that I can learn from even if they don't guarantee a good grade.
25.	If I don't understand the course material, it is because I didn't try hard enough.
26.	I like the subject matter of this course.
27.	Understanding the subject matter of this course is very important to me.
28.	I feel my heart beating fast when I take an exam.

29.	I'm certain I can master the skills being taught in this class.
30.	I want to do well in this class because it is important to show my ability to my family, friends, employer, or others.
31.	Considering the difficulty of this course, the teacher, and my skills, I think I will do well in this class.

Adapted Turkish Version

Aşağıda IS100 dersinizdeki motivasyon ve tutumunuzla ile ilgili çeşitli ifadeler verilmiştir. Belirtilen ifade için size uygunluk durumuna göre uygun ifadeyi secerek işaretleyiniz. Eğer belirtilen ifade sizi yansıtmıyorsa 1'i seçiniz. Eğer belirtilen ifade sizi yansıtıyorsa, uygunluk derecesini belirten şıkkı seçiniz. Unutmayın ki doğru ya da yanlış cevap yoktur. Bu nedenle size uygun ifadeyi seçiniz.

Beni hiç yansıtmıyor						Beni tam olarak yansıtıyor
1	2	3	4	5	6	7

|	
1.	IS100 dersinde yeni bilgiler öğrenebilmek için, büyük bir çaba gerektiren sınıf çalışmalarını tercih ederim
2.	Eğer uygun şekilde çalışırsam IS100 dersindeki konuları öğrenebilirim.
3.	IS100 sınavları sırasında, diğer arkadaşlarıma göre soruları ne kadar iyi yanıtlayıp yanıtlayamadığımı düşünürüm.
4.	IS100 dersinde öğrendiklerimi başka derslerde de kullanabileceğimi düşünüyorum.
5.	IS100 dersinden çok iyi bir not alacağımı düşünüyorum.
6.	IS100 dersi ile ilgili okumalarda yer alan en zor konuyu bile anlayabileceğimden eminim
7.	Benim için şu an IS100 dersi ile ilgili en tatmin edici sey dersi geçmektir.
8.	IS100 sınavları sırasında bir soru üzerinde uğraşırken, aklım sınavın diğer kısımlarında yer alan cevaplayamadığım sorularda olur
9.	IS100 dersindeki konuları öğrenemezsem bu benim hatamdır.
10.	IS100 dersindeki konuları öğrenmek benim için önemlidir.
11.	...
12.	IS100 dersinde öğretilen temel kavramları öğrenebileceğimden eminim.
13.	Eğer başarabilirsem, IS100 dersinde sınıftaki pek çok öğrenciden daha iyi bir not getirmek isterim .
14.	IS100 sınavları sırasında bu dersten başarısız olmanın sonuçlarını aklımdan geçiririm.
15.	IS100 dersinde, öğretmenin (asistanın) anlattığı en karmaşık konuyu anlayabileceğimden eminim.
16.	IS100 derslerinde öğrenmesi zor olsa bile, bende merak uyandıran sınıf çalışmalarını tercih ederim.
17.	IS100 dersinin kapsamında yer alan konular çok ilgimi çekiyor.
18.	Yeterince sıkı çalışırsam IS100 dersinde başarılı olurum.
19.	IS100 sınavlarında kendimi mutsuz ve huzursuz hissederim.
20.	IS100 dersinde verilen sınav ve ödevleri en iyi şekilde yapabileceğimden eminim.
21.	IS100 dersinde çok başarılı olacağımı umuyorum
22.	IS100 dersinde beni en çok tatmin eden şey, konuları mümkün olduğunca iyi öğrenmeye çalışmaktır.
23.	IS100 dersinde öğrendiklerimin benim için faydalı olduğunu düşünüyorum.
24.	…

25.	IS100 dersinde bir konuyu anlayamazsam bu yeterince sıkı çalışmadığım içindir.
26.	IS100 dersindeki konulardan hoşlanıyorum.
27.	IS100 dersindeki konuları anlamak benim için önemlidir.
28.	IS100 sınavlarında kalbimin hızla attığını hissederim.
29.	IS100 dersinde öğretilen becerileri iyice öğrenebileceğimden eminim.
30.	IS100 dersinde başarılı olmak istiyorum çünkü yetenegimi aileme, arkadaşlarıma göstermek benim için önemlidir
31.	Dersin zorlugu, öğretmen ve benim becerilerim gözönüne alındığında, IS100 dersinde başarılı olacağımı düşünüyorum.

Appendix G- Message Examples

Intended Strategy	Authority
Target Behavior	Join Facebook Discussion Group
Technology Channel	e-mail, Facebook
Treatment Group	1-3
Control Group	2-4
Description	In order to announce course activities, make discussion about course related activities, four closed Facebook group were created. Students were invited to join these groups separately. For the treatment group messages, expressions were included representing authority.
Treatment Group Message	Merhaba <<name of the student>> IS100 dersi için Facebookta bir grup oluşturduk. Ders ile ilgili duyuruları takip edebileceğin, ders ile ilgili konuları tartışabileceğin gruba aşağıdaki linkten katılabilirsin. Link: https://www.facebook.com/groups/IS100DiscussionGroup1/ Sevgiler Yrd.Doc.Dr. Tugba Taskaya Temizel ODTU Enformatik Enstitüsü Bilişim Sistemleri Bölümü Tel: 0 312 2107782 Fax: 0 312 2103745 E-mail: ttemizel@metu.edu.tr ttaskayatemizel@gmail.com
Control Group Message	Merhaba <<name of the student>> IS100 dersi için Facebookta bir grup oluşturduk. Ders ile ilgili duyuruları takip edebileceğin, ders ile ilgili konuları tartışabileceğin gruba aşağıdaki linkten katılabilirsin. Link: https://www.facebook.com/groups/IS100DiscussionGroup2/ Sevgiler

Intended Strategy	Authority, Liking
Target Behavior	Accessing Learning Management System (LMS)
Technology Channel	e-mail, LMS
Treatment Group	1-3
Control Group	2-4
Description	In order to take the attention of the students to attend the lectures regularly, a video is recorded and edited. The video contains the messages of the instructors from different departments about the importance of the course content and attending to lectures regularly. The instructors were selected by considering the popularity of the instructors in school and in their departments. The video were published online and the link of the video was sent to the students.

	The video message was only sent to the treatment groups.
Treatment Group Message	Merhaba <<name of the student>>
	IS100 dersi diğer her bölüm dersleriniz gibi düzenli takip edilmesi gereken önemli bir derstir.Dersi online olarak alan öğrencilerin ders notlarını düzenli takip etmeleri önemlidir, çünkü ders notlarını düzenli takip ederek geç olmadan anlamadığın yerleri sorup öğrenebilirsin. Ders notlarını düzenli takip ederek sınavları rahatlıkla geçebilirsin.
	Gereksiz gibi görülen IS100 dersi hakkında bölüm hocaları neler düşünüyor öğrenmek için linkteki videoyu izlemelisin: https://vimeo.com/78711887
	Ders materyallerine istediğin zaman METU Online'dan erişebilirsin. Ders ile ilgili takıldığın herhangi bir konu olursa ders asistanına sorarak veya is100@metu.edu.tr adresine mail atarak öğrenebilirsin.
	Sevgiler
Control Group Message	no message
Screen shots from video	

Öğrenciler nerede yanılıyorlar?

1. Dersin içeriği oldukça kapsamlıdır, sadece MS Office gibi programları içermemektedir.
2. IS100 dersinin içeriği her bölümde gerekli temel bilgisayar bilgisini içermektedir.
3. Ders kredisiz ama zorunlu bir derstir.
4. Ders zorunlu olduğu için mezun olabilmek için dersi geçmek gereklidir.

IS100 dersini okulumuzda bütün bölümlerin alması gereklidir

Intended Strategy	Scarcity, Authority
Target Behavior	Assignment submission
Technology Channel	e-mail
Treatment Group	1-3
Control Group	2-4
Description	This message is designed to remind the assignment. The students were announced the assignment via Learning Management System. When there was a limited time to submit the assignment, the reminder message was sent.
Treatment Message	Merhaba <<Name of the student>> Excel ödevinin teslim tarihi 18 Mayıs'tır. Ödevi tamamlayabilmen

	için <u>sadece **3** günün kaldı</u>. Bu ödev toplam notunun %15'ini oluşturduğunu hatırlatmak isterim. Ödevi tamamlayınca Metu Online'a yükleyebilirsin. Takıldığın durumda geç olmadan ders asistanına ya da is100@metu.edu.tr adresine e-mail atarak sorabilirsin. Sevgiler Yrd.Doc.Dr. Tugba Taskaya Temizel ODTU Enformatik Enstitüsü Bilişim Sistemleri Bölümü Tel: 0 312 2107782 Fax: 0 312 2103745 E-mail: ttemizel@metu.edu.tr ttaskayatemizel@gmail.com
Control Message	Merhaba <<Name of the student>> Excel ödevinin teslim tarihi 18 Mayıs'tır. Ödevi tamamlayınca Metu Online'a yükleyebilirsin. Sevgiler

|	
Intended Strategy	Scarcity
Target Behavior	Taking midterm exam
Technology Channel	e-mail
Treatment Group	1-3
Control Group	2-4
Description	This message is designed to remind the midterm exam to the students.
Treatment Message	Merhaba <<Name of the student>> 13 Nisan Pazar günü IS100 dersinin midterm sınavının olduğunu hatırlatmak isterim. Midterme çalışmak ve eksik konularını tamamlamak için <u>yalnızca 2 günün kaldı</u>. Midterm sınav saatini ve yerini aşağıdaki linkten öğrenebilirsin. Ayrıca METU Online ile ilgili sorun olursa ders notlarına da aynı sayfadan erişebilirsin. Başarılar dileriz.. Link: http://ii.metu.edu.tr/is100
Control Message	Merhaba <<Name of the student>> IS100 Midterm sınavı 13 Nisan'da yapılacaktır. Sınav saati ve yerini aşağıdaki linkten öğrenebilirsin. Ayrıca METU Online ile ilgili sorun olursa ders notlarına da aynı sayfadan erişebilirsin. Başarılar dileriz Link: http://ii.metu.edu.tr/is100

Facebook Message Examples

Example 1	

Example 2	
Example 3	

Appendix H-Message Effectiveness Scale

Title: IS100 Dersi Email Mesajları

Explanation: Aşağıda, IS100 dersinde bu dönem boyunca aldığınız e-posta mesajları ile ilgili çeşitli ifadeler verilmiştir. Verilen ifadeye katılıp katılmadığınızı uygun şıkkı seçerek işaretleyiniz. Eğer belirtilen ifade size uygun değilse 1- Kesinlikle katılmıyorum seçeneğini, eğer belirtilen ifade size uygun ise 5- Kesinlikle katılıyorum seçeneğini işaretleyiniz.

Aşağıda aldığınız e-posta mesajları ile ilgili genel ifadeler verilmiştir. Lütfen bu ifadeleri değerlendirirken dönem boyunca almış olduğunuz tüm e-postaları düşünerek cevap veriniz.	
1.	Hatırlatma mesajlarının içeriği faydalıydı.
2.	Hatırlatma mesajlarının sıklığı uygundu
3.	Benimle kişisel olarak ilgilenilmesi beni motive etti
4.	Aldığım mesajlar ders hakkındaki görüşlerimi daha olumlu yönde etkiledi.
5.	Gelen mesajlar dersin hocasından geldiği zaman daha çok dikkate aldım.
6.	Gelen mesajların gerekli olduğunu düşünmüyorum.
Aşağıda verilen ifadelerin size uygunluk durumunu vize (midterm) sınavından önce almış olduğunuz e-posta mesajlarını düşünerek seçiniz.	
1.	Aldığım mesajlar sayesinde sınavı kaçırmadım.
2.	Aldığım mesajlar sayesinde sınava kaç günüm kaldığını öğrendim.
3.	Çalışma vaktimi doğru planladım; son güne bırakmadım.
4.	Aldığım mesaj beni sınava çalışmaya teşvik etti.
5.	Mesaj içeriğindeki bilgiler METU Onlineda olduğu için bu mesajların gerekli olmadığını düşünüyorum.
Aşağıda verilen ifadelerin size uygunluk durumunu ödevden önce almış olduğunuz e-posta mesajlarını düşünerek seçiniz.	
1.	Aldığım mesajlar sayesinde ödevi kaçırmadım.
2.	Aldığım mesajlar sayesinde ödevi yapabilmek için ne kadar zamanım olduğunu öğrendim.
3.	Çalışma vaktimi doğru planladım; ödevi yapmayı son güne bırakmadım.
4.	Aldığım mesaj beni ödevi zamanında yapmaya teşvik etti.
5.	Mesaj içeriğindeki bilgiler METU Onlineda olduğu için bu mesajların gerekli olmadığını düşünüyorum.
E-Posta mesajları ile ilgili eklemek istediğiniz bir şey varsa lütfen belirtiniz:	

Appendix I- Experiment groups characteristics

	Group1: Online Treatment			Group2: Online Control			Group3: Blended Treatment			Group4: Blended Control		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
E	2.13	4.63	3.22	1.38	4.38	3.16	1.25	4.38	3.45	1.88	4.75	3.42
N	1.75	4.25	3.06	1.75	5.00	3.12	1.38	4.88	2.99	1.75	4.75	3.13
A	2.11	4.33	3.61	1.89	4.33	3.29	2.67	4.22	3.50	2.67	4.56	3.50
C	2.00	4.00	2.88	2.00	4.33	3.30	1.78	4.78	3.22	2.11	4.33	3.26
O	2.50	4.40	3.59	2.20	4.10	3.50	2.70	4.40	3.54	2.90	4.50	3.67
REC	2.75	7.00	5.52	2.25	7.00	5.33	2.75	7.00	5.49	1.00	7.00	5.58
SCAR	1.00	7.00	4.93	1.00	7.00	4.55	1.00	6.75	4.47	1.75	7.00	4.53
AUTH	2.20	7.00	4.74	2.60	6.60	4.74	2.20	7.00	4.62	1.60	7.00	4.38
LIKE	1.00	7.00	5.55	2.50	7.00	5.30	2.25	7.00	5.16	2.50	7.00	5.25
CONS	1.00	7.00	4.12	1.00	6.00	3.72	1.00	5.75	3.39	1.50	6.50	4.01
COM	3.33	7.00	5.45	3.33	7.00	5.47	2.67	7.00	5.51	3.00	7.00	5.54
IGO	1.00	5.00	2.87	1.00	5.67	2.76	1.00	7.00	3.77	1.00	6.33	3.46
TV	1.00	7.00	3.76	1.00	6.00	3.60	1.00	6.67	4.62	1.00	6.83	4.46
CLB	1.00	7.00	4.52	1.25	6.25	4.42	2.50	7.00	4.92	1.75	7.00	4.63
SELP	1.00	6.88	4.18	1.75	6.88	4.41	2.00	7.00	4.87	2.50	7.00	4.86
TA	1.00	7.00	3.69	1.60	6.60	3.91	1.00	6.40	3.25	1.00	6.80	3.68

Appendix J- Department information of the participants in each experiment group

Department Name	Total Number	Blended Treatment	Blended Control	Online Treatment	Online Control
Biology	2	0	1	1	0
Environmental Engineering	2	1	0	1	0
Electrical and Electronics Engineering	3	1	2	0	0
Industrial Engineering	1	0	0	0	1
Industrial Design	2	1	0	1	0
Philosophy	1	0	1	0	0
Physics	1	0	1	0	0
Physics Education	3	0	1	2	0
Food Engineering	3	0	0	0	3
Economics	3	1	1	0	1
Elementary Science Education	1	0	0	1	0
Elementary Mathematics Education	2	0	1	1	0
Foreign Language Education	7	3	1	1	2
Foreign Language Education (SUNY Program)	1	0	0	1	0
Civil Engineering	4	1	0	1	2
Statistics	5	1	2	0	2
Business Administration	6	1	0	3	2
Geological Engineering	1	1	0	0	0
Chemistry	3	0	1	1	1
Chemical Engineering	3	1	2	0	1
Chemistry Education	1	0	0	1	0
Global & International Affairs	1	0	0	1	0
Mining Engineering	1	0	1	0	0
Mechanical Engineering	3	0	1	1	1
Mathematics	1	0	1	0	0
Metallurgical and Materials Engineering	2	0	0	0	2
Architecture	1	0	0	0	1
Molecular Biology and Genetics	2	1	1	0	0
Elementary Education	7	1	0	3	3
Petroleum and Natural Gas Engineering	4	3	0	0	1
Political Science and Public Administration	10	3	1	4	2
Sociology	5	1	3	0	1
City and Regional Planning	3	0	2	0	1
History	4	1	0	2	1
International Relations	6	2	1	0	3
Total	105	24	25	26	30

Appendix K- Normality Test Results for Experiment Data

Tests of normality for online group

Group type		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Treatment	IGO_1	0.149	26	0.140	0.929	26	0.072
	TA_1	0.081	26	0.200[*]	0.977	26	0.799
	SELP_1	0.120	26	0.200[*]	0.974	26	0.717
	CLB_1	0.118	26	0.200[*]	0.978	26	0.840
	TV_1	0.104	26	0.200[*]	0.961	26	0.409
	IGO_2	0.157	26	0.096	0.919	26	0.043
	CLB_2	0.156	26	0.105	0.932	26	0.087
	TA_2	0.113	26	0.200[*]	0.984	26	0.939
	SELP_2	0.136	26	0.200[*]	0.979	26	0.857
	TV_2	0.145	26	0.168	0.968	26	0.570
	MessageG	0.211	26	0.004	0.899	26	0.015
	MessageM	0.160	26	0.085	0.923	26	0.052
	MessageH	0.161	26	0.083	0.923	26	0.052
	Grade	0.106	26	0.200[*]	0.962	26	0.423
	LMS use	0.277	26	0.000	0.79	26	0.000
Control	IGO_1	0.222	30	0.001	0.894	30	0.006
	TA_1	0.117	30	0.200[*]	0.972	30	0.587
	SELP_1	0.087	30	0.200[*]	0.986	30	0.956
	CLB_1	0.136	30	0.162	0.950	30	0.170
	TV_1	0.086	30	0.200[*]	0.977	30	0.746
	IGO_2	0.144	30	0.115	0.954	30	0.212
	CLB_2	0.154	30	0.068	0.955	30	0.229
	TA_2	0.214	30	0.001	0.93	30	0.051
	SELP_2	0.157	30	0.057	0.931	30	0.052
	TV_2	0.094	30	0.200[*]	0.957	30	0.257
	MessageG	0.119	30	0.200[*]	0.94	30	0.089
	MessageM	0.187	30	0.009	0.914	30	0.019
	MessageH	0.141	30	0.134	0.949	30	0.162
	Grade	0.164	30	0.039	0.869	30	0.002
	LMS use	0.288	30	0.000	0.692	30	0.000
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Tests of normality for blended groups

Group type		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Treatment	IGO_1	0.113	24	0.200[*]	0.978	24	0.846
	TA_1	0.095	24	0.200[*]	0.984	24	0.955
	SELP_1	0.150	24	0.175	0.950	24	0.273
	CLB_1	0.136	24	0.200[*]	0.963	24	0.493
	TV_1	0.104	24	0.200[*]	0.962	24	0.481
	IGO_2	0.093	24	0.200[*]	0.982	24	0.923
	CLB_2	0.167	24	0.081	0.940	24	0.160
	TA_2	0.146	24	0.200[*]	0.919	24	0.055
	SELP_2	0.130	24	0.200[*]	0.921	24	0.061
	TV_2	0.146	24	0.200[*]	0.925	24	0.076
	MessageG	0.165	24	0.091	0.942	24	0.185
	MessageM	0.137	24	0.200[*]	0.964	24	0.516
	MessageH	0.173	24	0.063	0.921	24	0.061
	Grade	0.139	24	0.200[*]	0.939	24	0.151
	LMS use	0.124	24	0.200[*]	0.927	24	0.083
Control	IGO_1	0.092	25	0.200[*]	0.957	25	0.362
	TA_1	0.113	25	0.200[*]	0.978	25	0.843
	SELP_1	0.126	25	0.200[*]	0.961	25	0.442
	CLB_1	0.156	25	0.120	0.958	25	0.368
	TV_1	0.117	25	0.200[*]	0.970	25	0.652
	IGO_2	0.122	25	0.200[*]	0.960	25	0.407
	CLB_2	0.107	25	0.200[*]	0.967	25	0.572
	TA_2	0.103	25	0.200[*]	0.949	25	0.235
	SELP_2	0.108	25	0.200[*]	0.959	25	0.390
	TV_2	0.096	25	0.200[*]	0.981	25	0.898
	MessageG	0.185	25	0.027	0.891	25	0.012
	MessageM	0.143	25	0.199	0.940	25	0.151
	MessageH	0.152	25	0.141	0.893	25	0.013
	Grade	0.146	25	0.178	0.878	25	0.006
	LMS use	0.119	25	0.200[*]	0.934	25	0.108
*. This is a lower bound of the true significance.							
a. Lilliefors Significance Correction							

Appendix L- Levene's Test Results

Online group data

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
IGO_1	0.527	1	54	0.471
TA_1	0.743	1	54	0.392
SELP_1	2.945	1	54	0.092
CLB_1	0.317	1	54	0.576
TV_1	1.011	1	54	0.319
IGO_2	0.057	1	54	0.811
CLB_2	0.003	1	54	0.958
TA_2	1.096	1	54	0.300
SELP_2	1.116	1	54	0.295
TV_2	1.271	1	54	0.265
MessageG	0.066	1	54	0.798
MessageM	0.000	1	54	0.985
MessageH	1.635	1	54	0.206
Grade	0.003	1	54	0.953
TotalAccess	4.265	1	54	0.054

Blended group data

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
IGO_1	1.190	1	47	0.281
TA_1	0.335	1	47	0.566
SELP_1	0.988	1	47	0.325
CLB_1	0.133	1	47	0.717
TV_1	1.056	1	47	0.309
IGO_2	0.774	1	47	0.383
CLB_2	0.664	1	47	0.419
TA_2	0.293	1	47	0.591
SELP_2	3.057	1	47	0.087
TV_2	0.001	1	47	0.982
MessageG	9.459	1	47	0.003
MessageM	7.737	1	47	0.008
MessageH	3.582	1	47	0.065
Grade	2.822	1	47	0.100
TotalAccess	0.045	1	47	0.833

CURRICULUM VITAE

PERSONAL INFORMATION

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EDUCATION

Degree	Institution	Year of Graduation
Ph.D	METU, Information Systems	2015
MS	METU, Information Systems	2010
BS	METU, Computer Education and Instructional Technologies	2007
High School	Manisa Anatolian Vocational High School	2001

WORK EXPERIENCE

Year	Place	Enrollment
2007-Present	METU, Informatics Institute, Ankara Turkey	Research Assistant
2015	Rehber Consulting, Ankara Turkey	ARIS Modeler
2014-2015	METU, Informatics Institute, Ankara, Turkey	Organizing Committee Member, NATO Cyber Defence Training Courses
2010-2011	METU, Informatics Institute, Ankara, Turkey	Researcher, TÜBİTAK (The Scientific & Technological Research Council of Turkey) 1001 Research Project
2005-2007	METU, Computer Center, Ankara, Turkey	Student Assistant, User Support Group
2006	METU College, Ankara, Turkey	Intern Teacher

FOREIGN LANGUAGES
Advanced English

PUBLICATIONS

1. Alkış N. and Temizel T. T. The Impact of Individual Differences on Influence Strategies, Personality and Individual Differences, 87, 147-152 (2015).

2. Alkış N, Coşkunçay D. F. and Yıldırım S. Ö. E-Öğrenme Bağlamında Teknoloji Kabul Modelinin Sistematik İncelenmesi, YAEM 2015, Ankara, Turkey, 2015. Coşkunçay D. F., Alkış N. and Yıldırım S. Ö. Öğrenme Yönetim Sistemlerininin Kullanmasını Etkileyen Faktörlerin Belirlenmesi: Teknoloji Kabul Modeli Yaklaşımı, YAEM 2015, Ankara, Turkey, 2015.

3. Alkış N., Coşkuncay D. F. and Yıldırım S. Ö. A Systematic Review of Technology Acceptance Model in e-Learning Context. In Proceedings of the XV International Conference on Human Computer Interaction, Tenerife, Spain, 2014.

4. Alkış N. and Temizel T. T. How to Persuade Students for Active Participation in Course Activities?: A Qualitative Study, Persuasive 2014, Padua, Italy, 2014.

5. Özkan S., Alaşehir O., Alkış N, Çakır M, Çetin Y., Fındık D, Kanat İ. E. and Sezgin E. Kullanıcı Teknoloji Benimseme Faktörleri: Yapısal Eşitlik Modeli Yaklaşımı ile Farklı Bağlamlarda Ampirik İncelemeler. 31. Ulusal Yöneylem Arastirmasi ve Endustri Mühendisligi Kongresi YAEM 2011, Sakarya, Turkey, 2011

6. Alkış N. and Özkan S. Work in Progress – A Modified Technology Acceptance Model for E-Assessment: Intentions of Engineering Students to Use Web-Based Assessment Tools. Frontiers in Education ConferenceFIE, Washington DC, USA, 2010

7. Fındık D., Alkış N. and Özkan S. The Usage of WEB2.0 Tools in Learning Management Systems from the Perspective of Instructors in Turkey. European Conference on Educational Research , Helsinki, Finland, 2010

8. Özkan S., Alaşehir O., Alkış N, Çakır M, Çetin Y., Fındık D, Kanat İ. E. and Sezgin E. Factors Influencing Users' Adoption of Technology: Empirical Investigations in Different Contexts Using Structural Equation Modeling Approach. 24th European Conference on Operations Research, EURO2010, Lisbon, Portugal, 2010

9. Özkan S., Alaşehir O., Alkış N, Çakır M, Çetin Y., Fındık D, Kanat İ. E. and Sezgin E. Kullanıcı Teknoloji Benimseme Faktörleri: Yapısal Eşitlik Modeli Yaklaşımı ile Farklı Bağlamlarda Ampirik İncelemeler. 30. Ulusal Yöneylem Arastirmasi ve Endustri Mühendisligi Kongresi YAEM 2010, İstanbul, Turkey